

**Increase in size of containment cell and changes to
removal of drainage outfalls at McCabe St,
Mosman Park (Assessment 993)**

Landcorp and Octennial Holdings Pty Ltd

Proposed changes to Environmental Conditions

**Report and recommendations
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia
Bulletin 807
February, 1996**

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's report.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding Environmental Conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of \$10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6005

CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm on 22 February 1996.

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Assessment No. 993

Contents

	Page
Summary	i
1. Introduction and background	1
1.1 Purpose of this report	1
1.2 Background	1
2. The proposal	3
3. Environmental Protection Authority Review Committee	3
4. Environmental impact assessment method	6
5. Evaluation	7
5.1 Containment cell expansion	7
5.2 Treatment of existing drainage outfalls	8
<hr/>	
6. Conclusions and recommendations	8
7. Recommended environmental conditions	11
8. References	18
Figures	
1.1 Location of containment cell at McCabe Street, Mosman Park	2
1.2 Original containment cell design	4
1.3 Extended containment cell design	5
Appendices	
1. Statement of Conditions of Approval, 1 February 1994	
2. EPA Review Committee Terms of Reference	
3. EPA Review Committee Report to EPA	
4. List of submitters	
5. Summary of Submissions and Proponents' Response to Submissions	

Summary

The Environmental Protection Authority herein reports on the environmental assessment of the proposed modification to Landcorp and Octennial Holdings Pty Ltd's proposal to place contaminated materials into an enlarged portion of an engineered containment cell located on-site at McCabe Street in Mosman Park (Figure 1.1). The proponent wishes to increase the size of the containment cell and to amend environmental conditions relating to removal of drainage outfalls at the site. To accommodate any approval of these modifications to the original proposal, the Minister for the Environment's Statement of Approval of 1 February 1994 would need to be amended.

The Minister for the Environment requested the Authority to assess the proposed changes under the provisions of Section 46 of the *Environmental Protection Act, 1986*.

Implementation of the clean-up proposal to date has resulted in the identification of the need to increase the available volume of the original containment cell shown in Figure 1.2. The principal reasons for this change are:

1. an increase in the volume of limestone material affected by acid leaching beneath the Western Plant Area;
2. adjustment to the containment cell dimensions to allow for the retention of mature trees along the McCabe Street boundary of the site in the vicinity of the cell; and
3. minor changes to cell design.

During the detailed design process following release of the 1994 Ministerial Statement, the proponent received a request from the Swan River Trust to not disturb the immediate foreshore any more than necessary during implementation of the clean-up operations. As a consequence, the proponent is now seeking to amend Proponent Commitment 9 relating to removal of all drainage outfalls and is proposing to remove only parts of the drainage structure so as to avoid mobilisation of soil and vegetation near the riverbank.

This assessment advises on the environmental acceptability of the proposed expansion of the containment cell and on the proposed changes to Proponent Commitment 9. Original approval for on-site containment at McCabe Street was given by the Minister for the Environment in February 1994.

To assist the Authority in assessing the proposed changes, it sought the advice of specialist government agencies and established an independent Review Committee to report on issues relating to the containment cell expansion. The Review Committee has allowed for the Authority to obtain further direct community input, and gain a wide range of expert technical advice.

Public input to this assessment process was provided for through a two week submission period and by the Review Committee holding a public meeting which allowed for the community to provide its comments on the proposal direct to the Review Committee members.

The Review Committee advised the Environmental Protection Authority that it believed that the proposed expansion could be made environmentally acceptable subject to changes to improve containment and an expanded monitoring system to assess the performance of the cell.

The Environmental Protection Authority in examining the Review Committee's report and following consideration of public and government agency submissions has concluded that the proposal to increase the size of the containment cell by 20% is environmentally acceptable. This conclusion is based largely on the recognition that the proposed modifications do not change the technical basis of the proposal. The containment cell concept is amended only by an increase in size; there is no consequential reduction in the efficiency or effectiveness of the cell.

Notwithstanding the above, the Environmental Protection Authority recognises the heightened perceived risk associated with on-site disposal of contaminated materials by the public and brings this issue to the attention of Government. The Environmental Protection Authority concludes that Government should undertake steps to identify suitable sites within close

proximity to the metropolitan area that could receive and/or treat contaminated waste material in an environmentally acceptable manner. The Environmental Protection Authority also concludes that the Government should put in place mechanisms for regulation and future disposal of contaminated materials.

The Environmental Protection Authority concludes that Government should examine options for dealing with contaminated material in the foreshore area.

The Environmental Protection Authority also concludes that the proposed change to Proponent Commitment 9 is environmentally acceptable. It is considered that the proposed treatment of the existing outfalls, while a change from the approach outlined in the proponents' 1993 Consultative Environmental Review, will achieve the same objective, specifically, the cessation of discharge to the river.

The public and the Review Committee have raised several issues beyond the scope of this assessment, or the terms of reference of the Review Committee, with which the Environmental Protection Authority agrees. These recommendations are included in the summary below.

SUMMARY OF RECOMMENDATIONS	
1	The Environmental Protection Authority recommends adoption of Environmental Conditions contained within Section 7 of this bulletin. The bulletin assesses the increase in size of the containment cell and the change to environmental conditions relating to the removal of drainage outfalls at the site. These conditions are to apply in conjunction with the existing environmental conditions (Ministerial Conditions for the Clean-up of the Contaminated Site at McCabe Street, Mosman Park, issued on 1 February 1994).
2	The Environmental Protection Authority recommends that the Environmental Conditions for this project include the following: <ul style="list-style-type: none"> a) Upon deposition, contaminated material should be managed in a manner that will reduce the incidence of specific material of high concentration of heavy metals, or similar material being localised within the containment cell. b) Selection of the materials for the construction of the cap and cover of soil shall ensure that the moisture content within the clay is maintained at a level to avoid cracking and to minimise the quantities of water entering the contaminated materials within the containment cell. c) In the event of excess space being available within the containment cell, the upper surface of the clay layer should lie at a depth of at least 0.65 metres below the finished surface and at most 2.00 metres below the finished surface. Notwithstanding this, every effort should be made to increase the depth of the soil cover so as to minimise ongoing management needs.

<p>2 (Cont'd)</p>	<p>d) A management plan for the use of the land over the clay cap should be prepared in association with the Department of Land Administration and the Town of Mosman Park to ensure that land uses are compatible with the need to maintain the integrity of the clay cap.</p> <p>e) The design of the cell and its cap should incorporate mechanisms to manage the drainage and prevent erosion in the long term.</p> <p>f) The capping over the proposed extension and the approved cell should be continuous.</p> <p>g) The proponent should provide to the Department of Environmental Protection, the Town of Mosman Park, and the Department of Lands Administration, an "as constructed" drawing of the containment cell, indicating the location and details of all material placed in the cell.</p> <p>h) An appropriate monitoring system to measure settlement and moisture content within the cap and the contaminated material shall be prepared together with a management plan to deal with any irregularities should they occur.</p> <p>i) Additional bore(s) should be constructed to monitor groundwater downstream from the containment cell. The number and location of the bores should be adequate to monitor any possible contamination of the groundwater.</p> <p>j) The proponent should provide a contingency plan for dealing with possible contamination of groundwater to the satisfaction of the Minister for the Environment on advice from the Environmental Protection Authority.</p> <p>k) Contingency plans should be prepared by the proponent to address the management of any additional material which is found at the site.</p>
<p>3</p>	<p>These management requirements of Recommendation 2 should be implemented to the satisfaction of the Environmental Protection Authority unless otherwise stated.</p>

RECOMMENDATIONS BEYOND TERMS OF REFERENCE FOR THIS ASSESSMENT

<p>4</p>	<p>Dust control measures should be reviewed by the proponent, and an improved programme submitted to the Department of Environmental Protection for approval to ensure that site works be programmed wherever possible so as to minimise the generation of dust. This reviewed programme should include any special health issues.</p>
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5	<p>The Environmental Protection Authority recommends that the Town of Mosman Park, the Ministry for Planning and the Department of Lands Administration public plans and files should be marked to clearly show the existence and extent of the containment cell and that activities or developments on this land need specific approval which should take into account the long term integrity of the cell.</p> <p>Copies of the plan showing the location of the containment cell should be provided to servicing utilities such as the Town of Mosman Park, Telstra, Optus, Water Corporation, Alinta Gas and Western Power together with a requirement advising them to seek approval/advice from the Department of Lands Administration before undertaking any works over or adjacent to the cell.</p>
6	<p>Recognising that there are several other contaminated sites within the metropolitan area and the public perception of on-site containment of contaminated materials within urban areas, the Environmental Protection Authority recommends to Government that it should consider steps to identify suitable sites within a reasonable distance of the metropolitan area that could receive and/or treat contaminated waste material in an environmentally acceptable manner.</p>
7	<p>The Environmental Protection Authority recommends to Government that it should review and implement mechanisms for the regulation and disposal of contaminated material.</p>
8	<p>The Environmental Protection Authority recommends to Government that investigations to identify options for dealing with contaminated material on the river foreshore and other public land not covered by this assessment be undertaken, and decisions made regarding the most appropriate course of action.</p>

1. Introduction and background

1.1 Purpose of this report

On 6 December 1995, the Minister for the Environment requested the Environmental Protection Authority, under Section 46 of the *Environmental Protection Act, 1986*, to report to him on the proposed changes to the Environmental Conditions for the clean-up of the contaminated site project at McCabe Street in Mosman Park (Figure 1.1). The amendments to the conditions are required as a result of a proposal by Landcorp and Octennial Holdings Pty Ltd to increase the size of the containment cell and to amend the Environmental Condition relating to the removal of drainage outfalls at the site.

This report and recommendations provides the Environmental Protection Authority's advice to the Minister for the Environment on the environmental acceptability of the proposed changes.

1.1 Background

In November 1987, the Environmental Protection Authority found acceptable Landcorp's (then known as Landbank) proposal to clean-up the McCabe Street site by consolidating the material on site and removing an amount of lead contaminated soil. However, at that time the Town of Mosman Park determined that it would not support the proposal because it did not include total removal of all contaminants from the site. This situation resulted in environmental conditions not being finalised by the Minister for the Environment.

In September 1992, the Environmental Protection Authority agreed to the release for public comment of a second proposal to clean-up the site. This time, Octennial Holdings Pty Ltd proposed to clean-up the site to render it suitable for future residential development. The excavated material was proposed to be disposed of to a secure landfill at the Shire of Williams sanitary landfill site. The Environmental Protection Authority did not report on this proposal as the Shire of Williams withdrew its support for the proposal and Octennial Holdings was unable to locate an alternative acceptable landfill.

In February 1994 proponents, Landcorp and Octennial Holdings Pty Ltd received approval from the Minister for the Environment to collect waste and contaminated soils from around the site and place them into a capped and engineered containment cell to be constructed on-site at McCabe Street in Mosman Park. The above proposal was assessed by the Environmental Protection Authority at the level of Consultative Environmental Review.

The key environmental issues associated with the above proposal were identified as:

- the potential for contamination of groundwater;
- the potential for contamination of the Swan River through export of contaminants;
- the long term management of the underground containment cell;
- the generation of wind-blown dust; and
- noise and vibration impacts.

The environmental conditions applied to the latest proposal addressed the management of the above issues. A copy of the Minister's Statement of Environmental Conditions in 1994 is included in Appendix 1.

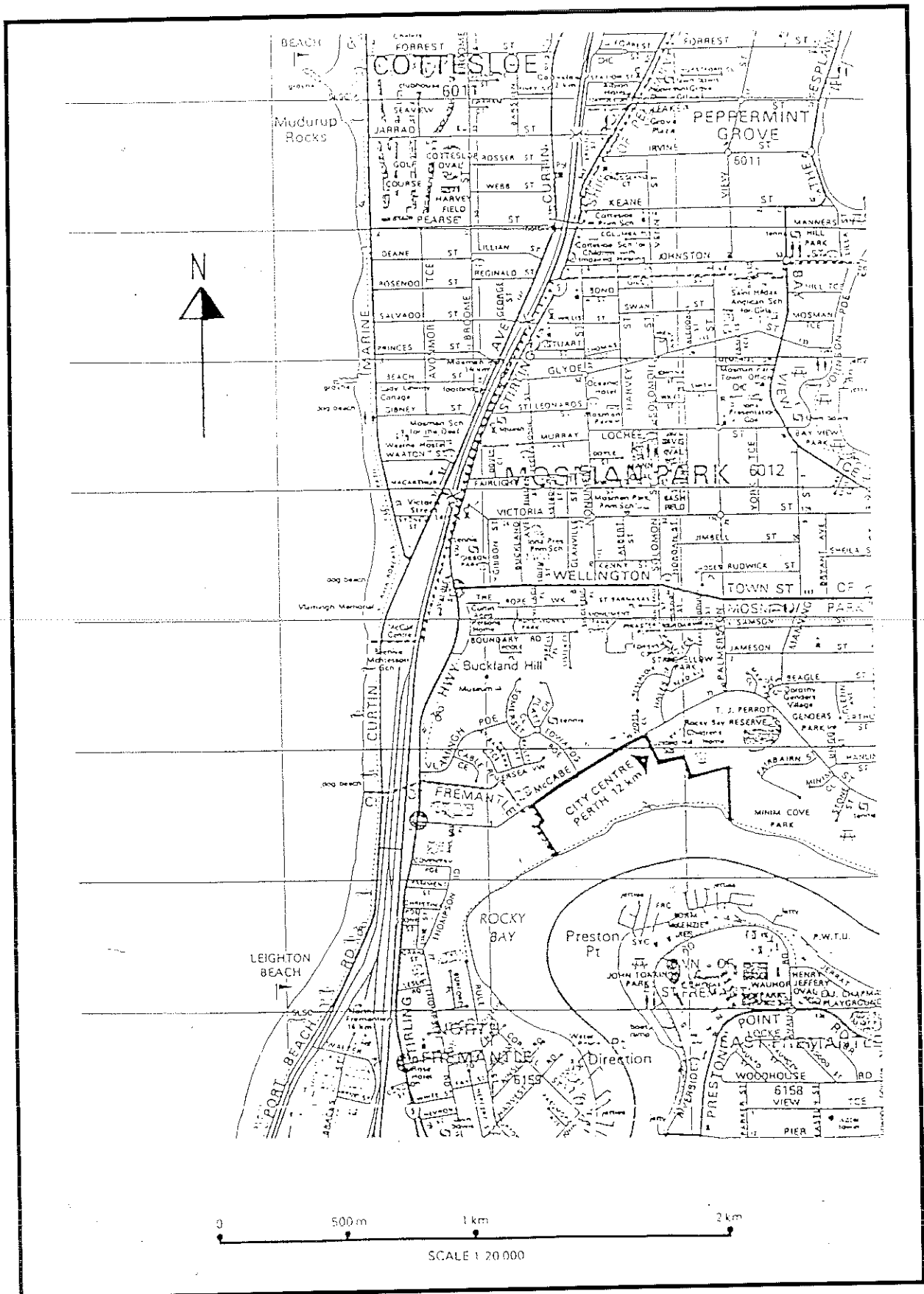


Figure 1.1 Location of the contaminated site at McCabe Street, Mosman Park.

In accordance with Environmental Condition 3 of that statement, the proponent prepared an Environmental Management Programme (EMP) which included details on the design of the containment cell as well as measures to monitor and manage environmental impacts (eg dust, noise and vibration) during the clean-up operation. Following advice from the Environmental Protection Authority, the EMP was approved by the Minister for the Environment on 8 August 1995 whereupon clean-up operations commenced in accordance with the approved EMP.

2. The proposal

Increase in size of containment cell

Implementation of the clean-up proposal to date has resulted in the need to increase the available volume within the original containment cell shown in Figure 1.2. The principal reasons for this change are:

- an increase in the volume of limestone material affected by acid leaching beneath the Western Plant Area resulting in an additional 16,000m³ of material requiring relocation into the cell;
- adjustment to the containment cell dimensions to allow for the retention of mature trees along the McCabe Street boundary of the site in the vicinity of the cell resulting in a reduction in the original cell volume by 3,500m³; and
- minor changes to the design of the slopes of the containment cell wall resulting in a reduction in cell volume by 4,810m³.

Figure 1.3 illustrates the proposed increase in the containment cell dimensions. The increase in size of the containment cell sought by the proponent will result in a total excavated volume of 277,000m³. A total excavated volume of 233,150m³ was originally proposed in 1993.

The proponents' Section 46 document - "Notice of Intent to Increase the size of the Industrial Waste Containment Cell" provides a more detailed description of the proposal to increase the size of the cell as well as the estimates of the amounts of materials requiring placement into the cell.

Changes to treatment of drainage outfalls

Proponent commitment 9 contained in the statement of approval for the previous proposal (Appendix 1), requires the proponents to remove all existing drainage outfalls to the Swan River in order to prevent stormwater discharge directly entering the Swan River. The proponents are seeking to remove only sections of the structures to reduce the potential for disturbance of surrounding soil and vegetation around some of the existing drainage structures.

The proponents' Section 46 document provides more detail on the proposed treatment of drainage outfalls.

3. Environmental Protection Authority Review Committee

The Environmental Protection Authority sought the advice of an independent Review Committee on issues relating to the containment cell expansion. Members were chosen from a wide ranging background. The Review Committee consisted of four technical experts from the fields of chemistry, water resource protection, engineering and natural resource management, a representative of the Town of Mosman Park and two representatives of the local community. The Review Committee members and their Terms of Reference are provided in Appendix 2.

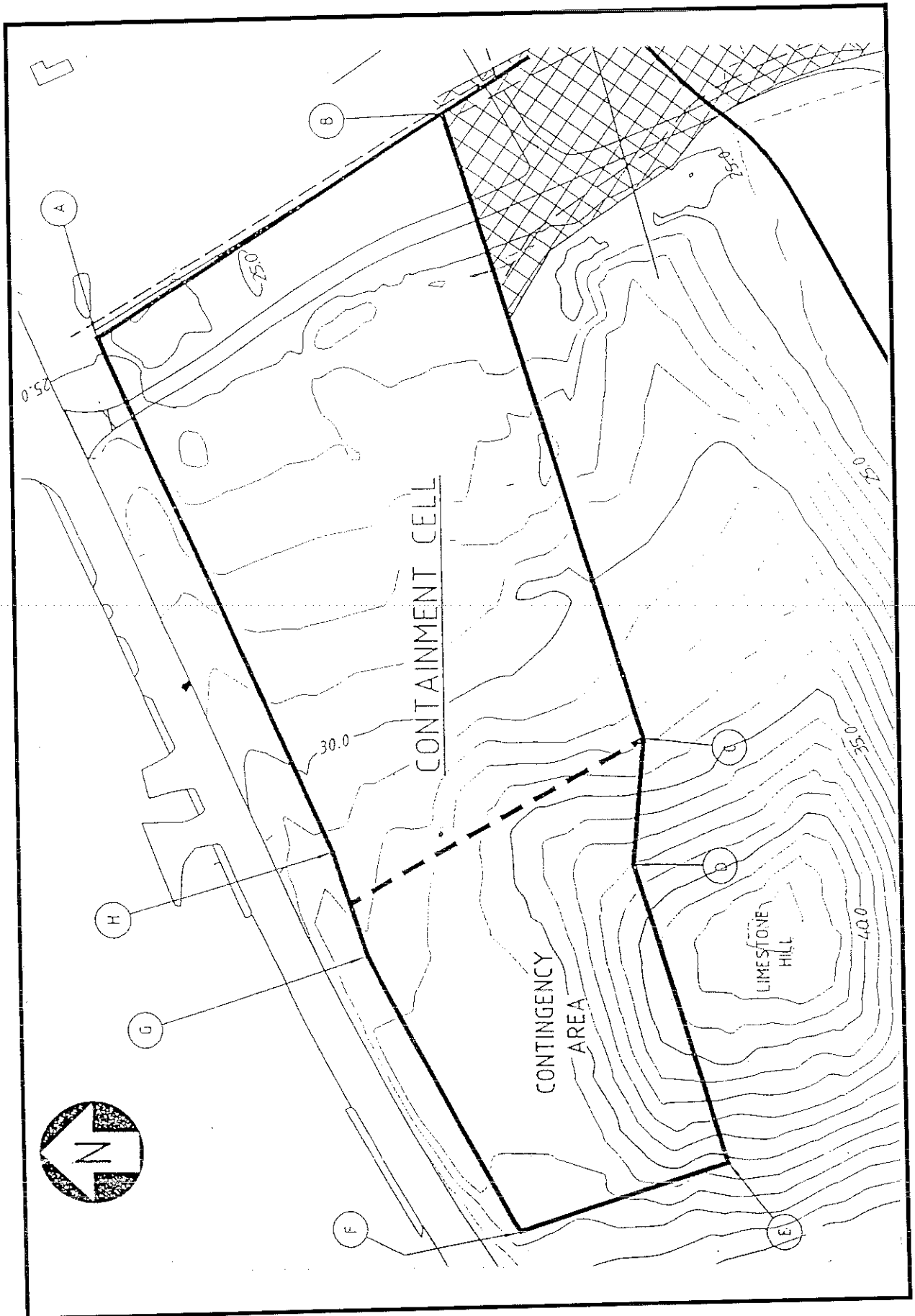


Figure 1.2. Original containment cell design

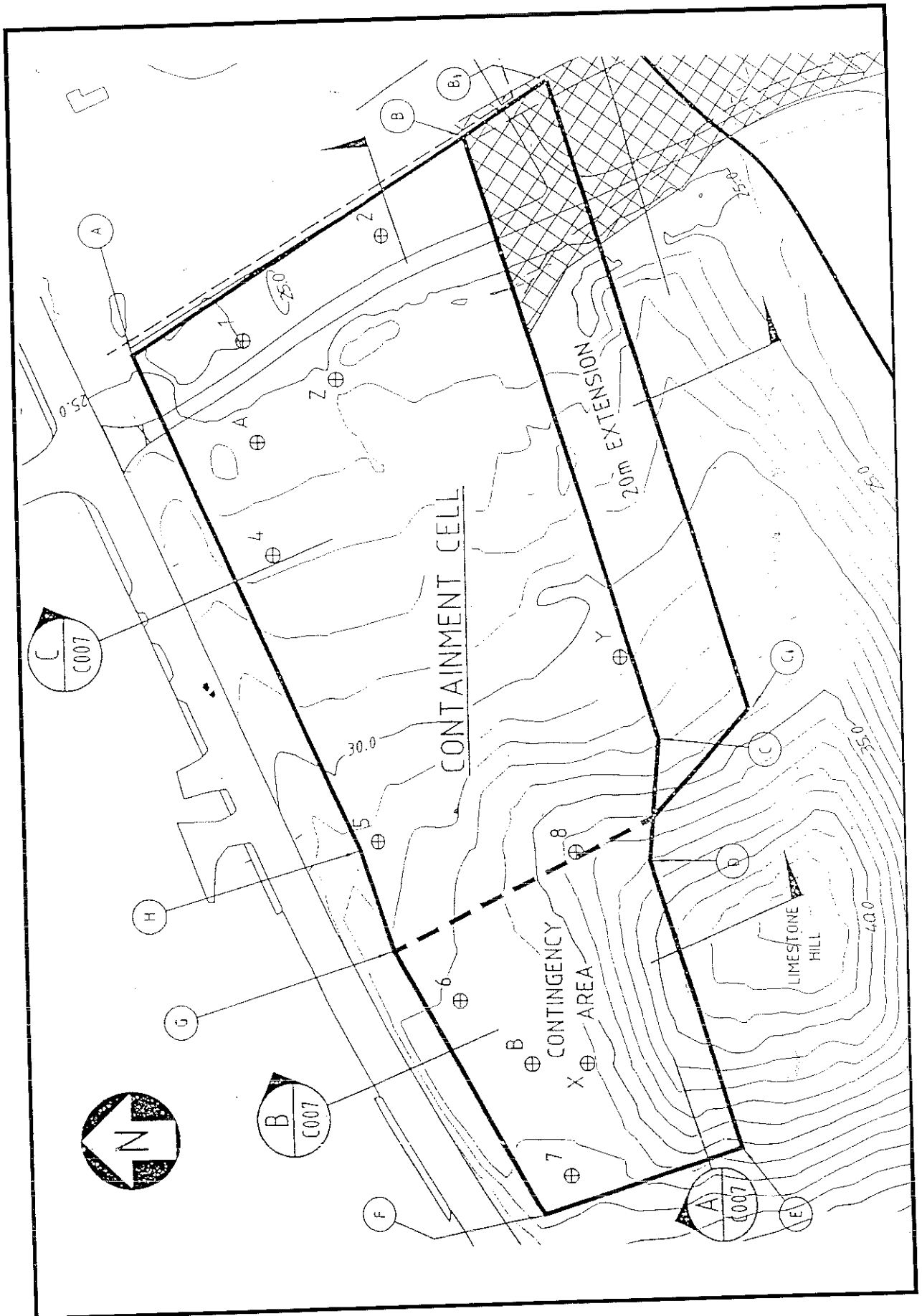


Figure 1.3. Extended containment cell design

The Review Committee met on four separate occasions between 10 January 1996 and 25 January 1996. A public meeting was held at "Memorial Hall" in Mosman Park on Friday 19 January 1996 so that the Review Committee could receive comments directly from the public on the cell expansion proposal. Approximately 80 people attended this meeting.

The Review Committee took into account the issues raised at that meeting as well as public submissions received during the two week public review period. The Review Committee submitted its final report and recommendations to the Environmental Protection Authority on Monday 29 January 1996. A copy of the Review Committee's report is provided in Appendix 3.

4. Environmental Impact Assessment Method

Upon receiving Landcorp and Octennial Holdings Pty Ltd's request to amend the clean-up of the contaminated site project at McCabe Street in Mosman Park, the Minister for the Environment requested the Environmental Protection Authority to report to him on the effect of the proposed changes on the 1994 Statement of Conditions.

The proposed changes to the size of the containment cell and the changes to conditions relating to the treatment of drainage outfalls are discussed in the proponents' Section 46 document - "Notice of Intent to Increase the size of the Industrial Waste Containment Cell". Environmental issues involved with the above are detailed in that document and include the following:

- Dust generation.
- Control of leaching.
- Protection of groundwater.
- Leachate neutralisation.
- Gas generation.
- Long term security of the cell and the material within.
- Groundwater contamination.
- Monitoring.
- Contingency planning.
- Stormwater discharge to the Swan River.

The proponents' Section 46 document was released for a two week public review period. A total of 19 submissions were received; 5 from state and local government agencies, 4 from community groups and 10 from members of the public. A list of submitters is provided in Appendix 4 and the proponents' response to issues raised during the submission period is provided in Appendix 5.

The main concerns raised in submissions and during the public meeting held on the 19 January 1996 related to the following:

1. The need to consider off-site disposal of the contaminated materials.
2. The potential impacts on groundwater and the Swan River due to the export of contaminants from the cell and the expansion.
3. The impacts of dust, noise and vibration due to works on-site.
4. The implications of recent testing at the foreshore and the need to clean-up this area.

In assessing the proposed changes, the Environmental Protection Authority took into account the following:

- Information provided in the proponents' Section 46 document - "Notice of Intent to Increase the size of the Industrial Waste Containment Cell".
- The report and recommendations of the Environmental Protection Authority Review Committee.
- The principal issues raised during the public review period from the community and government agencies, and at the public meeting of 19 January 1996.
- The proponents' response to issues raised during the review period.

5. Evaluation

5.1 Containment cell expansion

Based on the information provided from the above mentioned sources, the Environmental Protection Authority has concluded that, with regard to the increase in size of the containment cell, the principal environmental issues of concern are consistent with those that were assessed during the Environmental Protection Authority's previous assessment of 1993. These issues have been identified in the previous section.

The Environmental Protection Authority, after consultation with specialist Government departments and in consideration of advice of the Environmental Protection Authority Review Committee (Appendix 3), has concluded that:

- the quantities of materials detailed in the proponents' Section 46 document represent a best estimate of the amount of contaminated material at the site;
- the dimensions of the contaminated cell are adequate to contain the materials estimated by the proponent;
- subject to the proponent addressing the Review Committee's comments in relation to the design, construction and maintenance of the containment cell clay cap, the placement of material in the cell, and the ongoing management of the cell, the Environmental Protection Authority considers that there is a low potential for chemical reactions producing large volumes of leachate contaminated with metals to occur;
- the proponent should address the issues raised by the Review Committee in relation to monitoring of the cell and the clay cap, as well as the need for additional monitoring bore(s) to monitor groundwater; and
- the Environmental Protection Authority concludes that further information on contingency plans in relation to response to groundwater degradation should be provided by the proponent.

In relation to the issue of impacts from dust, noise and vibration generated from on-site activities, the Environmental Protection Authority notes that the proponents' existing requirements to address these issues are stringent. Nevertheless, the Environmental Protection Authority is aware that there has been a high level of public concern in relation to these issues. Accordingly, the Environmental Protection Authority concurs with the Review Committee's comments in relation to the need for the proponents to review and improve existing measures to address these issues.

Technical risk and perceived risk

Although it falls outside of the guidelines for the Review Committee, the Environmental Protection Authority notes the comments of the Committee in relation to the removal of contaminated material from the McCabe Street site.

Public sentiment, as demonstrated by the detail of submissions provided both orally to the Review Committee and in written submissions to the Environmental Protection Authority, indicates that there is a philosophical opposition to having residential development on or immediately adjacent to contaminated land. Although the technical risk associated with such a proposal is addressed through the engineering of the containment cell, the commitment to a rigorous monitoring and maintenance programme, and a contingency plan to pump the aquifer should contamination of groundwater be detected, this does not address the perceived risk within the community as a consequence of such a proposal.

It is clearly the community's preference that contaminated material should be removed to a remote landfill identified for that purpose, or an appropriate treatment facility.

The Environmental Protection Authority recognises the heightened public perceived risk associated with the possible contamination of groundwater and the river foreshore, leading to

concern about long term public health. Accordingly, the Environmental Protection Authority brings this issue to the attention of Government.

The Environmental Protection Authority considers that Government should undertake steps to identify suitable sites that could receive and/or treat contaminated waste material in an environmentally acceptable manner. The disposal sites are needed to accept and/or treat material from other contaminated sites, for example Tonkin Park (EPA Bulletin 397, 1989 and EPA Bulletin 588, 1991), and East Perth Gas Works site (EPA Bulletin 651, 1992), and other sites which may be identified in the future. The disposal sites should be within close proximity to the Perth metropolitan area.

Options that could be considered to address the above include the use of mining industry tailings dams which are designed to accept processed materials, and be capable of accepting materials from contaminated sites.

Further, it is considered that the Government should put in place mechanisms for regulation and future disposal of contaminated materials.

Foreshore de-contamination

The Environmental Protection Authority is aware that the proponents' original proposal in 1993 and the current modification to the original proposal has not addressed clean-up of the foreshore and cycleway, as it is outside the development site. In the light of recent test results from these areas, and based on comments from the Review Committee, the Environmental Protection Authority considers that the extent and source of pollution needs to be determined and a management plan prepared for its clean-up should this be necessary.

The Environmental Protection Authority recommends that investigations regarding options for dealing with the material (including funding arrangements), should be undertaken and responsible government agencies determined.

5.2 Treatment of existing drainage outfalls

With regard to the proposed treatment of the existing drainage outfalls, the Environmental Protection Authority sought advice from the Swan River Trust and the Department of Environmental Protection. The advice provided suggests that the removal of structures under the cycleway and into the riverbank would greatly disturb the surrounding soil and vegetation. Accordingly, the proposed treatment is considered to be acceptable as it will achieve the same objective — the cessation of discharge to the river.

Notwithstanding the above, should testing undertaken on the foreshore area indicate that clean-up of the foreshore is required, the Environmental Protection Authority considers that the proposed treatment of the drainage outfalls may then require review.

6. Conclusions and recommendations

The Environmental Protection Authority concludes that the proposal by Landcorp and Octennial Holdings Pty Ltd to increase the size of the containment cell and to amend environmental conditions relating to the removal of drainage outfalls at the site is environmentally acceptable. Existing environmental conditions (Ministerial Conditions for the Clean-up of the Contaminated Site at McCabe Street, Mosman Park, issued on 1 February 1994) 5-1 to 5-6 are recommended to be replaced by the recommendations 1 to 3 below, the proponents' commitments arising from this assessment and the following recommendations from both within and outside the terms of reference of this assessment.

Recommendation 1

The Environmental Protection Authority recommends adoption of Environmental Conditions contained within Section 7 of this bulletin. The bulletin assesses the increase in size of the containment cell and the change to environmental conditions relating to the removal of drainage outfalls at the site. These conditions are to apply in conjunction with the existing environmental conditions (Ministerial Conditions for the Clean-up of the Contaminated Site at McCabe Street, Mosman Park, issued on 1 February 1994) and the proponents' commitments arising from this assessment.

Recommendation 2

The Environmental Protection Authority recommends that the Environmental Conditions for this project include the following:

- a) Upon deposition, contaminated material should be managed in a manner that will reduce the incidence of specific material of high concentration of heavy metals, or similar material being localised within the containment cell.
- b) Selection of the materials for the construction of the cap and cover of soil shall ensure that the moisture content within the clay is maintained at a level to avoid cracking and to minimise the quantities of water entering the contaminated materials within the containment cell.
- c) In the event of excess space being available within the containment cell, the upper surface of the clay layer should lie at a depth of at least 0.65 metres below the finished surface and at most 2.00 metres below the finished surface. Notwithstanding this, every effort should be made to increase the depth of the soil cover so as to minimise ongoing management needs.
- d) A management plan for the use of the land over the clay cap should be prepared in association with the Department of Land Administration and the Town of Mosman Park to ensure that land uses are compatible with the need to maintain the integrity of the clay cap.
- e) The design of the cell and its cap should incorporate mechanisms to manage the drainage and prevent erosion in the long term.
- f) The capping over the proposed extension and the approved cell should be continuous.
- g) The proponent should provide to the Department of Environmental Protection, the Town of Mosman Park, and the Department of Lands Administration, an "as constructed" drawing of the containment cell, indicating the location and details of all material placed in the cell.
- h) An appropriate monitoring system to measure settlement and moisture content within the cap and the contaminated material shall be prepared together with a management plan to deal with any irregularities should they occur.
- i) Additional bore(s) should be constructed to monitor groundwater downstream from the containment cell. The number and location of the bores should be adequate to monitor any possible contamination of the groundwater.

- j) The proponent should provide a contingency plan for dealing with possible contamination of groundwater to the satisfaction of the Minister for the Environment on advice from the Environmental Protection Authority.
- k) Contingency plans should be prepared by the proponent to address the management of any additional material which is found at the site.

Recommendation 3

These management requirements of Recommendation 2 should be implemented to the satisfaction of the Environmental Protection Authority unless otherwise stated.

RECOMMENDATIONS BEYOND TERMS OF REFERENCE FOR THIS ASSESSMENT

Recommendation 4

Dust control measures should be reviewed by the proponent, and an improved programme submitted to the Department of Environmental Protection for approval to ensure that site works be programmed wherever possible so as to minimise the generation of dust. This reviewed programme should include any special health issues.

Recommendation 5

The Environmental Protection Authority recommends that the Town of Mosman Park, the Ministry for Planning and the Department of Lands Administration public plans and files should be marked to clearly show the existence and extent of the containment cell and that activities or developments on this land need specific approval which should take into account the long term integrity of the cell.

Copies of the plan showing the location of the containment cell should be provided to servicing utilities such as the Town of Mosman Park, Telstra, Optus, Water Corporation, Alinta Gas and Western Power together with a requirement advising them to seek approval/advice from the Department of Lands Administration before undertaking any works over or adjacent to the cell.

Recommendation 6

Recognising that there are several other contaminated sites within the metropolitan area and the public perception of on-site containment of contaminated materials within urban areas, the Environmental Protection Authority recommends to Government that it should consider steps to identify suitable sites within a reasonable distance to the metropolitan area that could receive and/or treat contaminated waste material in an environmentally acceptable manner.

Recommendation 7

The Environmental Protection Authority recommends to Government that it should review and implement mechanisms for the regulation and disposal of contaminated material.

Recommendation 8

The Environmental Protection Authority recommends to Government that investigations to identify options for dealing with contaminated material on the river foreshore and other public land not covered by this assessment be undertaken, and decisions made regarding the most appropriate course of action.

7. Recommended environmental conditions

The recommended changes to the Minister for the Environment's statement of 1994 as a result of this assessment are detailed below.

The recommended conditions 5-1 to 5-9 would replace existing conditions 5-1 to 5-6 in the original Statement issued by the Minister for the Environment on 1 February 1994. Minor adjustments have been made to condition 1 to take into account the expansion of the containment cell, as well as the commitment made by the proponent which address the modifications to the treatment of drainage outfalls. In addition, procedure 3 is added to the existing procedures and addresses one of the management recommendations of the Environmental Protection Authority Review Committee (EPA recommendation 2(e)) which could not be imposed upon the proponent.

All the other conditions and commitments in the original statement of 1994 are substantially adequate and therefore there are no recommendations for their replacement or modification.

If the recommended changes are accepted by the Minister for the Environment, and subsequently following consultation with the other decision-making authorities for this proposal, these new conditions would also be applicable to the project, and would be legally binding on the proponent.

RECOMMENDED ENVIRONMENTAL CONDITIONS STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL (PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE ENVIRONMENTAL PROTECTION ACT 1986)

PROPOSAL: CLEAN-UP OF CONTAMINATED SITE
McCABE STREET, MOSMAN PARK (817 / 993)

CURRENT PROPONENT: LANDCORP AND OCTENNIAL HOLDINGS PTY
LTD

CONDITIONS SET ON: 1 FEBRUARY 1994

The following conditions replace conditions 1 and 5-1 to 5-6 in the Statement issued by the Minister for the Environment on 1 February 1994, and procedure 3 is added to the existing procedure:

1 Proponent Commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

- 1-1 In implementing the proposal (including the documented modifications of January 1996), the proponent shall fulfil the relevant environmental management commitments made in documentation on the increase in size of the containment cell in January 1996, and

reported on in Environmental Protection Authority Bulletin 807; in the Consultative Environmental Review (July 1993), and published in Environmental Protection Authority Bulletin 699, and in response to issues raised following public submissions; provided that the commitments are not inconsistent with the conditions or procedures contained in this statement.

A schedule of those environmental management commitments, including additional commitments made in connection with the increase in the size of the containment cell (January 1996), which will be audited by the Department of Environmental Protection was published in Environmental Protection Authority Bulletin 807 and a copy is attached.

5 Expanded Underground Containment Cell

- 5-1 Prior to any filling of the expanded containment cell, the proponent shall ensure that an agreement, acceptable to the Minister for the Environment on advice of the Environmental Protection Authority, regarding the long-term management of the expanded containment cell has been finalised with the Department of Land Administration.
- 5-2 The proponent shall design, construct and monitor the performance of the expanded containment cell to ensure that there is no unacceptable release of contaminants, in the opinion of the Minister for the Environment.
- 5-3 The proponent shall prepare the final design details of the expanded containment cell in consultation with the Environmental Protection Authority, the Town of Mosman Park, the Water and Rivers Commission of Western Australia, including the Geological Survey Division, to the requirements of the Minister for the Environment, on advice of the Environmental Protection Authority.

This design shall incorporate the principal findings of the Environmental Protection Authority Review Committee, as included in the design requirements in Attachment A.

- 5-4 The proponent shall construct the expanded containment cell to achieve the objectives of condition 5-2.
- 5-5 The proponent shall prepare the final monitoring programme for the expanded containment cell in consultation with the Environmental Protection Authority, the Town of Mosman Park, the Water and Rivers Commission of Western Australia, including the Geological Survey Division, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

This programme shall address but not be limited to the following:

- 1. The measurement of settlement and moisture content within the cap and the contaminated material, including a management plan to deal with any irregularities that may occur.
 - 2. Additional monitoring bores constructed to ensure that the groundwater downstream of the extension area is adequately monitored for release of contaminants from the cell.
 - 3. Review of dust control measures, and submission of an improved programme to the requirements of the Department of Environmental Protection to ensure that site works are programmed wherever possible to minimise the generation of dust. This reviewed programme to address any special health issues.
- 5-6 The proponent shall implement the monitoring programme required by condition 5-5 to achieve the objective of condition 5-2.

- 5-7 At the time of filling the expanded containment cell, the proponent shall deposit all material in a manner that will reduce the incidence of specific material of high concentration of heavy metals or similar being localised within the cell.
- 5-8 Within three months of the commencement of filling of the expanded containment cell, the proponent shall prepare a contingency plan to the requirements of the Minister for the Environment, on advice of the Environmental Protection Authority, to address but not be limited to the following:
- 1 contamination of the groundwater; and
 - 2 management of any additional material found at the site.
- 5-9 In the event that the monitoring programme required by condition 5-5 indicates that contamination of groundwater is occurring, the proponent shall immediately undertake appropriate measures, including those in the contingency plan referred to in condition 5-8, to address the environmental impacts, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Procedure

- 3 Within three months of the completion of filling of the containment cell, the Department of Land Administration will prepare a management plan for the use of the land over the clay cap in association with the Town of Mosman Park to ensure that land uses are compatible with the need to maintain the integrity of the clay cap.

ATTACHMENT A

Design Requirements For the Expanded Containment Cell

- 1. Selection of the materials for the construction of the cap and cover of soil, shall ensure that the moisture content within the clay is maintained at a level to avoid cracking and to minimise the quantities of water entering the contaminated materials.**
- 2. In the event of excess space being available within the containment cell, the upper surface of the clay layer must lie at a depth of at least 0.65 metres below the finished surface and at most 2.00 metres below the finished surface. Notwithstanding this, every effort should be made to increase the depth of the soil cover so as to minimise ongoing management needs.**
- 3. The design of the cell and its cap should incorporate mechanisms to manage the drainage and prevent erosion in the long term.**
- 4. The capping over the proposed extension and the approved cell should be continuous.**
- 5. The proponent should provide to the Department of Environmental Protection (and to the Town of Mosman Park and the Department of Lands Administration), an "as constructed" drawing of the containment cell, showing the location and details of all material placed in the cell.**

Amended Environmental Management Commitments

**CLEAN-UP OF CONTAMINATED SITE
McCABE STREET, MOSMAN PARK (817/993)**

Landcorp and Octennial Holdings Pty Ltd

The proponent has made the following environmental management commitments:

Clean-up Phase

Proponents: Landcorp and Octennial Holdings Pty Ltd

The joint Proponents make the following commitments in respect of the clean-up of contamination from the McCabe Street site:

1. Any activity pertaining to the clean-up undertaken on the McCabe Street site will comply with all legislative requirements.
2. The site clean-up will excavate and remove all pyrite cinders from the three dump areas (the western cinders dump, the pyrite slurry dump and the embankment cinders dump), the foundry waste dump, contaminated surface soils from the two areas around the former acid plants that have been identified as having high lead levels, and any discrete pockets of contaminated topsoils that occur elsewhere on the site.
3. During the placement of material into the containment cell, contaminated fill will be layered to maximise the retention of residual contaminants in accordance with best practice as indicated in column and leach testing.
4. The effectiveness of the site clean-up will be confirmed by chemical analyses, to the satisfaction of the EPA.
5. All contaminated soils and pyritic cinders material, building rubble etc. on the site will be excavated and consolidated within an engineered storage cell located on the site.
6. The storage cell will be constructed to ensure waste is separated by a minimum of 5 m vertical distance from the groundwater table.
7. The storage cell will be constructed to the details described in this CER, or to a similar approved standard.
8. The site clean-up will be supervised by professionals in the environmental and engineering fields, to ensure the work is carried out to the standards required by the EPA, the Health Department and the Department of Occupational Health, Safety and Welfare.
9. A separate Lot will be created to contain the waste storage cell. This Lot will remain as Crown land.
10. Drainage outfalls from the site to the Swan River will be sealed and/or otherwise treated in a manner that will avoid disturbance to the surrounding vegetation and soil. No other direct stormwater discharges to the Swan River will be constructed on the site.
11. Subdivision and sale of the land will not occur until the site clean-up is completed to the satisfaction of the EPA, the Town of Mosman and all other relevant Government agencies.
12. Areas of the site to be sold as freehold residential lots will be covered with a minimum of 1 m of clean fill.
13. Special precautions will be taken to control dust generation and protect workers from dust inhalation during site clean-up.

14. No water used during the clean-up works will be sourced from groundwater beneath the site.
15. All clean-up work will be supervised by professionals in the engineering and environmental fields using recognised quality control and quality assurance procedures to ensure the work is carried out to the highest standard.
16. In the event that the remedial works need to disturb the existing cycleway/pedestrian path along the southern boundary to the site, an alternative thoroughfare will be provided and the path restored as soon as possible, to the satisfaction of the Town of Mosman Park.
17. Noise, dust and vibration from the site will be controlled to prevent unacceptable environmental impacts. In the event that the EPA receives ongoing complaints relating to noise or dust emissions from the site, the Proponents will conduct surveys and assessments in consultation with the EPA.
18. The Proponents will install two groundwater monitoring bores in accordance with the proposed monitoring programme in this report. An assessment of the results will be provided to the EPA, WAWA and Town of Mosman Park.
19. Upon completion of the remedial work programme, excavated areas will be sprayed with mulch and planted with grass to minimise any ongoing potential for dust emissions.
20. All areas of remedial works will be surrounded with appropriate fencing to exclude public access. Vehicle entry and exit points will have a gate that will be locked during non-working hours. Appropriate signs will be displayed along the perimeter fencing to inform the public of the nature and purpose of the remedial works, and to prohibit public access to the site.
21. The excavated disposal pit will be separately surrounded with 2 m high wire mesh fencing capped with barbed wire, with appropriate signs to warn of the deep excavation. The security of this fence will be regularly inspected and maintained during the remedial works programme.

Long Term Containment

Proponent: Department of Land Administration

The Proponent makes the following commitments in respect of the long term containment of wastes of the McCabe Street site:

22. Conduct ongoing monitoring of groundwater quality and the storage cell capping system (refer Commitment 18) and if necessary, based on the results, implement actions necessary to prevent unacceptable environmental impacts.
23. Ensure all maintenance works necessary to ensure the ongoing integrity of the storage cell capping system are identified promptly by regular monitoring and carried out in a thorough and professional manner as quickly as is practicable.
24. Maintain a Crown Reserve over the waste storage cell and ensure adequate notification is given to all interested parties concerning the function and status of the Reserve.
25. Ensure that the surface of the Crown Reserve is properly maintained to a standard in keeping with the function of the land as part of the public recreational resource of the area to the satisfaction of the Town of Mosman Park, Ministry for Planning and any other relevant Government agency.

8. References

- Halpern Glick Maunsell, 1993. Consultative Environmental Review - Clean-up of McCabe Street site, Mosman Park.
- Environmental Protection Authority, 1993. Clean-up of contaminated site McCabe Street, Mosman Park. Report and Recommendations of the Environmental Protection Authority. Bulletin 699. Environmental Protection Authority, Perth.
- Halpern Glick Maunsell, 1995. Clean-up of McCabe Street site - Environmental Management Programme.
- Halpern Glick Maunsell, 1996. Notice of Intent to Increase the size of the Industrial Waste Containment Cell
- Environmental Protection Authority Review Committee, 1996. Report to the Environmental Protection Authority on the increase in size of the containment cell at McCabe Street.
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Appendix 1

Statement of Conditions of Approval (1 February 1994)



Ass # 817

Bull # 699

State # 338

WESTERN AUSTRALIA

MINISTER FOR THE ENVIRONMENT

**STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)**

**CLEAN-UP OF CONTAMINATED SITE
McCABE STREET, MOSMAN PARK (817)**

LANDCORP AND OCTENNIAL HOLDINGS PTY LTD

This proposal may be implemented subject to the following conditions:

1 Proponent Commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

- 1-1 In implementing the proposal, the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Consultative Environmental Review dated July 1993. These commitments are published in Environmental Protection Authority Bulletin 699. (A copy of the commitments is attached.)

2 Implementation

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

- 2-1 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

3 Environmental Management Programme

- 3-1 The proponent shall protect the beneficial uses of the Swan River and the amenity of the public during clean-up operations on the site.
- 3-2 The proponent shall prepare an Environmental Management Programme to achieve the objectives of condition 3-1. This plan shall address, but not be limited to, the following:
- 1 dust,
 - 2 noise,
 - 3 vibration; and
 - 4 transport issues.

Published on

- 1 FEB 1994

The proponent shall consult with the Town of Mosman Park, the Swan River Trust, the City of Fremantle, the Water Authority of Western Australia and the Geological Survey of Western Australia in the preparation of this programme.

- 3-3 The proponent shall implement the Environmental Management Programme required by condition 3-2 to achieve the objectives of condition 3-1.

4 Contaminated Site Clearances

- 4-1 The proponent shall only proceed with the clean-up of the site after having demonstrated that the site clean-up criteria identified in the Consultative Environmental Review, Section 2.2, have been met. (The soil quality objectives are those in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, January 1992).
- 4-2 The proponent shall collect, analyse and report on soil samples, after contaminated waste or soil is removed and prior to further development of an area.

5 Underground Storage Cell

- 5-1 Prior to any clean-up operations on the site, the proponent shall ensure that an agreement, acceptable to the Minister for the Environment, regarding the long-term management of the storage cell has been finalised with the Department of Land Administration.
- 5-2 The proponent shall design, construct and monitor the performance of the underground storage cell to ensure that there is no unacceptable release of contaminants.
- 5-3 The proponent shall prepare the final design details of the storage cell in consultation with the Environmental Protection Authority, the Town of Mosman Park, the Water Authority of Western Australia and the Geological Survey of Western Australia.
- 5-4 The proponent shall construct the storage cell to achieve the objective of condition 5-2.
- 5-5 The proponent shall prepare the final monitoring programme for the storage cell in consultation with the Environmental Protection Authority, the Town of Mosman Park, the Water Authority of Western Australia and the Geological Survey of Western Australia.
- 5-6 The proponent shall implement the monitoring programme required by condition 5-5 to achieve the objective of condition 5-2.

6 Proponent

These conditions legally apply to the nominated proponent.

- 6-1 No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

7 Time Limit on Approval

The environmental approval for this proposal is limited.

- 7-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the

period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority.)

8 Compliance Auditing

In order to ensure that environmental conditions and commitments are met, an audit system is required.

- 8-1 The proponent shall prepare periodic "Progress and Compliance Reports", to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority.

Procedure

- 1 The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency.
- 2 If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.

Note

Where required, the Environmental Protection Authority will address specific incidents regarding noise, dust or other pollution control issues under the provisions of Part V of the Environmental Protection Act.



Kevin Minson MLA
MINISTER FOR THE ENVIRONMENT

- 1 FEB 1994

Environmental Management Commitments

**CLEAN-UP OF CONTAMINATED SITE
McCABE STREET, MOSMAN PARK (817)**

Landcorp and Octennial Holdings Pty Ltd

The proponent has made the following environmental management commitments:

Landcorp and Octennial Holdings Pty Ltd list of environmental management commitments

The following commitments are made to ensure that this proposal proceeds in an environmentally acceptable manner. Those commitments flagged by an asterisk (*) have been identified as requiring specific auditing by the EPA. Other commitments will be implemented and reviewed by the Town of Mosman Park and other relevant Government agencies.

CLEANUP PHASE

PROPOSERS: LANDCORP AND OCTENNIAL HOLDINGS PTY LTD

The joint Proposers make the following commitments in respect of the cleanup of contamination from the McCabe Street site:

1. Any activity pertaining to the cleanup undertaken on the McCabe Street site will comply with all legislative requirements.
2. The site cleanup will excavate and remove all pyrite cinders from the three dump areas (the western cinders dump, the pyrite slurry dump and the embankment cinders dump), the foundry waste dump, contaminated surface soils from the two areas around the former acid plants that have been identified as having high lead levels, and any discrete pockets of contaminated topsoils that occur elsewhere on the site.
- 3.* The effectiveness of the site cleanup will be confirmed by chemical analyses, to the satisfaction of the EPA.
4. All contaminated soils and pyritic cinders material, building rubble etc. on the site will be excavated and consolidated within an engineered storage cell located on the site.
5. The storage cell will be constructed to ensure waste is separated by a minimum of 5m vertical distance from the groundwater table.
6. The storage cell will be constructed to the details described in this CER, or to a similar approved standard.
7. The site cleanup will be supervised by professionals in the environmental and engineering fields, to ensure the work is carried out to the standards required by the EPA, the Health Department and the Department of Occupational Health, Safety and Welfare.
8. A separate Lot will be created to contain the waste storage cell. This Lot will remain as Crown land.

9. All existing drainage outfalls to the Swan River will be removed from the site. No other direct stormwater discharges to the Swan River will be constructed on the site.
- 10.* Subdivision and sale of the land will not occur until the site cleanup is completed to the satisfaction of the EPA, the Town of Mosman and all other relevant Government agencies.
11. Areas of the site to be sold as freehold residential lots will be covered with a minimum of 1m of clean fill.
12. Special precautions will be taken to control dust generation and protect workers from dust inhalation during site cleanup.
13. No water used during the cleanup works will be sourced from groundwater beneath the site.
14. All cleanup work will be supervised by professionals in the engineering and environmental fields using recognised quality control and quality assurance procedures to ensure the work is carried out to the highest standard.
15. In the event that the remedial works need to disturb the existing cycleway/pedestrian path along the southern boundary to the site, an alternative thoroughfare will be provided and the path restored as soon as possible, to the satisfaction of the Town of Mosman Park.
- 16.* Noise, dust and vibration from the site will be controlled to prevent unacceptable environmental impacts. In the event that the EPA receives ongoing complaints relating to noise or dust emissions from the site, the Proponents will conduct surveys and assessments in consultation with the EPA.
17. The Proponents will install two groundwater monitoring bores in accordance with the proposed monitoring programme in this report. An assessment of the results will be provided to the EPA, WAWA and Town of Mosman Park.
18. Upon completion of the remedial work programme, excavated areas will be sprayed with mulch and planted with grass to minimise any ongoing potential for dust emissions.
19. All areas of remedial works will be surrounded with appropriate fencing to exclude public access. Vehicle entry and exit points will have a gate that will be locked during non-working hours. Appropriate signs will be displayed along the perimeter fencing to inform the public of the nature and purpose of the remedial works, and to prohibit public access to the site.

20. The excavated disposal pit will be separately surrounded with 2m high wire mesh fencing capped with barbed wire, with appropriate signs to warn of the deep excavation. The security of this fence will be regularly inspected and maintained during the remedial works programme.

LONG TERM CONTAINMENT

PROPONENT: DEPARTMENT OF LAND ADMINISTRATION

The Proponent makes the following commitments in respect of the long term containment of wastes on the McCabe Street site:

- 21.* Conduct ongoing monitoring of groundwater quality and the storage cell capping system (refer Commitment 17) and if necessary, based on the results, implement actions necessary to prevent unacceptable environmental impacts.
22. Ensure all maintenance works necessary to ensure the ongoing integrity of the storage cell capping system are identified promptly by regular monitoring and carried out in a thorough and professional manner as quickly as is practicable.
23. ~~Maintain a Crown Reserve over the waste storage cell and ensure adequate notification is given to all interested parties concerning the function and status of the Reserve.~~
24. Ensure that the surface of the Crown Reserve is properly maintained to a standard in keeping with the function of the land as part of the public recreational resource of the area to the satisfaction of the Town of Mosman, DPUD and any other relevant Government agency.

Appendix 2

Environmental Protection Authority Review Committee

Terms of Reference

The Environmental Protection Authority Review Committee consisted of the following members:

Mr Ken Webster (Chairman)

Mr Trevor Harken (Town of Mosman Park)

Dr John Rogers (Resident)

Mr John Ripp (Resident)

Dr Raymond Perry

Dr Donald Watts

Mr Robert Taylor

The Review Committee's Terms of Reference follow.

ENVIRONMENTAL PROTECTION AUTHORITY REVIEW COMMITTEE

TERMS OF REFERENCE DATED 28 DECEMBER 1995

Proposal by Landcorp and Octennial Holdings Pty Ltd to increase the size of the containment cell at McCabe Street, Mosman Park

The Environmental Protection Authority Review Committee (henceforth referred to as "Committee") to the Environmental Protection Authority (EPA) shall:

1. Review specific information supplied by the EPA and the proponent regarding the proposal by Landcorp and Octennial Holdings Pty Ltd to increase the size of the containment cell at the contaminated site at McCabe Street, Mosman Park.
2. Provide the EPA with advice on the following:
 - (a) adequacy of the site investigation undertaken to enable a reliable estimate to be made of the contaminated material;
 - (b) adequacy of the dimensions of the containment cell to contain all of the contaminated material assessed in item 2 (a) above;
 - (c) an assessment of the likelihood of contaminated material or the products of any chemical reactions which may occur, migrating from the containment cell, taking into account the containment design and its effectiveness over the long term (say, 100 years);
 - (d) adequacy of the proposed monitoring to detect any migration from the additions to the containment cell and consider any contingency plan should monitoring results exceed agreed standards;
 - (e) identify any technical implications that the Committee's findings (with respect to the expansion of the containment cell) may have on the existing approved cell; and
 - (f) the Committee may determine that it should receive additional public submissions. The Committee may also seek existing information from government agencies through the EPA.
3. Provide a written report to the EPA by 31 January 1996, noting that the Committee's report may be published with the EPA's advice to the Minister for the Environment.

Notes

1. That (a) member(s) of the Committee should be available to attend a public information meeting scheduled for Friday, 19 January 1996 from 4:00 to 6:00pm.
2. That relevant components from public and government agency submissions received by the EPA as part of the review of Environmental Conditions under section 46 of the Environmental Protection Act 1986, will be made available to the Committee by no later than Tuesday, 23 January 1996.
3. Assume that the size and design of the containment cell for the initially assessed contaminated material is satisfactory as approved by the EPA.

Appendix 3

Environmental Protection Authority Review Committee

Final Report to the EPA

**PROPOSED EXPANSION OF CONTAINMENT CELL,
McCABE STREET, MOSMAN PARK**

EPA REVIEW COMMITTEE REPORT

JANUARY 1996

The Committee has structured its report in the same manner as the terms of reference.

As well as specifically addressing the terms of reference, the committee has, as a result of its deliberations, made comment on issues outside the terms of reference where it believes the issues should be brought to the attention of the Environmental Protection Authority.

The committee has not considered the merits of the containment cell as a means of dealing with contaminated waste on this site in comparison with other options such as on-site treatment or removal of the waste off-site. The committee also received a number of briefings from Mr Paul Reed of Halpern Glick Maunsell on the extent and outcomes of investigations undertaken at the site.

This report is based on the written information provided to it by the Environmental Protection Authority together with issues brought to its attention by the public at a meeting held at Mosman Park on 19 January 1996.

1 The Environmental Protection Authority Review Committee to the Environmental Protection Authority (EPA) shall review specific information supplied by the EPA and the proponent regarding the proposal by Landcorp and Octennial Holdings Pty Ltd to increase the size of the containment cell at the contaminated site at McCabe Street in mosman Park.

The committee has reviewed the information supplied by the Environmental Protection Authority and the proponent regarding the expansion of the containment cell.

2(a). The Environmental Protection Authority Review Committee to the Environmental Protection Authority (EPA) shall provide the EPA with advice on the adequacy of the site investigation undertaken to enable a reliable estimate to be made of the contaminated material.

The Committee noted that there were discrepancies between quantities of contaminated wastes calculated from earlier investigations and was concerned about:

- the lack of a systematic approach to the site investigations undertaken by the proponent in previous proposals (1987 and 1992) to determine the quantities of contaminated material spread across the site; and
- the significant increases that have occurred in the estimates.

However, the Committee is satisfied that the quantities set out in Table 2.2 of the proponent's Section 46 document - "Notice of Intent to Increase the size of the Industrial Waste Containment Cell" and from the verbal presentation given by Mr Paul Reed represent a best estimate of the contaminated material.

The committee noted that the remediation of contaminated sites involves ongoing information gathered throughout the period of the contract. The management of the project therefore, needs to be dynamic and responsive to this new information as it becomes available, so that issues can be appropriately addressed as the project proceeds.

2(b). The Environmental Protection Authority Review Committee to the Environmental Protection Authority (EPA) shall provide the EPA with advice on the adequacy of the dimensions of the containment cell to contain all of the contaminated material assessed in item 2 (a) above.

The dimensions of the contaminated cell are adequate to contain the material estimated in Reference 2(a). The material which will be selectively placed in the cell needs to be compacted to avoid any settlement which would impact upon the integrity of the clay cap. Care needs to be taken with the contouring of the finished surface of the cell to ensure adequate cover above the clay capping particularly where it meets the natural surface.

The contingencies provided for in the estimate of contaminated material from the slurry dump should provide enough flexibility for the cell to contain all the contaminated material.

2(c). The Environmental Protection Authority Review Committee to the Environmental Protection Authority (EPA) shall provide the EPA with an assessment of the likelihood of contaminated material or the products of any chemical reactions which may occur, migrating from the containment cell, taking into account the containment design and its effectiveness over the long term (say, 100 years); and

Based on the available soil sample results, the committee considers that there is a low potential for chemical reactions producing large volumes of leachate contaminated with metals to occur. However, the committee notes that this analysis is not consistent with some of the groundwater results from the site.

Accordingly, the committee considers that the cap is an important element in the control and dispersion of moisture through the pit and the long term performance of the containment cell is dependant on the integrity of this cap. A properly constructed and maintained clay cap will reduce the ingress of moisture into the contaminated materials so that any chemical reactions and formation of leachate within the cell is unlikely to occur to the extent that it would have an unacceptable environmental impact.

The following issues relating to the placement of material in the cell and the ongoing management should be considered.

- 1 The deposition of material in the cell should be managed in a manner that will reduce the risk of small volumes of soil containing high concentrations of heavy metals, or other contaminants occurring.
- 2 Careful selection of the materials for the construction of the cap and cover of soil, will be necessary to ensure that the moisture content within the clay is maintained at a level to avoid cracking and to minimise the quantities of water entering the contaminated materials.
- 3 In the event of excess space being available within the cell the clay cap should be placed no greater than two metres below the finished surface.

- 4 Whilst the committee finds the minimum cover depth of 650mm over the clay cap is technically adequate, every effort should be made to increase the depth of the soil cover so as to minimise ongoing management needs. The maximum depth of cover should not exceed two metres as per item 3 above.
- 5 A management plan for the use of the land over the clay cap should be prepared in association with the Department of Land Administration and the Town Council to ensure that land uses are compatible with the need to maintain the integrity of the clay cap. A grass cover should be considered over the cap and watered during the summer months, to prevent dust and assist with moisture control within the cap.
- 6 The design of the cell and its cap should incorporate mechanisms to manage the drainage and prevent erosion in the long term.
- 7 The capping over the approved cell and the proposed extension should be continuous.
- 8 The proponent should provide to the Department of Environmental Protection (and hence to the Town of Mosman Park and the Department of Lands Administration), an as constructed drawing of the containment cell, showing the location and details of all waste placed in the cell.

2(d). The Environmental Protection Authority Review Committee to the Environmental Protection Authority (EPA) shall provide the EPA with advice on the adequacy of the proposed monitoring to detect any migration from the additions to the containment cell and consider any contingency plan should monitoring results exceed agreed standards.

To ensure that the containment cell performs as designed, an appropriate monitoring system to measure settlement and moisture content within the cap and the contaminated material is necessary. A management plan should be prepared to deal with any irregularities should they occur.

An additional monitoring bore(s) should be considered to ensure that the groundwater downstream of the extension area is adequately monitored. In view of information which is now available following the excavation of the cell, the committee believes that the single downstream monitoring bore originally proposed, may not be adequate to monitor the groundwater. Accordingly, the number and location of monitoring bores for the original cell and its expansion should be reviewed by the appropriate authority.

The committee notes the proponents' contingency plans for dealing with the possibility for groundwater being contaminated beneath the cell. The committee believes that there are limits to the application of this contingency option and that further information on this and other contingency options should be provided by the proponent to the Environmental Protection Authority

2(e). The Environmental Protection Authority Review Committee to the Environmental Protection Authority (EPA) shall identify any technical implications that the Committee's findings (with respect to the expansion of the containment cell) may have on the existing approved cell;

The committee has considered the proposed extension and existing cell as parts of the one large cell and all of the recommendations contained in this report should apply to both.

- 2(f). *The Environmental Protection Authority Review Committee to the Environmental Protection Authority (EPA) may determine that it should receive additional public submissions. The Committee may also seek existing information from government agencies through the EPA.*

The Committee has considered the public submissions as they were provided to the Committee by the Department of Environmental Protection, together with comments provided by the public at a meeting held on Friday 19 January 1996.

The treatment and disposal of contaminated material on site in urban areas creates human and social problems and evokes strong emotional responses to proposals that are technically feasible. Problems similar to those experienced at Minim Cove in Mosman Park are likely to be faced in the future. Public responses to the Minim Cove development suggest that the most acceptable environmental and social solution is the disposal of the contaminated materials at a secure site well removed from urban development.

The committee recommends that studies should be commenced immediately to locate a suitable site that could receive contaminated waste material and that it be stored or treated in a manner that is environmentally and socially acceptable.

The committee noted that stringent requirements are already in place to control the generation of dust from the site. However, it is also aware from public comments that dust levels are of concern to nearby residents. The committee recommends that dust control measures should be reviewed by the proponent and improved to address this issue. This review should include any special health issues.

The committee noted that dust monitoring results are now available to the public from the office of the Town of Mosman Park.

The committee recognises the specific risks associated with moving waste material on-site in terms of dust generation, and accordingly recommends that site works be programmed wherever possible so as to minimise the generation of dust.

Other issues

The following are additional comments submitted by the Review Committee and relate to issues beyond the Committee's terms of reference.

- (i) It is recommended that contingency plans be prepared to address the management of any additional waste which is found at the site.
- (ii) In light of the Committee's recommendations on the monitoring of the clay cap, contaminated materials within the cell and groundwater; it should be noted that the management and additional financial costs of monitoring need to be re-negotiated with the appropriate parties responsible for post clean-up monitoring and management of the site.
- (iii) It is recognised that the proponent's proposal has not addressed clean-up of the foreshore and cycleway, as it is outside the development site. In the light of recent test results from these areas, it is recommended that the extent and source of pollution be determined and a management plan be prepared for its clean-up if this is necessary.

The committee believes that if the foreshore and cycleway areas require clean-up, it would be preferable for this material to be placed within the containment cell. Investigations regarding this option and other options for dealing with the material (including funding arrangements), should be undertaken and decisions made as a matter of urgency.

- (iv) The committee recommends that the Town of Mosman Park, the Ministry for Planning and the Department of Lands Administration public plans and files should be marked to clearly show the existence and extent of the containment cell and that activities or developments on this land need specific approval which should take into account the long term integrity of the cell.

Copies of the plan showing the location of the containment cell should be provided to servicing utilities such as the Town of Mosman Park, Telstra, Optus, Water Corporation, Alinta Gas and Western Power together with a requirement advising them to seek approval/advice from the Department of Lands Administration before undertaking any works over or adjacent to the cell.

- 3 *The Environmental Protection Authority Review Committee to the Environmental Protection Authority shall provide a written report to the EPA by 31 January 1996, noting that the Committee's report may be published with the EPA's advice to the Minister for the Environment.*

The committee provided a draft report to the Environmental Protection Authority on 25 January 1996 and its final report on 30 January 1996.

Appendix 4

List of Submitters

- Department of land Administration
- Town of Mosman Park
- Water and Rivers Commission
- Swan River Trust
- Health Department of Western Australia

- North Fremantle Community Association
- Buckland Hill Residents Association
- Minim Cove Protection Group
- Conservation Council of Western Australia

- Mrs Jane Shepherd
- Mr A Nichols and Mr Richardson
- Dr Jenny Gregory
- Mr Andrew Milne
- D and M Mazanetz
- Michale McGhie
- Dr and Mrs Gargett
- Margaret Thomas (Rod Lillywhite, Alex Thomas, Bonnie Thomas)
- 2 Confidential Submissions

Appendix 5

**Proponents' response to issues raised during public submission
period**

INCREASE IN SIZE OF CONTAINMENT CELL AND CHANGES TO REMOVAL OF DRAINAGE OUTFALLS AT MCCABE ST, MOSMAN PARK

QUESTIONS TO Proponent

1. *Will the Proponent ensure that all works on the proposed extension continue to be conducted to the satisfaction of the DEP?*

The existing commitments will continue to apply and ensure this will occur.

2. *Will the Proponent ensure that the necessary consents from responsible state government authorities for the works be obtained?*

As for 1 above.

3. *Will the Proponent provide contour plans to local government specifications illustrating finished cut and fill levels?*

Contour plans showing approximate final landforms at the conclusion of the cleanup have already been provided to the Town of Mosman Park. Final land development contours will be generated when subdivision details are finalised.

Details of landform within the Foreshore Reserve as already agreed with the Town of Mosman Park, will be achieved at the completion of cleanup. This will allow landscape treatments to proceed.

4. *Could the Proponent clarify why the formal development application for the extension was received by the Town of Mosman on 5 January thus leaving inadequate time to consider the proposal fully?*

The proposal to extend the Containment Cell was advised to the Town of Mosman Park on 21 November, 1995. No formal application was deemed necessary based on previous correspondence from Council, dated 12 April, 1995 (copy of which is attached) which deferred to the Department of Environmental Protection in respect of the Containment Cell design details.

5. *What assurances can be given that residents will not:*

1. *be affected by noise and vibration*
2. *be affected by toxic dust*
3. *have the value of their properties diminished*
4. *be affected by carcinogens and teratogens in present and future generations?*

1. Noise and vibration - there is an approved Environmental management Plan (EMP) in place and this will form the basis of ongoing management of these issues. It is inevitable, however, that noise and vibration levels above those normally experienced in the vicinity of the site will occur.

2. Dust - as for 5.1 above. Extensive dust monitoring and analysis will continue to be undertaken in conjunction with the dust management measures outlined in the EMP.

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3. Property values - this issue has no relevance to an environmental assessment.
 4. Carcinogenic and teratogenic effects - the principal purpose of consolidating the wastes on site is to prevent their release to the wider environment. This is clearly a great improvement on the current situation that has existed for many decades.

6. *Why were the works carried out in summer and not logically in winter?*

The nature and extent of work to be carried out presents difficulties in both summer and winter. The dust issue in summer is replaced with stormwater control and discharge to the river problems in winter. Indeed, the duration, no matter what start date is used, spans elements of prevailing summer and winter weather. Extreme care and intensive management of operations is essential at all times.

7. *The public have made it clear on various occasions that the contaminated wastes at the site would be best treated by removal and relocation to an alternative, less inhabited site?*

The observation is valid but efforts to achieve the complex and multifaceted approvals necessary for such an operation have been unsuccessful.

8. *Is the relocation of some or all of the waste at the site an option that has been recently considered?*

Practicable opportunities to relocate some or all of the wastes offsite would be welcomed by the Proponents. Potential opportunities are currently being considered but only in the context of short term implementation consistent with the present and approved cleanup operation.

9. *Is the Proponent's decision not to take the waste offsite solely based on commercial factors?*

No. Previous efforts to achieve such a solution demonstrate this.

10. *Can the Proponent comment on the recent studies on groundwater, foreshore and river conditions which have shown previously unknown levels of contamination?*

Given recent undertakings of the Swan River Trust to further testing of the foreshore and river environment it is inappropriate to comment on preliminary findings.

11. *If these are directly related to the site, what implications does this have on the efficacy of the containment cell proposed?*

Refer response to 10) above.

12. *If the above results are due to hot spots and/or preferred pathways, has the Proponent been able to prove this?*

There is as yet insufficient evidence to indicate the existence or nature of any contamination problems. Further results are currently awaited to better define preliminary findings.

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13. *Are the formation of hot spots and/or preferred pathways likely to occur in the containment cell?*

The physical processes involved in excavating the wastes and placing them in the Containment Cell will lead to homogenisation of the material. In these circumstances the likelihood of any hot spots, even if they exist currently, surviving through the waste consolidation process is very small. In addition, testing has shown a generally high level of acid neutralisation capacity in much of the waste (refer Question 30) below). This will lead to suppression of hot spot effects in the overall waste volume.

14. *What measures will be taken to ensure that such areas of high contamination do not get reproduced in the cell?*

Refer to 13) above. Note also that the Proponents will be inspecting the wastes during excavation and testing the wastes on a regular basis or as otherwise required to identify potential "hot spots".

Measures available to disperse concentrated pockets of waste include:

- . physical mixing with limestone;
- . physical homogenisation with similar but less concentrated wastes;
- . encapsulation in limestone.

15. *How will the construction of roads and carparks which may be proposed over the cell affect the integrity of the cell?*

Landuse over the cell, whether for recreational or infrastructure purposes will be strictly controlled to maintain the integrity of the Containment Cell.

Adequate vertical clearance will be available to allow pavement construction to proceed without impacting on the clay capping.

16. *How will surface erosion of the cell be managed in light of the steepness of the hill?*

There is no evidence of gross surface erosion on the limestone hill despite significant surface disturbance by off-road vehicles and motorcycles. The steepness of finished slopes will not exceed that of the previous ground contours which were entirely stable. The situation will, nevertheless, be monitored (refer EMP).

17. *Will the underlying limestone layer below the cell cap result in potential pathways for water and result in the instigation of adverse chemical reactions resulting in the generation of hot spots?*

No. There is no reason for preferred drainage pathways to develop in the graded and compacted 300mm deep limestone layer beneath the clay cap.

Even if this did occur there is no indication that such a situation would lead to "adverse chemical reactions" (refer Questions 19) and 30) below)

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18. *Is it accurate to suggest that approximately 800,000L of water will permeate through the cap each year and that should irrigation of the cell surface as public open space be allowed, this may increase to 1,600,000L per year?*

The figures represent a conservative order of magnitude estimate of moisture ingress to the waste. They translate to an annual average application of between 40mm and 80mm per unit surface area.

19. *What are the implication of this on the potential for leachate generation from the cell?*

Testing and calculations have shown that this amount of moisture ingress might only be sufficient to oxidise approximately 0.00018 percent of the available residual sulphide. This combined with a net acid neutralisation capacity in the wastes within the Containment Cell in excess of 40,000 tonnes of sulphuric acid equivalent indicates that this level of moisture ingress will not result in significant contaminated leachate generation.

Previously conducted (ref: CER) and more recent leaching tests of the cinders and slurry material conform the lack of heavy metal mobility even in very aggressive (i.e. acidic) environments.

20. *Could the Proponent provide some indication of the monitoring proposed for the measurement of the moisture within the cap and the cell?*

If deemed appropriate as a means of assessing cap performance, the approved Containment Cell monitoring programme could be extended to include the regular measurement of moisture contents throughout the depth of the waste materials using a nuclear moisture meter. This would involve the installation of one or more PVC cased bores following capping of the cell. The bore(s) would then allow a moisture meter using a neutron source to monitor gross material moisture contents at any depth within the cell.

Frequency, extent and duration of such monitoring would need to be specified if deemed to be necessary.

21. *Have groundwater studies been undertaken to assess groundwater levels on a seasonal and long term basis?*

Historical investigations of groundwater levels beneath the site have been reported in the CER. Monitoring bores near the Containment Cell are being used to identify current levels and ongoing measurements will be taken at regular intervals.

Investigation results are consistent with regional groundwater records and expectations.

22. *Have studies of the presence of horizontal layers of higher transmissivities been undertaken in the vicinity of the cell?*

No. There is not seen to be any reason for such studies to be done.

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23. *Is the Proponent confident that sufficient information is available to enable it to have a firm understanding of the quantities and chemical properties of the materials to be placed in the cell?*

Yes. Recent sampling and chemical testing in response to requests from various authorities have produced results consistent with previous findings.

Details of waste quantity investigations and calculations are given in the Notice of Intent. This document does, however, refer to and recognise that there are some risks regarding final quantities that have been accounted for via contingency allowances in the quantities used to determine the Containment Cell dimensions.

24. *Comparisons have been made between levels of Hg, CN and pH for bores measured in the vicinity of the site in 1980 and 1995 (bore 4 and bore MC3). Similarly, recent results have shown that molluscs had levels of mercury and arsenic in excess of acceptable levels. These results may imply that a plume of contaminants are emanating from the site. Could the Proponent comment on these issues?*

Refer to response to Question 10) above. The presence of groundwater contamination beneath the slurry dump is not surprising given the high moisture content of the deposited wastes, the lack of preparation of the contaminant structure and the lack of any engineered covering to the dump.

25. *Given that the groundwater flow is generally towards the Swan River, would it be accurate to suggest that any contaminated plume will eventually reach and pollute the river?*

In the absence of detailed hydrogeological investigations, the suggestion regarding plume movement is reasonable. The question of pollution of the Swan River is more complex and cannot be definitively answered with the current level of information available to the Proponent.

26. *Can the Proponent comment on the following statement made in a submission: The cell relies on entirely two factors: staying dry and alkalinity within the limestone tending to immobilise heavy metals (but not cyanide and known to enhance the migration of Arsenic).*

- a) Maintenance of dry conditions - this is not correct since some ingress of moisture is unavoidable.
- b) Alkalinity - the stability of the wastes is largely dependent upon the establishment and maintenance of slightly alkaline conditions within the Containment Cell. Recent testing has confirmed that the composite waste volume has a net acid neutralisation capacity (refer Question 30) below) and this is expected to prevent widespread and generally acidic conditions developing.

The mobility of cyanide and arsenic is more complex than for heavy metals but testing and general chemistry principles suggest that cyanide and arsenic will not be highly mobile in the conditions expected to prevail in the Containment Cell.

27. *What groundwater studies have been undertaken to assess the seasonal or long term movements of the groundwater level?*

Repeat of Question 21) above.

28. *What studies of horizontal aquifers throughout the layered sand/limestone have been undertaken?*

Repeat of Question 22) above.

29. *What effect will capillary fringes in the limestone have on the movement of contaminated plumes?*

No effects are anticipated in the event of any contaminated plume developing.

30. *Given that recent bore samples for the eastern pyrites dump show an average sulfur content of 2.2%, can the Proponent confirm that there is adequate acid neutralising capacity when the wastes are placed in the cell?*

The testing has shown average total sulphur, sulphate sulphur and non-sulphate sulphur contents for the various wastes as listed below. These figures ignore samples that clearly contain some limestone.

Waste Source	Average Sulphur Contents (%)		
	Total Sulphur	Sulphate Sulphur	Non-Sulphate Sulphur
Pyrite Slurry	2.45	1.94	0.51
Western Pyrite Cinders	0.99	0.75	0.25
Embankment Pyrite Cinders	1.59	1.35	0.25
Foundry Waste	0.13	0.06	0.07
Western/Eastern Plant Areas	1.49	1.19	0.30

The acid production potential of the waste is related to the unoxidised sulphur (non-sulphate sulphur) content.

Based on these values and the appropriate acid neutralisation capacity results the total waste volume has a net acid neutralisation capacity in excess of 20,000 tonnes of sulphuric acid equivalent. Inclusion of all sample analyses results in a net acid neutralisation capacity in excess of 40,000 tonnes of sulphuric acid equivalent.

Calculations based on total sulphur conversion to sulphuric acid (an extremely unlikely scenario) leads to a net acid neutralisation capacity in excess of 2,000 tonnes of sulphuric acid equivalent.

These calculations ignore limestone that lines or surrounds the Containment Cell.

31. *Given the pH levels in pyrites have been measured as low as 3.9, would the Proponent confirm that this could lead to the mobilisation of heavy metals?*

Testing confirms mobilisation of heavy metals in a pH 3.9 environment. However, the results discussed in Question 30) above confirm such conditions are extremely unlikely to be found in the Containment Cell.

32. *Would such acidity levels occur in wastes placed in the cell?*

Refer to Questions 30) and 31) above.

33. *In the event of acidic reactions occurring the areas near the base of the pit, would it be realistic to suggest that this could lead to the destabilisation of the limestone base and result in the export of contaminated leachate from the site?*

The scenario described will not occur as it is proposed to place the Western Plant Area wastes in the base of the Containment Cell. This will fill the cell to a depth of approximately 4 metres with material having an average acid neutralisation capacity of 350 kg/tonne.

34. *Will the Proponent commit to preparing an comprehensive contingency plan which would address measures to be taken in the event the cell 'leaks' or the cap is damaged?*

These commitments are already in place (refer CER, Commitments 21 and 22).

35. *Who would be responsible for exercising contingency the measures?*

The Department of Land Administration (DOLA) becomes the Proponent at completion of the cleanup and therefore takes on this responsibility. LandCorp will act on behalf of DOLA to conduct monitoring and carry out corrective works.

36. *Is it envisaged that monitoring will continue for 100 years hence?*

The EMP provides a monitoring programme covering at least 15 years. Extension of this period is subject to assessment of results.

37. *Can the Proponent comment on the implications of recent bore results showing a reduced amount of limestone beneath the base of the cell than originally expected?*

The design function of the limestone lining is to provide a consistent, selected and engineered base and sides to the Containment Cell. This was determined to be appropriate given variability of coastal limestone strata, presence of solution holes and channels and the potential presence of non-calcareous sands.

The design allows for the nominal 0.5 m of limestone lining to be thickened to 1.0 m adjacent to sand layers. Even with 0.5 m of limestone base lining the results of acid production testing (Question 30) above) show this is a conservative provision in the design.

38. *Can the Proponent confirm that the estimated 5 to 7 tonnes of cyanide in the wastes will not pose an environmental or health problem through the potential for gas formation within the cell?*

Given the presence of significant quantities of iron in the waste it is considered that the majority of cyanide will be complexed with the iron or with other heavy metals present. Restrictions on water and oxygen ingress to the Containment Cell are also expected to limit the potential for gas production (refer Section 3.5 of the Nol).

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39. *Available evidence suggests that the leachate from this site is quite mobile in the local soils. How will the Proponent prevent leachates from escaping from the contaminated cell?*

The Proponent is unaware of the evidence referenced in this question. The primary purpose of the Containment Cell is to prevent generation of environmentally unacceptable leachates.

40. *Available evidence suggests that the leachate from this site is quite mobile in the local soils. How will the Proponent prevent leachates from escaping from the contaminated cell?*

See 39) above.

41. *Clay cappings on containment cells eventually crack and leak, thus allowing water to enter the cell. How will the Proponent prevent this from occurring at the site?*

The clay cap is not designed to prevent all moisture ingress but to limit it to a practicable minimum. Calculations (refer Question 19) above) and leach tests confirm that this is acceptable. Indeed, based on average chemistry throughout all wastes in the cell, it can be concluded that a clay cap is not necessarily required. The inclusion of a clay cap is therefore a conservative element of the design.

42. *There is no evidence or guarantee that the containment cell or its extension will prevent the leakage of dangerous contaminants into the water table and the Swan River.*

Evidence presented herein demonstrates with a high degree of confidence that contaminants will be stabilised and that there is minimal risk to the surrounding environment.

The CER, EMP and Nol all reference the methods available of containing any unexpected contamination if it occurs and if a threat to the environment develops.

43. *Has the Proponent explored all possible avenues to find a way to remove the contaminants to a less fragile environment?*

The Proponents have undertaken an exhaustive and extensive series of investigations over a 10 year period in an attempt to achieve a satisfactory cleanup of the site.

The original cleanup proposal as presented in the 1993 CER is the only one to receive all necessary approvals.

The Proponents question the "fragility" of the environment given the past history of the site and the apparent lack of disastrous effects arising from past waste disposal strategies.

44. *Why hasn't the Proponent sought widespread even world wide advice and tenders on the best course of action to follow for the remediation of this site?*

The investigations referenced above (Question 43)) included, in parallel with investigations related to similar wastes on another site in Perth, reference to North American experience, preliminary testing of various soil washing technologies and exploration of alternative disposal strategies. In all cases the feasibility and/or acceptability of the schemes proved inadequate.

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45. *Has the Proponent considered using a natural clay product such as "saponite" which is currently marketed or any other product for the containment cell floor, walls and roof cap?*

Consideration has been given to the use of various materials, both natural and artificial, to form the clay cap. Currently clay is deemed to be adequate.

The Containment Cell design is not based on the need to contain moisture. Use of a low permeability lining system is therefore not required.

46. *Have enough exploratory bores been drilled to characterise the amount and distribution of wastes at the site?*

The Proponents are satisfied that this is the case. It does not, however, remove all risks of unforeseen circumstances arising. The NOI details where contingencies have been included in recognition of such risks.

47. *Has the conservation and cultural value of the site been purposely allowed to degrade to allow the containment proposal to proceed?*

No. The site is essentially unusable in its current state and hence there has been no incentive to preserve or enhance its value to the community until a satisfactory cleanup could be achieved.

48. *Should it be allowed to proceed, it should be done under the proviso that no further extension be allowed.*

The comment is noted. The Proponents note that, unless a separate Containment Cell is excavated there will be no practical means to further expand the extended cell. It is extremely unlikely that application would be made to create a second Containment Cell on the site.

49. *Will the hill be reconstructed to its original contour?*

Yes, although some smoothing of surface contours will occur to render all areas of the Public Open Space usable.

50. *What local native vegetation will be planted on it?*

Landscape planning for the development is currently under way. Detailed species lists are not yet available but the revegetation programme can be broadly described as follows:

Revegetation with shallow rooted indigenous species and dry land grass areas.

51. *Will the hill form part of Leighton Peninsula Park without having to be fenced off or course rendered inaccessible?*

The status of the limestone hill in respect of the Leighton Peninsula Park is unknown. However, there will be no restrictions to public access to the Public Open Space within or external to the Crown Reserve over the Containment Cell.

52. *Has been expressed that the true volume and nature of the site contamination has not been established. The radial boundaries of leachate from the site have not been identified.*

Refer Question 46) above and the Nol. The Proponents understand that further testing of groundwaters adjacent to the Swan River is under way. This is currently the responsibility of the Swan River Trust.

53. *Section 2.2 of the Halpern Glick Maunsell proposal states, "a contingency allowance should be made to cover unforeseen waste volumes that could not be reliably identified from sub-surface investigations. An allowance of 10% for each volume was added to all identified sources of waste except for the Western Plant Area which was already known".*

Statement only.

54. *This statement indicates that a more detailed appraisal is warranted. There is no indication in the report as the classification of "contaminated".*

Contaminated materials are those containing heavy metal concentrations above specified cleanup concentrations as defined in the CER and EMP as follows:

Metal	Typical Soil Background Concentrations (mg/kg)	Cleanup Concentration (mg/kg)
Arsenic	0.2-30	20
Cadmium	0.04-2	3
Copper	1-190	60
Lead	<2-200	300
Mercury	0.001-0.1	1
Zinc	2-180	200

In respect of site investigations refer to Question 46) above.

55. *What is the classification cut off used to determine the "contaminated nature of policies of the site"?*

Refer 54) above.

56. *What measures will the Proponent use to prevent harmful discussion from the site impacting upon nearby residents?*

It is assumed that the question refers to "emissions" (not discussion). The EMP and established site management procedures will be used to control emissions from the site.

57. *Have the big term effects of the contaminants leaking into the ground been examined?*

Refer to Question 42) above.

58. *Nearby residents consider the present level of noise and vibration emanating from the site during construction as totally unacceptable, given the sites location within a densely populated suburb. Why isn't the Proponent able to prevent these impacts? What will the Proponent do to rectify this unacceptable situation?*

The undertaking of the cleanup work on site inevitably leads to the imposition of noise and vibration emissions in excess of those normally experienced in the area. Nevertheless, the operations are being carried out within normally accepted performance parameters. Working hours generally comply with Town of Mosman Park requirements except where machinery movement is necessary to control dust emissions.

Monitoring of vibration levels in adjacent properties is being carried out and measures will be taken to control site operations if unacceptable vibrations occur.

59. *What guarantee is there that further wastes will not be found and require additional increases - the size of the cell?*

No guarantees are available, hence the use of what are believed to be conservative volume estimates and the inclusion of contingency allowances. Refer Question 46) above.

60. *How much waste is leaking into the river at present?*

The groundwater beneath the site grades slightly towards the Swan River. The Proponents have not undertaken any investigations to estimate flow rates.

61. *What will happen to the contaminants on adjoining Swan River land?*

This is a matter beyond the responsibility of the Proponents.

62. *How will the Proponents remediate the site in order to restore the original land contours and natural vegetation?*

The site will be left, at completion of the cleanup, in a state ready for subdivision development. Plans representing this have been recently lodged with the Town of Mosman Park. It is not intended to restore all areas of the site to pre-cleanup contours except for the area of the Containment Cell (refer Question 49) above).

The Proponents have a binding agreement with the Town of Mosman Park to institute extensive landscaping of parts of the site and the river foreshore immediately upon completion of the cleanup.

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63. *What assurances can the Proponent give that the contours of the original hill will be reconstructed as close as possible to its original form to allow for public access?*

Refer Question 49) above.

The Proponents have made a clear undertaking to restore ground contours over the Containment Cell to blend with those of the adjacent and surrounding land. Public access will not in any way be restricted to the limestone hill.

64. *Volume estimates throughout the Proponents' document became difficult to follow since the figures in grey hatching "adjusting volumes" (page 6) clearly do not add up. Does the Proponent intend to issue a corrected version of the document with accurate figures? If not, why not?*

The Proponents acknowledge the presence of a typographical error in the shaded areas of Table 2.1 (Column 2) and Table 2.2 (Column 1). In both cases the quoted "Volume of Cell" figure should read 225,000 m³ (not 255,000 m³ as given). Corrected copies of pages 6 and 7 of the Nol are attached herewith.

Any inconvenience or confusion generated by this unfortunate error is regretted.

65. *Is the Proponent prepared to formulate and implement a long term monitoring programme to monitor moisture levels in the contained wastes in order to monitor the integrity of the cell capping?*

The Proponents are able to monitor for internal Containment Cell moisture contents if this is deemed necessary (refer Question 20) above).

66. *What is the likelihood that further wastes that will be required to be disposed of in the expanded cell will be located?*

This is understood to be similar to Questions 23), 46), 52), 54) and 59) above. Refer to answers to these questions.

67. *The cell will be located in a residential area. Any extension to the disposal pit will only serve to increase the problems due to unsuitable location. How will the Proponents prevent these problems?*

The Proponents have approval to construct and fill the Containment Cell. The extension introduces little, if any, additional disruption to the surrounding residential area either in its construction, backfilling or long term monitoring and maintenance.

68. *Evidence from adjacent disposal sites show that contamination of groundwater will occur if the integrity of the cell is disturbed. An increase in size adds substantially to this risk. How will the Proponent ensure that this will not occur at this site?*

The Proponents are unaware of the evidence cited. The results of chemical analyses and calculations (refer Question 30) above) do not support the contention of high risk either with the Containment Cell undisturbed or if the clay capping is damaged or disturbed (refer Question 41) above).

In this context the proposed increase in the size of the cell is not considered to add

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69. substantially to risks to the integrity of the cell.
The design of the pit and the nature of the pyrites waste means the integrity of the cell cannot be maintained in the long term. How will the Proponent eliminate this problem and therefore guarantee the long term integrity of the cell?

No reasons are given for this statement. Responses to Questions 30) and 41) in particular address the long term integrity of the Containment Cell.

70. *The Notice of Intent is not sufficiently detailed to allow a full and thoroughgoing assessment to be made of the proposal. Furthermore, the Notice of intent is generally extremely confusing and occasionally apparently contradictory. How does the Proponent respond to these statements?*

No specific references are given and hence the Proponents are unable to offer a definitive response. Every effort has been made to address the Guidelines to the Section 46 application and to provide appropriate background information as to the need for the Containment Cell extension.

71. *The Notice of Intent gives the impression that sealing and backfilling the outfall pipes will be sufficient rehabilitation or remedial work to prevent (further) contamination of the river foreshore, by stating that the Swan River has asked that disturbance to the immediate foreshore be kept to a minimum.*

The Proponents contest this observation. The treatment of the drainage outfalls is designed to meet the specific requirements of effectively removing direct drainage discharges from the site to the Swan River.

The proposed treatments are considered to achieve this requirement and fully meet the commitments of the Proponents under the existing and approved cleanup strategy.

72. *It is clear to anyone who walks along the foreshore below the embankment pyrites dump that apart from the drainage outfall there is significant pollution of the banks the beach itself. Unfortunately, the foreshore will have to undergo significant disturbance if there is to be any real rehabilitation of the foreshore. How does the Proponent respond to the above statements?*

The cleanup strategy for the site is limited to areas north of the existing cycleway. No allowance has therefore been made to include the river bank areas in the site cleanup activities or in the volume requirements of the Containment Cell.

The need for and development of a strategy to cleanup the foreshore is a complex matter beyond the scope of the current Section 46 Application.

It is also an issue that may better be resolved when the results of recent testing by the Swan River Trust become available.

73. *The Proponent in the CER (Halpern Glick Maunsell, July, 1993) suggested the amount of waste on site was known due to their thorough sampling and that a 10% contingency was built into their proposal. As such, why is the expansion necessary?*

The reasons for the expanded waste volume are detailed in the Nol.

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74. *It is apparent that acid leaching from beneath the Western Plant Area, Notice of Intent (NOI) (p2 section 1.3.1a). How is this possible when the underlying limestone provides a buffer preventing any leaching and since one of the major arguments in favour of the design of the disposal pit was the buffering effect of the limestone?*

The Western Plant Area housed the acid generating plant of the superphosphate works. The comment referenced from the NOI relates to spillages and waste discharges of apparently strong acid solutions that occurred over the extended operating life of the plant.

The depth of penetration of the metal rich acidic liquors would have been related to solution channelling created by ongoing reactions with the underlying limestone. In effect, this represented a situation of acid supply in excess of neutralisation capacity of the limestone.

This is not the case in the Containment Cell (refer Question 30) above).

75. *How far below the Western Plant Area has leachate penetrated?*

Cleanup of contaminated soils and limestone extended at its deepest to approximately 5 m below ground levels prior to cleanup. This, however, was only in isolated areas of the site.

76. *The NOI states (p2, section 1.3.1a) that pit expansion is principally due to: "an increase in volume of limestone material affected by acid leaching beneath the Western Plant Area". According to the NOI, (p3 section 2.2) an additional 16,000m³ of contaminated material has been found at the Western Plant Area but later (p5, section 2.2) under reduced waste volumes, it is states: "Testing has shown no underlying limestone contamination to the Western Plant Area" and gives a volume of 17, 160m³. This is confusing and apparently contradictory. Can the Proponent clarify this apparently contradictory information?*

The reference is correct and represents an unintentional error in the wording on Page 5, Section 2.2 of the NOI. The note should correctly refer to the Western Pyrite Cinders stockpile. The 17,160 m³ refers to the 1.5 m of contaminated limestone allowance shown in Tables 2.1 and 2.2 but includes for a 10% contingency allowance that would normally have been applied in Column 2 of Table 2.2.

Again, the Proponents regret any confusion arising from this error in the text.

77. *Why in Table 2.1 (p6, NOI), under "Volume of Cell" is the "Adjusted Volume": "Total Volume Available" less than the "Original" "Total Volume Available"? This is confusing and apparently contradictory. Can the Proponent clarify this information?*

Refer Question 64) above and appended corrections to Tables 2.1 and 2.2.

78. *Figure 3.1 "Bore Location Plan" shows the location of the pit in relation to monitoring bores in the area. The North pointer on this figure is actually pointing East (see fig. 1.3). The "vacant land" shown to the west (actually north) immediately upstream (in a groundwater flow sense) to the proposed extension of the pit is now a housing development (the residents of which presumably unrestricted as to their use of water) and not vacant at all. Although the plan is dated October 1994 it contains the updated extension of the disposal pit. If the pit design could be updated why not the vacant land designation? Can the Proponent clarify this point of concern?*

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- a) The north point is shown incorrectly on the plan.
 - b) The "Vacant Land" whilst now serviced and subdivided is, nevertheless currently unoccupied with no residences yet built on any of the blocks.
 - c) It is understood that groundwater use on the Swansea subdivision will be restricted for the same reasons as use on the adjacent Rocky Bay Estate, namely Water Authority gazettal to protect the shallow freshwater layer at the surface of the unconfined aquifer.
 - d) The outline of the Containment Cell shown is diagrammatic only and does not reflect the extended cell dimensions as demonstrated by comparison to Figure 1.3.

79. *Figure 2.1 shows a cross section of the pit but takes no account of topography which shows a drop of 6 metres south to north and more accurate representation of the cross section is given in attached figure 1. If the Proponents wish to maximise the volume of the pit and minimise the visual impact shouldn't they attempt to follow the contour of the natural surface?*

Figure 2.1 depicts a cross-section of the Containment Cell at the eastern end. If necessary the cell will be filled to within 1.55 m of surrounding natural surface levels and to slopes appropriate to achieve an evenly contoured finished surface but with positive drainage slopes to the outer edges in all cases.

80. *If the pit is to be containment cell would the Proponent agree that it must at no point rise higher than the lowest point of the surrounding earth, ie. some height less than 25m AHD, or the contained material will flow out like water tipped from a bucket.*

The Proponents do not agree with this statement.

There is no mechanism by which water seeping into the Containment Cell will form a perched water table sufficient to cause it to flow laterally either back out through the clay cap at a lower level or laterally through tens of metres or more of limestone to an exposed face elsewhere on the site.

The material to be placed in the Containment Cell is solid and will only hold its field capacity of moisture if subjected to significant saturating water flows, a situation precluded in this case by the clay cap. Even in such a saturated state the material would have no propensity to "flow" as suggested in the question.

81. *If the Proponent limit their design of the cell to below 25m AHD what will prevent build up and ingress of water along the cliff formed by the excavation of the limestone hill?*

There is no intention to limit backfill of the Containment Cell to RL25.0 m AHD.

82. *Has consideration been given to encasing the contaminated waste in the cell in concrete?*

No. The evidence to support the integrity of the design obviates the need to consider expensive and volume consuming options such as concrete encapsulation. Further, concrete lining of the Containment Cell is impracticable and would not offer any benefits over the proposed design.

-
83. *What assurance can the DEP give that they won't allow the DPUD use the containment cell to be included in the calculation for public open space in the proposed new estate?*

This is a matter beyond the responsibility of the Proponents.

84. *Which government department will be responsible for the integrity, testing, maintenance of the toxic site and cell?*

Refer Question 35) above.

85. *What assurances can the Proponent give that this extension will be sufficient to hold all toxic material including all unexcavated material from the eastern end of the site?*

Refer Questions 23), 46), 52), 54), 59) and 66) above.

86. *What signage will be erected for perpetuity to protect future residents from changing the nature of the top soil of the containment cell?*

The nature of the Containment Cell, the principal purpose of the overlying Crown Reserve and the appropriate restrictions on use and development of the site will be clearly marked on plans held by DOLA and the Town of Mosman Park. The purpose of the Crown Reserve will also be identified in the records of the WA Land Information System. This will form the basis of long term control on the use of the land.

The depth of clean soil cover over the waste in the Containment Cell provides a good level of safety to inadvertent uncovering of the waste. In any event, however, even if disturbance did occur for any reason the effects either on personnel involved, local residents or the integrity of the waste containment would be minimal (refer Questions 30) and 41) above).

87. *What measures are in place to prevent penetration (accidental or with intent) of the cap?*

Refer Question 86) above.

88. *Are toxic materials being used to reform the sloping portion of the northern side of the hill?*

Yes up to within 1.55 m of the final surface if this storage volume is required.

89. *Will the finished site be different from what is being provided by detail of figure 2.1? If so, what are the true details of construction?*

The details presented in Figure 2.1 provide an indicative layout of the Containment Cell. Final cap levels and slopes will vary to allow finished ground levels to blend with surrounding ground levels.

There is no intention to mislead with the presentation of Figure 2.1 but merely to identify the key design principles that can then be adapted to suit particular circumstances at various locations on the cell perimeter.

-
90. *Will the toxic mound require different design features to that of a pit constructed on flat ground with the cap being domed in the centre so water can run off the sides?*

The design principles of the cap will be uniform, that is, provision of positive falls to the edges of the Containment Cell cap in all cases. The use of a central dome or one-way crossfall will be dependent upon location.

The natural ground contours facilitate the provision of positive cap surface drainage slopes.

91. *What or how will the design of the cell on the side of the hill be altered to prevent ingress of water which runs down the hill, from penetrating the pit on the high side of the hill?*

The design detail to be utilised if the full volume of the Containment Cell is required is shown on the attached diagram. Surface runoff and/or infiltration flows will either be intercepted by the clay cap or pass in a predominantly vertical direction through the limestone formation adjacent to the Containment Cell.

Excavation of the cell has not revealed any preferential hydraulic pathways that may lead to concentrated infiltration flows into the cell.

92. *If so, what are they are why haven't these details been provided for this in the report or any other report?*

Refer Question 91) above.

The details requested relate to final design and have not been considered necessary for the gaining of environmental approvals. They are, to some degree irrelevant to the environmental performance of the cell (refer Question 41) above).

Nevertheless, the Proponents are happy to provide such details in light of the specific request made for such information.

93. *Will the integrity of the cell be put to risk due to the cell location being on the weathered side of the hill?*

The reference to "weathered side of the hill" is unclear. The hill formation prior to cleanup works commencing was largely man made and not created by natural weathering processes.

In respect of prevailing weather patterns the location and orientation of the Containment Cell is considered immaterial.



TOWN OF MOSMAN PARK

Between River and Sea

All correspondence
to be addressed to
the Town Clerk

OUR REF: BGB/SWG (csbp) ENQUIRIES TO: Mr B. G. Burnett

12 April, 1995

Halpern, Glick, Mansell
PO Box 524
WEST PERTH WA 6872

Att: *Mr P. C. Reed*

Dear Sir

Re: C.S.B.P. Environmental Management Programme

I refer to your correspondence of March 7, 1995 and subsequent fax in regard to the proposed monitoring bore.

Council's approval of the clean-up was subject to:-

**"all works being conducted to the satisfaction of the
Department of Environmental Protection"**

The Town of Mosman Park does not have the expertise to evaluate the design variation of the containment cell and nor does it wish to. As it is the D.E.P. who will be issuing the appropriate approvals, it is the function of their approvals process to evaluate the proponents design.

Additionally as D.O.L.A. will ultimately be responsible for the containment cell reserve they may wish to be informed of the design variation.

The revised groundwater monitoring programme is in accordance with Council's comments on the draft Environmental Management Plan and is therefore acceptable.

Enquiries in regard to this matter should be directed to Council's Principal Environmental Health Officer, Mr B. G. Burnett.

Yours faithfully,

T. J. HARKEN
TOWN CLERK

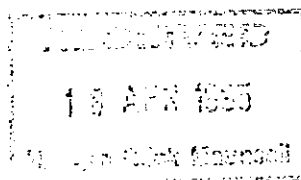


Table 2.1
McCabe Street Cleanup Containment Cell Volumes (cubic metres)

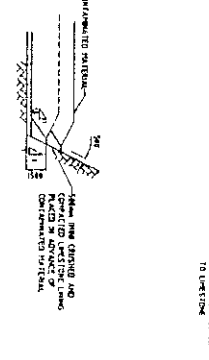
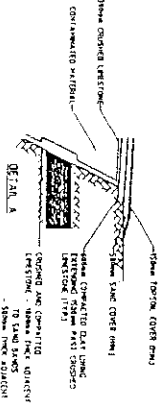
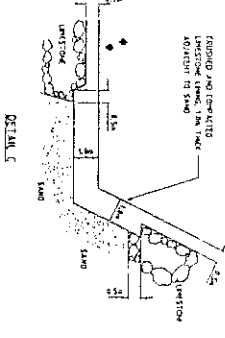
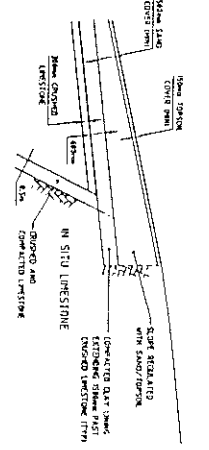
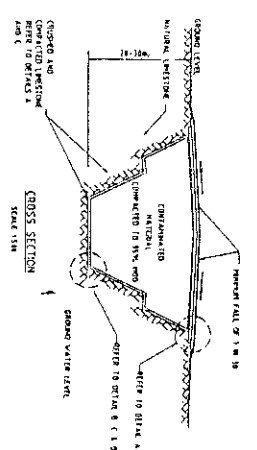
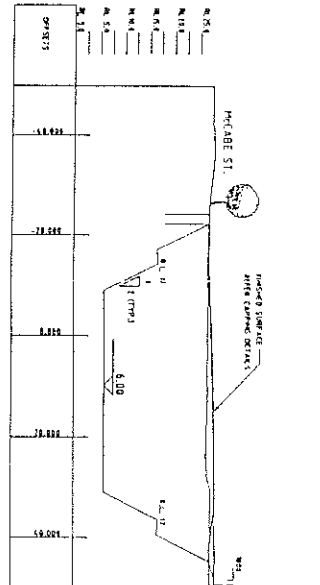
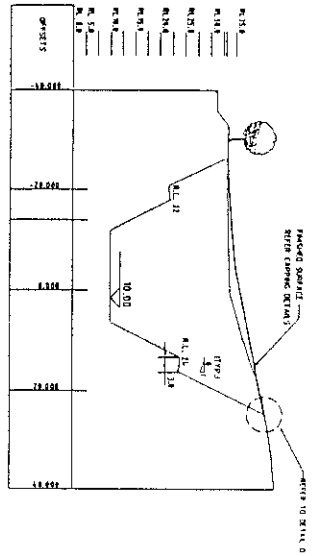
	Original	Adjusted Volumes ¹
Volume of Cell	233,150	225,000
Less:		
Clay Cap	8,510	8,510
Limestone Cap	4,300	4,300
Limestone Base	3,200	3,200
Limestone Walls	14,840	15,000
Total Volume Available	202,300	193,990
Slurry Dump		
Estimated Volume	123,600	123,600
Less:		
Cover ²	6,000	6,000
Refuse ³	3,000	3,000
Total Volume	114,600	114,600
Western Pyrites		
Estimated Volume	34,680	34,680
+ 1.5 m Limestone underneath	15,600	15,600
Total Volume	50,280	50,280
Foundry Waste		
Estimated Volume	23,100	23,100
Embankment		
Estimated Volume	5,000	5,000
Western Plant (Surface)		
Estimated Volume	5,000	
Actual Volume		21,000
Eastern Plant (Surface)		
Estimated Volume	4,345	4,345
Total to Cell	197,980	213,980
Volume Available	4,320	(19,990)⁴

- Notes:
1. These figures represent the changes in volume detailed in the text (Section 2.2). The overall volume change is 24,310 m³.
 2. Building rubble lying over and around the pyrite slurry dump.
 3. Refuse placed over a section of the pyrite slurry dump.
 4. Shortfall in available volume in the Containment Cell.

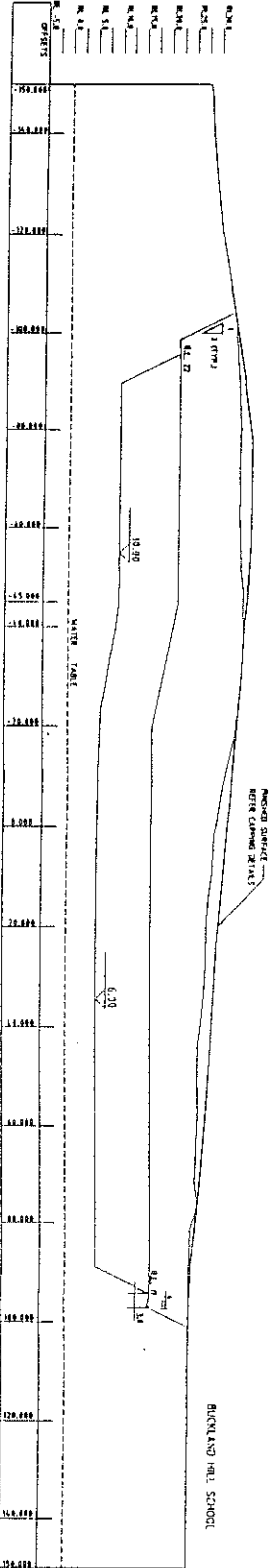
Table 2.2
McCabe Street Cleanup Adjusted Containment Cell Volumes (cubic metres)

	Adjusted Volumes ¹	Contingency ² Adjustment	Adjusted ³ Volumes plus Contingency	20 m Extension ⁴ to Cell
Volume of Cell	225,000		225,000	277,000
Less:				
Clay Cap	8,510		8,510	10,050
Limestone Cap	4,300		4,300	5,025
Limestone Base	3,200		3,200	4,000
Limestone Walls	15,000		15,000	15,500
Total Volume Available	193,990		193,990	242,425
Slurry Dump				
Estimated Volume	123,600	+ 10%	135,960	135,960
Less:				
Cover	6,000	Delete	-	-
Refuse	3,000		3,000	3,000
Total Volume	114,600		132,960	132,960
Western Pyrites				
Estimated Volume	34,680	+ 10%	38,148	38,148
+ 1.5 m Limestone underneath	15,600	Delete ⁹	-	-
Total Volume	50,280		38,148	38,148
Foundry Waste				
Estimated Volume	23,100	See Note 5	15,000 ⁵	15,000
Embankment				
Estimated Volume	5,000	See Note 6	17,000 ⁶	17,000
Western Plant (Surface)				
Actual Volume	21,000	As measured	21,000	21,000
Eastern Plant (Surface)				
Estimated Volume	4,345	See Note 7	15,000 ⁷	15,000
Extra Depth Council Depot		See Note 8	1,000 ⁸	1,000
Total Volume			16,000	16,000
Total to Cell	213,980		240,108	240,108
Volume available	(19,990)		(46,118)	2,317

- Notes:
1. As per Table 2.1
 2. Per cent adjustment of waste volumes to allow for uncertainty in quantities.
 3. Resulting changes in volume demand arising from contingency allowances on wastes.
 4. Balance of volume availability and demand with 20 m extension to Containment Cell.
 5. Recent site investigations have led to a reduction in volume of Foundry Waste.
 6. Assumptions made in previous site investigations have been shown to be incorrect leading to increase in waste volumes.
 7. Testing has shown increase in areal extent of contaminated surface soils leading to increase in waste volume.
 8. Previously unidentified volume of pyrite cinders stockpile north of slurry dump found to contain significant depth of cinders material.
 9. This waste allowance no longer required as demonstrated by testing.



CONTAINMENT CELL
LINER AND CAPPING DETAILS



NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMIT	10/15/03
2	REVISED PER COMMENTS	11/05/03
3	REVISED PER COMMENTS	11/15/03
4	REVISED PER COMMENTS	11/25/03
5	REVISED PER COMMENTS	12/05/03
6	REVISED PER COMMENTS	12/15/03
7	REVISED PER COMMENTS	12/25/03
8	REVISED PER COMMENTS	01/05/04
9	REVISED PER COMMENTS	01/15/04
10	REVISED PER COMMENTS	01/25/04
11	REVISED PER COMMENTS	02/05/04
12	REVISED PER COMMENTS	02/15/04
13	REVISED PER COMMENTS	02/25/04
14	REVISED PER COMMENTS	03/05/04
15	REVISED PER COMMENTS	03/15/04
16	REVISED PER COMMENTS	03/25/04
17	REVISED PER COMMENTS	04/05/04
18	REVISED PER COMMENTS	04/15/04
19	REVISED PER COMMENTS	04/25/04
20	REVISED PER COMMENTS	05/05/04

LANDCORP

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NO.	DATE	DESCRIPTION
1	03/15/04	ISSUED FOR PERMIT
2	03/25/04	REVISED PER COMMENTS
3	04/05/04	REVISED PER COMMENTS
4	04/15/04	REVISED PER COMMENTS
5	04/25/04	REVISED PER COMMENTS
6	05/05/04	REVISED PER COMMENTS
7	05/15/04	REVISED PER COMMENTS
8	05/25/04	REVISED PER COMMENTS
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15	08/05/04	REVISED PER COMMENTS
16	08/15/04	REVISED PER COMMENTS
17	08/25/04	REVISED PER COMMENTS
18	09/05/04	REVISED PER COMMENTS
19	09/15/04	REVISED PER COMMENTS
20	09/25/04	REVISED PER COMMENTS

PROJECT: RICHIE STREET CLEANUP
TITLE: CONTAINMENT CELL
CROSS SECTIONS SHOWING
CAPPING DETAILS AND FINAL LEVELS
CONTRACT NO.: 7529-C04-8
DATE: 03/15/04

DATE	03/15/04
DRAWN	JMM
CHECKED	JMM
APPROVED	JMM
SCALE	AS SHOWN
NO.	0

