Rehabilitation of former industrial land, McCabe Street, Mosman Park — proposal for management of additional waste volumes — proposed change to environmental conditions

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LandCorp and Octennial Holdings Pty Ltd

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 863
July 1997

ISBN. 0 7309 8045 6
ISSN. 1030 - 0120
Assessment No. 1061

Summary

The Proposal

This report is to provide the Environmental Protection Authority's (EPA) advice and recommendations to the Minister for the Environment on the proposal by LandCorp and Octennial Holdings Pty Ltd to manage an additional 67,500m^3 of contaminated material as part of the rehabilitation of former industrial land at McCabe Street, Mosman Park .

Clean-up of this industrial land commenced in 1995 and has been subject to three previous assessments (EPA Bulletins 324, 699 and 807). The proponents are seeking to amend the existing conditions of approval under Section 46 of the Environmental Protection Act to allow for disposal of the additional contaminated material. The existing approvals have allowed the disposal of some 240,000m^3 of material in an engineered containment cell on the site.

LandCorp and Octennial Holdings Pty Ltd propose to dispose of the additional contaminated material in a new containment cell on the site immediately adjacent to an existing cell. The proposed cell would have a maximum waste disposal capacity of about 80,000m^3 which includes an approximate 20% contingency. The proposal also includes a contingency for off-site disposal of material which cannot be accommodated in the proposed new cell, to approved and licensed landfills.

In carrying out this assessment the EPA considered the practicality and benefits of disposal of all or part of the additional contaminated material off the site. Off-site disposal was not practical previously due to the nature of the contaminated materials and lack of suitable landfill sites.

To assist the EPA in assessing the proposal, it re-established a Technical Review Committee (the Committee) to report on the proposal. Representation of the Committee was similar to that convened in January 1996 comprising technical experts and community representatives.

The EPA considered and generally accepted the Committee's findings. The Committee's report is included at Appendix 5.

Relevant environmental factors

It is the EPA's opinion that the following are the environmental factors relevant to the proposal:

(a) contaminated soils;

(b) groundwater quality;

(c) Swan River water quality;

(d) dust;

(e) noise and vibration; and

(f) social surrounds.

The proposal as submitted was evaluated against the EPA's objectives.

With respect to the EPA's objectives for the protection of groundwater quality for beneficial uses including ecosystem maintenance, the protection of Swan River water quality, ensuring that dust levels do not adversely affect public health, welfare and amenity, and the protection of amenity of residents with respect to noise and vibration, the EPA considers that, subject to the implementation of the recommended conditions and procedures outlined below, the proposal as submitted can be managed to meet the EPA's objectives.

However, with respect to the EPA's objectives in relation to contaminated soils and social surrounds, the EPA is of the view that although the risk associated with implementation of this proposal is low and the proposal meets the appropriate technical criteria, the alternative of off-site disposal better meets the EPA's objectives of presenting minimal environmental risk in the long term and of meeting the public's concern with respect to environmental risk.

Conditions and procedures

It is the EPA's opinion that the following amendments should be made to the existing conditions and procedures (Ministerial Statement 338 and 409) if the proposal is implemented as submitted:

(a) Condition 1 should be amended to make the proponents' revised commitments, made in their reports of February 1997 and April 1997, legally enforceable.;

(b) Conditions 2 and 5 should be amended to allow disposal of the additional contaminated material in accordance with the proponents' reports of February 1997 and April 1997, and

(c) Condition 3 should be amended to require the Environmental Management Programme to be upgraded to the satisfaction of EPA in respect of the following matters:

  (i) Cell construction;

  (ii) Environmental monitoring;

  (iii) Environmental monitoring response action plans;

  (iv) Off-site waste disposal; and

  (v) Environmental reporting.

Other advice

The Technical Review Committee advised that:

"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 initiatives should continue as a matter of utmost urgency to locate a suitable site or sites that could receive contaminated waste material and that it be stored, treated/or disposed of in a manner that is environmentally and socially acceptable.

As an option is now available for this additional contaminated material to be removed from the site, the committee finds that off site disposal (with or without treatment or interim storage) rather than the establishment of a new cell, is the preferred option in terms of risk and potential impact on the environment. This option would also be more socially acceptable".

The EPA agrees with the Committee's views. Disposal of the additional contaminated material off-site at an approved landfill site presents lesser environmental risks in the long term and avoids the need for increased monitoring and management which is necessary if the material is buried on-site.

The EPA is strongly of the view the material should be taken off the site.

Recommendations

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment note the relevant environmental factors and the EPA's objective for each factor as set out in Section 3 of this report.

Recommendation 2

That the Minister for the Environment note that although the environmental risk of the proposal as submitted is low and meets technical criteria, the alternative of off-site disposal better meets the EPA's objectives of presenting minimal environmental risk in the long term and of meeting the public's concern with respect to environmental risk.

Recommendation 3

That if the proposal is implemented as submitted the Minister for the Environment imposes the conditions and procedures set out in Section 4 of the report.

Recommendation 4

Notwithstanding Recommendation 2 that the environmental risk of the proposal submitted is low, the Minister for the Environment note that disposal off-site of the excess contaminated material is now a practical option because of the availability of appropriate disposal sites, and that the EPA prefers this option.

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Appendices

1. Introduction and background

This report is to provide the EPA's advice and recommendations to the Minister for the Environment on the proposal by LandCorp and Octennial Holdings Pty Ltd to manage an addition 67,500 m^3 of contaminated material as part of the rehabilitation of former industrial land, McCabe Street, Mosman Park .

The principal method of management of the wastes proposed by the proponents is on-site disposal in a new cell as detailed in Halpern Glick Maunsell (HGM) 1997a & b. The cell would have a maximum waste capacity of about 80,000m^3, providing a volume contingency of about 20% on the expected volume of 67,500m^3. The cell would be located immediately adjacent to the existing cell (Appendix 1:Figure 1). The proposal also includes a contingency option to dispose off-site any wastes additional to the maximum capacity of the cell in appropriately licensed landfills.

The wastes are additional to the 242,000m^3 currently approved for disposal in the existing cell under Ministerial conditions for the project set in February 1994 and amended in March 1996 (Ministerial Statements 817 and 993). A summary of previous proposals and decisions relating to disposal of wastes in the existing cell is presented in Appendix 2, and the existing environmental conditions are listed in Appendix 3.

Rehabilitation of the site and disposal of the additional waste volume constitutes an amendment to the original proposal, and has been assessed under Section 46 of the *Environmental Protection Act 1986.*

EPA Technical Review Committee

To assist the EPA in assessing the proposal, it re-established the Independent Review Committee (the Committee) convened during the 1996 assessment to report on issues relating to the current proposal. The Committee has allowed the EPA to obtain direct community input, and gain a wide range of expert technical advice. A similar committee was used in January 1996 to assist with the assessment of the proposal to increase the size of the containment cell and changes to removal of drainage outfalls. The 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. A list of the Independent Review Committee Members and the Committee's Terms of Reference are presented in Appendix

The Committee's report is presented at in Appendix 5.

Previous assessments

The cleanup of the McCabe Street site has been previously assessed by the EPA. The outcomes of these assessments are documented in the following EPA publications and Statements of Environmental Approval by the Minister for the Environment:

- EPA report and recommendations to the Minister for the Environment on the Consultative Environmental Review (EPA Bulletin 699, August 1993a);
- Ministerial Statement That a Proposal May be Implemented, dated 1 February 1994;
- EPA report and recommendations to the Minister for the Environment on proposed changes to environmental conditions (EPA Bulletin 807, February 1996); and
- Ministerial Statement to amend conditions applying to a proposal dated 15 March 1996.

The site clean-up commenced in 1995 comprised removal of wastes and contaminated soil from future residential areas and disposal of these materials in a secure cell within a Crown Reserve on the site (Appendix 1:Figure 1). This clean-up resulted in:

- disposal of about 274,000m^3 (about 32,500m^3 above the approved volume) of wastes in a secure cell on site;

- the interim stockpiling of approximately 27,000m^3 in other areas of the site; and
- the identification of approximately 3,500m^3 of additional wastes to be removed from relatively minor areas of the site.

2. The Proposal

To enable final completion of the site remediation it is necessary to manage an additional volume of approximately 67,500m^3 of contaminated materials.

The volume of waste presented in the proposal (Halpern Glick Maunsell, 1997a) was 48,500m^3. However, during the assessment of the proposal by the DEP and following further review of the quantities by the proponents' consultants, this value has been increased to 67,500m^3, due principally to the re-assessment of the amount of material stockpiled in the existing containment cell. A detailed description of the additional wastes are presented in Appendix 6.

In order to accomplish this, the proponents propose to create a new secure cell within a Crown Reserve adjacent to and constructed in a similar manner to the existing cell (Figures 1 and 3) (Halpern Glick Maunsell, 1997a & b). It is also proposed that the cell have a maximum waste capacity of approximately 80,000m^3, providing a contingency of approximately 20% on the estimated quantity of 67,500m^3.

The proposal also includes a contingency option to dispose of low level contaminated wastes, additional to the maximum waste capacity (80,000m^3) of the proposed new cell, off-site in appropriately designated and licensed landfills within and in close proximity to the Perth Metropolitan area.

The additional wastes addressed in the proponents' proposal comprise the following approximate volumes and Classes of materials (Table 2 over).

The locations of these materials are shown in Appendix 1:Figure 2 and more detailed descriptions are presented in Appendix 6.

The principal features of the proposal, as described by the proponents (Halpern Glick Maunsell, 1997a and 1997b) are:

- removal of waste and contaminated soil from future residential areas with the consolidation of these materials within a Crown Reserve on the site;
- removal of waste and contaminated soil from the foreshore area with the consolidation of these materials within the Crown Reserve on the site;
- construction of a disposal cell within this reserve to accommodate a maximum volume of waste of approximately 80,000m^3;
- lining of the cell with a layer of crushed limestone with a nominal thickness of 500mm (Appendix 1:Figure 3);
- placement of the wastes in the cell in the following order so that those wastes with the greatest acid producing potential are placed with as much limestone rich wastes below them:
  - contaminated limestone;
  - foundry waste;
  - concrete rubble;
  - residual pyrite cinders; and
  - foreshore waste.

Table 1. Approximate volumes, classification and location of additional contaminated materials at McCabe St, Mosman Park

Approximate Volume (m^3)	* Principal Class Designation	Location/Source
32,500	Mixture of III and IV	Stockpiled on the existing cell above the currently approved contours of the upper surface of disposed waste.
18,000	II and III	Two stockpiles on site.
9,000	III	Temporary storage facility. Approximately 6,500m^3 from cleanup of the foreshore by the proponent for DOLA, and the remainder comprising the sand lining to the storage facility.
5,000	I, II and III	A stockpile of concrete rubble and underlying contaminated material.
2,000	II, III and IV	Small quantities from several areas of the site still remain in the ground.
1,000	IV	Small quantities from two areas of the site
Total 67,500		

* from DEP 1996a, *Landfill Classification and Waste Definitions.*

- placement of a capping system, containing a low permeability clay layer with a minimum thickness of 600mm (Appendix 1:Figure 3);
- use of clean materials excavated from the cells as fill on the site to meet subdivision requirements;
- a waste volume contingency strategy comprising:
  - provision of additional storage capacity in the cell of about 20% (approximately 13,000m^3) on the expected volume of wastes (approximately 67,500m^3); and
  - off-site disposal in appropriately licensed landfills of material in excess of the maximum capacity of the cell (approximately 80,000m^3), with transport of any contaminated materials off-site under the control of an environmental transport management programme;

The proponents anticipate that implementation of the proposal would take approximately 20 weeks.

3. Relevant environmental factors

It is the EPA's opinion that the following environmental factors are relevant to the proposal:

(a) contaminated soils;

(b) groundwater quality;

(c) Swan River water quality;

(d) dust;

(e) noise and vibration; and

(f) social surrounds.

A description of these environmental factors and their assessment is presented in Sections 3.1 to 3.6 below.

References cited in the text are presented in Appendix 7.

3.1 Contaminated Soil

Description

Approximately 67,500m^3 of wastes are additional to that currently approved for disposal in the existing cell on the site, and comprise volumes and classes of wastes summarised in Section 2 and detailed in Appendix 6 of this report.

The wastes addressed in the current proposal generally appear to have a lower potential for acid generation and a correspondingly lower potential for mobilisation of heavy metals than the wastes disposed of in the existing containment cell. Notwithstanding, these wastes and contaminated soils have the potential to impact on the environment and human health and accordingly require management treatment.

Acid neutralisation potential is the quantity of sulphuric acid that will be neutralised by one tonne of contaminated material. The proponents estimate that, on average, the additional wastes have an acid neutralisation capacity of approximately 0.3 tonne of sulphuric acid per cubic metre of wastes, whereas the wastes disposed in the existing cell have a neutralisation capacity of approximately 0.2 tonne of sulphuric acid per cubic metre of waste. The higher the acid neutralisation potential of the contaminated material, the lower the potential for leaching of acid leachable material.

Unlike the previous wastes, the additional wastes are unlikely to contain materials which have been treated with cyanide.

As described in Section 2 and Appendix 6 of this report, approximately half the volume of the additional wastes (34,000m^3) has been identified by the proponents as Class III or less, and as occurring in discrete stockpiles or locations. These wastes would therefore be suitable, without treatment, for disposal in existing and appropriately licensed landfills within or in close proximity to Perth. The remaining wastes (approximately 33,500 m^3) have been identified by the proponents to comprise:

- approximately 32,500m^3 of a mixture of Class III (approximately 25,500m^3) and IV (approximately 7,000m^3) wastes located on top of the existing cell;
- approximately 1,000 m^3 of Class IV wastes located in two areas of the site.

Approximately 8,000 m^3 of the additional 67,500 m^3 contaminated materials comprise contaminated materials from the areas remaining from the previous cleanup operations (Appendix 1:Figure 2) and allowances for potentially contaminated soils below stockpiles. It is proposed that the cleanup of these areas should be undertaken to the requirements of existing Environmental Conditions 4-1 and 4-2 (Appendix 3) such that the site would be suitable for residential use. This would be achieved by reducing concentrations of heavy metals to less than the soil investigation levels listed in the Environmental Soil Quality Guidelines presented in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NHMRC 1992). Heavy metals contaminants of concern and their corresponding cleanup levels in mg/kg are:

Copper	Zinc	Arsenic	Cadmium	Mercury	Lead
60	200	20	3	1	300.

The achievement of these levels would be assessed by the use of the cleanup verification protocol developed by the Victorian EPA and described in Section 7 of the existing EPA approved Environmental Management Plan prepared by Halpern Glick Maunsell (HGM).

The principal options currently available for management of the additional wastes are:

(a) on-site disposal of up to about 80,000m^3 of wastes in an environmentally secure cell:

  (i) without treatment with a contingency to dispose of wastes in excess of 80, 000m^3 off-site in appropriately licensed landfills, as proposed by the proponents; and

  (ii) with treatment with a contingency to dispose of excess wastes off-site in appropriately licensed landfills.

(b) off-site disposal in appropriately licensed landfills of all the additional waste:

  (i) without treatment and with interim storage of about 33,500m^3 of Class IV waste until a Class IV landfill facility becomes available; and

  (ii) with treatment of about 33,500m^3 of Class IV wastes to reduce them to Class III.

Option (a) (i) is proposed by the proponents, and is the subject of this assessment.

The DEP has advised that the existing classification of the materials was based on the assessed concentrations in situ (that is before the materials were excavated, transported and placed on the existing cell or stockpiles).

Experience with environmental management of contaminated sites indicates that such normal waste handling procedures often result in dilution and mixing of the wastes with associated reduction in the classification of the materials. For example, testing of foundry wastes at the site showed the material to be Class IV, however, following movement of the wastes to the stockpiles, further analyses indicate that the concentrations of contaminants in stockpiles would classify the waste as Class III. The DEP therefore recommends that further testing and classification of the material be carried out if off-site disposal is proceeded with.

Assessment

The area considered for assessment of this relevant factor is the McCabe St development site, and existing and potential licensed landfill sites where the material could be disposed of.

The EPA's objectives in regard to this environmental factor are that:

(i) the site should be cleaned up to a condition suitable for residential use;

(ii) the contaminated material should be treated and/or disposed of in a manner which adequately controls the infiltration of water in the material, and the formation and seepage of leachate from the material; and

(iii) the contaminated material is treated and/or disposed of in an environmentally secure manner and presenting minimal environmental risk in the long term.

Based on its assessment the Technical Review Committee concluded that "the option of constructing a new cell on the site in accordance with the proposal put forward, was similar, and possibly lesser, in its environmental implications to the existing cell. However as a consequence, it can only increase the amount of contaminated material stored on what is essentially an urban site. It will therefore proportionally increase the inherent environmental risks, ongoing monitoring and maintenance requirements and contingency liability associated with such a cell in such a location."

Technical Review Committee found that off-site disposal (with or without treatment or interim storage) rather than establishment of a new cell, is the preferred option in terms of risk and potential impact on the environment.

The Committee's preference and conclusions are presented and its report included at Appendix 5.

The EPA notes that, during the previous assessments, wastes were predominantly classified as Class IV and that there were no Class IV disposal facilities available. As a result the previous assessments for management of contaminated materials at the site (EPA Bulletin 699, 1993a) and (EPA Bulletin 807, 1996) differed fundamentally with respect to the options that could be considered in comparison to the current assessment.

Options for disposal without treatment of some of the additional wastes by the proponents now exist because a significant portion (at least 50%) has been identified as Class III or less and is present in discrete stockpiles and locations. Also, re-assessment of the classifications of the excess wastes on the existing stockpile, which consists of a mixture of Class III and IV wastes, may result in classification of a considerably larger proportion of these wastes as Class III and/or enable separation of some of the Class III wastes.

The likely small volume of Class IV wastes remaining after reassessment could be easily treated to reduce them to Class III or stockpiled until a Class IV facility becomes available.

Treatment of the Class IV wastes with limestone or lime to reduce to them to Class III, thus making them suitable for disposal into currently available and appropriately licensed landfills, would avoid the environmental risks associated with storage of Class IV wastes until a Class IV facility becomes available and the uncertainties associated with the availability of a Class IV disposal facility.

Treatment of the wastes with lime or limestone to reduce the acid generation potential in accordance with approved protocols is both technically feasible and a straight forward method to reduce the mobility of contaminants to such an extent that, in conjunction with appropriate cell construction and management, the environmental risk of on-site disposal could be managed to meet the appropriate technical criteria. Treatment in this manner would, however, increase waste volume, and require a relatively large on-site mixing operation with incumbent quality control to ensure that the design objectives are achieved and potential environmental impacts such as noise and dust emissions are kept within acceptable limits.

The option for disposal into a Class IV facility is limited because at present there is no such facility available in proximity to Perth. The Eastern Metropolitan Regional Council has commenced assessment of the engineering and environmental aspects of the development of a Class IV facility at its existing Red Hill landfall facility. The EPA understands, however, that the earliest the facility is likely to be available is about April 1998, provided the proposal receives environmental approval and the council decides to construct the facility according to its current planning schedule. The DEP recently awarded a study to identify sites which are environmentally suitable for a Class IV landfill site that could service the Perth metropolitan area. However, it is expected that the final selection and environmental approval of such a site may take at least two years.

The EPA further notes the reiteration of the Committee's advice in January 1996 that public plans and files should show the existence and extent of contaminated land, and such information should be provided to servicing utilities.

Having particular regard to:

(a) the Technical Review Committee's advice;

(b) the quantity and current classification of the additional wastes;

(c) the existing and anticipated availability of landfill sites suitable for disposal of wastes classified as Class III or less;

(d) the likelihood that re-assessment of the classification of the excess material on the existing cell may result in an increase in the proportion of Class III wastes, and/or enable separation of some of the Class III wastes from Class IV wastes; and

(e) the availability of proven treatment methods to reduce Class IV wastes to Class III wastes,

it is the EPA's opinion that although the risk of the proposal as submitted is low and meets appropriate technical criteria, the alternative of off-site disposal better meets the EPA's objective of presenting minimal environmental risk in the long term.

Therefore, the EPA is strongly of the view that the wastes should be re-tested in accordance with protocols approved by DEP, treated if necessary and disposed of off-site in appropriately licensed landfills.

3.2 Groundwater quality

Description

With proposed on-site disposal, there is a low risk for leaching of heavy metals from the cell into the groundwater causing pollution. As a result of elevated salinity levels, there is currently no identified human use of the groundwater on the site. However, the groundwater flow beneath the site is towards the Swan River.

The potential for leaching of heavy metals from the proposed cell arises from the generation of an acid environment within the waste. This requires the addition of moisture and oxygen to the waste together with the presence of residual sulphur that can form sulphuric acid.

The proponents estimate that soils within the proposed cell would have the capacity, on average, to neutralise about 0.3 tonne of sulphuric acid. This is more than can be produced in the cell and is supplemented by the further acid neutralisation capacity available from the limestone lining to the cell and the minimum of 5 metres depth of calcareous soil and limestone between the cell and the groundwater table. In order to reduce the risk of leachate affecting groundwater to a practical minimum, the proponent's propose the following cell design and management approach:

- construction of the cell with a five metre vertical separation between the base of the cell and the groundwater table;
- placement of a limestone base and lining in the cell to provide more acid neutralisation potential;
- placement of a cover over the cell to minimise water and air ingress, including a low permeability (10^{-9} ms^{-1}) 600 mm thick clay layer;
- successive placement into the cell of layers of contaminated material and uncontaminated limestone;
- implementation of a monitoring programme which would include monitoring of the condition of the cover, moisture content of the waste, and downstream groundwater quality; and
- approved contingency measures would be implemented should monitoring indicate any deterioration of the integrity of the cell cover and/or leaching of significant concentrations of heavy metals into the groundwater.

The relationship of the site to the Swan River is discussed in Section 3.4.

Assessment

The area considered for assessment of this relevant factor is the groundwater aquifer in the limestone below the site.

The EPA's objective in regard to this environmental factor is to maintain the quality of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.

The EPA notes the advice of the Technical Review Committee 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 dependent on the integrity of this cap. A properly constructed and

maintained 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 EPA accepts that owing to the assessed overall acid neutralisation potential of the waste and the proposed cell construction, including the capping system, the risk of leachate generation and the subsequent contamination of the groundwater appear to be low.

The EPA agrees with the Committee's concern that the long term performance of the cell, and the subsequent protection of groundwater quality, are largely dependent on the integrity of the cap. It is the EPA's opinion that adequate measures will be required to address the following aspects to ensure such integrity:

- selection and placement of capping materials, and quality assurance and independent auditing of these activities;
- long term maintenance of the low permeability of the capping material;
- management of the use of the land over the cap to ensure uses are compatible with long term maintenance of its integrity;
- mechanisms to manage drainage and prevent erosion in the long term;
- monitoring of the condition of the cap, settlement of the cap, and moisture content of the cap and waste; and
- groundwater monitoring.

The EPA also notes the following views expressed by the Committee:

- the distribution of material in the cell should be managed in a manner to reduce the risk of small volumes of soil containing high concentrations of heavy metals or other contaminants occurring;
- in the event of lesser space being available within the cell the clay cap should be placed no greater than two meters below the finished surface;
- a management plan for the use of the clay cap should be prepared in association with the Department of Land Administration and Mosman Town Council;
- the capping over the existing cell and the proposed new cell should be continuous; and
- as constructed drawings of the containment cell showing locations and details of all waste placed in the cell should be provided to the DEP.

The EPA also notes the Committee's comment on the need to increase funding arrangements for long term monitoring, maintenance and contingency measures if the new cell proceeds, in whole or in part (Appendix 5). It is the EPA's opinion that such funding is an essential and integral part of the environmental management of the cell.

The EPA agrees with the Committee's concern about the limits to the application of the proposed groundwater recovery and treatment contingency system, particularly its spatial and temporal effectiveness in a limestone formation.

There has been no detailed study to show that the proposed groundwater contingency strategy is likely to be effective. Protocols set to define contingency response action levels and contingency actions are yet to be established. The EPA also notes that further information on this and other potential contingency options need to be provided as required under the existing (March 1996) approval for the increase in size of the existing cell.

The EPA notes that since the proposed new cell would be adjacent to and not downstream (in relation to groundwater flow direction) from the existing cell, the extent of groundwater contamination has the potential to be more dispersed (although it may be lower in concentration) than if the new cell was placed downstream of the existing cell.

The EPA notes both the Committee's concern with regard to cyanide not being included in the current groundwater monitoring programme, and the commitment by the proponent that it be included in all future groundwater monitoring.

Having particular regard to:

(a) the apparent low risk of leachate generation and subsequent contamination of the groundwater beneath the site;

(b) the salinity of the groundwater and no existing human use of the groundwater;

(c) the proposed cell cover system;

(d) the composition of the waste;

(e) the proposed waste placement techniques; and

(f) the proposed long term monitoring and management programme,

it is the EPA's opinion that the proposal could be managed so as not to compromise its objective in regard to groundwater quality provided that:

(a) the integrity of the cell cap is maintained in the long term;

(b) the proposed cell monitoring and management programme is undertaken to the satisfaction of the EPA, using sampling, analytical, assessment and reporting protocols specified in the Environmental Management Programme.

(c) the proposed cell monitoring and management programme is implemented and maintained in the long term to the satisfaction of the EPA; and

(d) it can be demonstrated, to the satisfaction of the EPA, on advice of the DEP, that the proposed groundwater recovery and treatment system is likely to be effective.

It should be noted that the EPA considers that the removal of the additional wastes off-site would fully meet the EPA's objective as it would remove any possibility of the additional material potentially contaminating groundwater at the site.

3.3 Swan River water quality

Description

Leachate from the proposed new cell into the groundwater could transport contamination to the Swan River if not adequately controlled. There are two potential pathways to be considered in relation to Swan River water quality. The first is that groundwater beneath that site and the containment cell flows towards the Swan River, some 200 metres from the southern edge of the proposed cell. The second pathway is from runoff from the site carrying material from surface soils to the river.

Once the site has been remediated to meet the criteria set out in the ANZECC guidelines for the assessment and management of contaminated sites (ANZECC 1992), it is unlikely that contaminated runoff will flow to the river.

All the remediated areas, including those at the foreshore, will be covered with clean fill following validation.

Assessment

The area considered for assessment of this relevant factor is the Swan River adjacent to the site.

The EPA's objective in regard to this environmental factor is to maintain or improve river water quality, consistent with the *draft Western Australian Water Quality Guidelines for Fresh and Marine Waters* (EPA, 1993b).

Due to the generally porous nature of the soils chosen for cover of remediated areas, the possibility of contaminated surface flow to the Swan River is low. The removal of site drainage channels were the subject of an earlier change in conditions (EPA 1996) and has been completed.

Following consideration of the relatively low level of risk of groundwater contamination, as discussed in Section 3.3 of this report, and additional acid neutralisation capacity available in the limestone aquifer between the cell and the Swan River, the risk of pollution of the river by leachate from the proposed cell appears to be very small. However, this level of risk is contingent on the maintenance of the integrity of the cell cap and adequate implementation of the management, monitoring and contingency strategies proposed for control of leachate generation and pollution of groundwater, as described in Section 3.3 of this report.

The discussion of long term integrity of the cap and protection of groundwater was in Section 3.3 is also relevant here.

Having regard to:

(a) the apparent low risk of generation of leachates from the cell; and

(b) the potential for further neutralisation of any leachate between the cell and the Swan River,

it is the EPA's opinion that the proposal can be managed so as not to compromise its objectives in regard to quality of water in the Swan River provided that:

(a) the integrity of the cell cap is maintained in the long term;

(b) the proposed cell monitoring and management programme is undertaken to the satisfaction of the Environmental Protection Authority, using sampling, analytical, assessment and reporting protocols specified in the Environmental Management Programme;

(c) the proposed cell monitoring and management programme is implemented and maintained in the long term to the satisfaction of the EPA; and

(d) it can be shown, to the satisfaction of the EPA, on advice from the DEP, that the proposed groundwater recovery and treatment system is likely to be effective.

It should be noted that the EPA's objective would be fully met if the additional material is removed off-site.

3.4 Dust

Description

There is a potential for emissions of wind-blown dust from the proposed operations to cause public nuisance, pose a risk to public health, and lead to environmental impacts.

Dust emissions may originate from a number of the site operations; including:

- excavation of the cell, and transport and placement of excavated materials;
- excavation of, transport and placement of contaminated materials in the cell;
- off-site transport of excess contaminated materials;
- transport to site of capping materials;
- placement of capping materials; and
- unstabilised stockpiles and other surfaces.

Dust monitoring has been undertaken at the site since 7 September 1995. Monitoring has involved the use of high volume air samplers, the locations for which are indicated in Appendix 1:Figure 4.

Dust monitoring results are summarised in Table 2 and represent averaged Total Suspended Solid load as a function of the volume of air sampled.

Table 2. [1] Measured dust concentrations, exceedences of 90µg/m³ annual average standard, and maximum recorded hourly concentrations determined at various sites on the McCabe St site.

[2] Location	Annual average (µg/m³)		[3] Number of daily exceedances of 90µg/m³		Maximum measurement over 24 hour period (µg/m³)	
	Sept 95 - Sept 96	Oct 96- Mar 97	Sept 95 - Sept 96	Oct 96- Mar 97	Sept 95 - Sept 96	Oct 96- Mar 97
West 1	51		7		273	
West 2	42		2		99	
East	41	40	3	2	231	135
Cell	48	44	12	5	167	110
Shed		43		0		83

Notes

1. It should be noted that the figures quoted relate to sampling sites within the disturbed area and accordingly are likely to be higher than dust levels experienced in adjoining residential areas.
2. The locations of the sampling sites are indicated in Appendix 1:Figure 4.
3. 90µg/m³represents a concentration which is desirable not to exceed, with an imposed limit of 150µg/m³

For comparison, typical total dust figures for the Perth metropolitan area during 1994 fell within the range 25 to 108 µg/m³ and exhibited a mean of 57 µg/m³.

The determination of heavy metals in the dust was undertaken for a number of samples which principally related to periods of considerable dust concentration as indicated by the results of high volume sampling. These results are indicated in Table 3 below.

Table 3. [1] Summary of selected heavy metal analysis results for dust from high volume air sampling, McCabe St., Mosman Park.

Parameter	Copper	Zinc	Arsenic	Cadmium	Mercury	Lead
Concentration	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)
criteria[2]	1000	1000	50	50	10	150
criteria[3]	33	33	1.7	0.33	1.7	5
low level	<0.006	<0.006	<0.0006	<0.0006	<0.00002	<0.006
high level	0.015	2.61	0.0017	<0.0006	0.00012	0.36
detection level	<0.006	<0.006	<0.0006	<0.0006	<0.00002	<0.006

Notes

1. Methodology: low temperature nitric/acid digestion /atomic absorption spectophotometic analysis.
2. Worksafe Australia Occupational Time Weighted Exposure Standards
3. Guideline Value calculated from 1/30th of the Worksafe Australia Occupational Time Weighted Exposure.

Interpretation of dust concentration results presented above indicate that annual average dust (total suspended solids) measurements are below the indicated EPA annual criteria of 90µg/m³ (EPA 1992). The monitoring of dust concentrations at other Perth development sites uses a shorter averaging time and accordingly direct comparisons are not possible.

The WA Environmental Protection Policy (Atmospheric Wastes) Kwinana (EPA 1992) specifies an ambient dust limit (averaged over 24 hours) for land used predominantly for residential and rural purposes of 150µg/m³ with a standard (a concentration which is desirable not to exceed) of 90µg/m³.

The results of analysis for selected heavy metal in dust collected from high volume air sampling at the McCabe St. site indicates levels of contamination well below accepted criteria.

The EPA has been advised that the DEP received 11 formal complaints with respect to unreasonable dust from 6 October 1995 until 30 May 1997. Further complaints and expressions of concern were lodged directly with the Town of Mosman Park or directly with the proponents.

LandCorp and Octennial Holdings Pty Ltd propose that additional works will be carried out using the following dust control strategies:

- note complaints during existing operations;
- application of water to dry surfaces to prevent dust lift off and control dust from earthmoving operations;
- use of wind fencing where relatively long term control of dust generation potential is required;
- use of water sprinklers if excessive dust generation becomes a problem;
- coverage of soil and wastes with hydromulch or a similar compound where such materials are likely to remain exposed for relatively long periods; and
- monitor the performance of a dust monitoring programme with the use of high volume air samplers.

Assessment

The area considered for assessment of this relevant factor is the development site and adjoining residential area, School, Rocky Bay village and areas of the river.

The EPA's objective with respect to dust is to ensure that the dust levels generated by the proposal do not adversely impact upon welfare and amenity or cause health problems by meeting statutory requirements and acceptable standards.

Relevant guidelines and standards include:

- the DEP *Guideline for the Prevention of Dust and Smoke Pollution from Land Development Sites in Western Australia* (DEP, 1986)
- the WA *Environmental Protection Policy (Atmospheric Wastes) Kwinana* (EPA 1992)

Interpretation of the dust monitoring data indicates that although average dust levels do not exceed the limit (150 $\mu g/m^3$) adopted for residential areas identified in the Kwinana Environmental Protection Policy (EPA 1992), ambient dust standards ($90\mu g/m^3$) are on occasion exceeded within the site.

Dust control procedures proposed for the additional cell (HGM, 1997a) are similar to those in place for the previous disposal operations. As a consequence of dust complaints during previous operations and the Review Committee's concern regarding dust impacts, the EPA recommends that the following procedures, additional to that proposed by the proponents, be included in an upgraded Environmental Management Programme that would control operations on the site:

- minimisation of the handling and stockpiling of materials on site, to reduce the potential for dust generation;
- coverage of soil and wastes with hydromulch or similar compound where such materials are likely to remain exposed for periods greater than two days;
- maintenance of cover over existing stockpiled wastes;
- prior approval for any proposal for such stockpiling be obtained from the DEP; and
- dust monitoring response action procedures.

Off-site disposal of all the wastes would limit effects associated with the excavation of the cell, placement of the excavated material, placement of contaminated material in the cell, placement of the cell lining, transport of capping materials site and placement of such materials.

Additional dust could be generated as a consequence of waste treatment if undertaken, and in the case of off-site disposal, loading into and movement of licensed transport vehicles on public roads.

Having regard to:

(a) the Committee's concern that dust levels are a continuing concern to local residents;

(b) complaints received from adjacent residents during the previous waste handling operations; and

(c) the proponents' proposed dust management strategy;

it is the EPA's opinion that the proposal is unlikely to compromise its objectives in regard to dust emissions provided that the proponents' proposed dust management procedures and the EPA's recommended additional control procedures listed above included in an amended Environmental Management Programme (EMP) controlling site operations, and the proposal is implemented in accordance with the EMP.

3.5 Noise and vibration

Description

Noise emissions from earthmoving equipment and trucks, and vibrations from compacters used in placement of the containment cell lining and cover materials have the potential to exceed levels acceptable to the community.

The Authority notes that from November 1995 to 30 May 1997 the DEP received 11 formal complaints with respect to noise and vibration. Complaints and expressions of concern have also been lodged with the Town of Mosman Park, or directly to the proponents. In response to complaints from nearby residents, monitoring was undertaken by specialist noise and vibration consultants on four occasions to quantify the:

- levels of vibration associated with ripping and bulldozing;
- levels of vibration associated with compacting at two residences; and
- noise levels associated with the excavation work.

All measurements were undertaken at the affected residence within the residential area adjoining the development. The results show that the vibration levels as a consequence of the operation of earthmoving machinery at the measurement position were below that which would normally be associated with structural damage, but approach the criteria specified in Australian Standard AS 2670.2 - 1990 for residential areas during the day and could be annoying. A summary of this data is presented in Table 4.

The results of vibration monitoring at nearby residences associated with compacting are presented in Table 5 and indicate that the levels at the measurement positions are below that which would normally be associated with structural damage. Regarding annoyance, the levels were on occasion considerably higher than the criteria specified in Australian Standard AS 2670.2 - 1990 for residential areas during the day.

Results of the measurement of noise levels associated with the excavation work indicate that noise levels were higher than the assigned levels during the day both during and following site operations. There is insufficient information in the report to determine if the measured noise was from the excavation site or from other sources contributing to high background levels.

Table 4. Summary of maximum vibration levels (mm/second peak) associated with the movement of equipment on site and measured in residential areas adjacent to McCabe St, Mosman Park.

	Value	Estimated Peak Particle Velocity (mm/sec)	Comments
criteria[1]			applies to:
class 1		2	<-- historical buildings and monuments
class 2		10	<-- houses and low rise residential
class 3		25	<-- commercial and industrial buildings
criteria[2]		0.28 to 0.56	daytime allowance for residential occupation
measured values			
compactor set on Low	low value	0.19	
	high value	0.21	
compactor set on High	low value	0.28	
	high value	0.28	

Notes
1. AS2187.2 1983 Explosives - Storage Transport and Use Part 2, Use of Explosives.
2. AS2670.2 1990 Evaluation of human exposure to whole body vibration Part 2, Continuous and shock induced vibration in buildings.

Table 5. Summary of maximum vibration levels (mm/second peak) associated with containment cell compacting and measured in residential areas adjacent to McCabe St, Mosman Park.

	Value	Estimated Peak Particle Velocity (mm/sec)	Comments
criteria[1]			applies to:
class 1		2	<-- historical buildings and monuments
class 2		10	<-- houses and low rise residential
class 3		25	<-- commercial and industrial buildings
criteria[2]		0.28 to 0.56	daytime allowance for residential occupation
measured values			
both rollers operating	low value	1.2	Results an aggregate of high and low
	high value	2.4	compaction settings
single roller operating	low value	0.9	Results an aggregate of high and low
	high value	2.3	compaction settings

Notes

1. Australian Standard AS2187 1983 Explosives - Storage Transport and Use Part 2, Use of Explosives.
2. AS2670.2 1990 Evaluation of human exposure to whole body vibration Part 2, Continuous and shock induced vibration in buildings.

The proponent has implemented recommendations made during the noise and vibration monitoring including the use of higher frequency, lower vibration amplitude settings on vibrating rollers.

The proponent has further implemented noise management strategies including the restriction of working hours, and case-by-case response to noise complaints. The existing Environmental Management Programme limits site work to the hours between 7:00 am and 6:00 pm Monday to Saturday and that the work would be carried out to meet the limits identified in the *Noise Abatement (Neighbourhood Annoyance) Regulations 1979.*

Assessment

The area considered for assessment of this relevant factor is the development site and adjoining residential area, School and Rocky Bay Village, as it is the people living and working in these areas who could be affected by unreasonable noise and vibration.

The EPA's objective with respect to noise and vibration emissions is to protect the amenity of nearby residents from noise and vibration impacts resulting from activities associated with the proposal by ensuring that noise levels meet statutory requirements and acceptable standards.

Relevant standards include:

(a) the *Noise Abatement (Neighbourhood Annoyance) Regulations 1979*;

(b) the *Draft Environmental Protection (Noise) Regulations* (when promulgated; and

(c) Australian Standard AS 2670.2 - 1990.

The EPA notes that vibration attributable to earthmoving and construction activities on the site can on occasion exceed amenity guidelines, and that there is no formalised system in the Environmental Management Programme which specifies what actions should be undertaken to address complaints relating to noise and vibration. Noise criteria may also be exceeded on occasion in part due to operations at the site. Due to the hours of operation at the site (daylight hours) and the nature of the operations on the site, the impact of operations will require close attention by the proponent.

Having regard to:

(a) the noise and vibration controls applied to date;

(b) previous complaints from local residents with respect to noise and vibration;

(c) the results on noise and vibration monitoring undertaken to present; and

(d) the proponents' proposed approach to noise control;

it is the EPA's opinion that the proposal could be managed so as not to compromise its objectives in regard to noise and vibration provided that the proponents' proposed management controls (ie hours of operation, monitoring in response to complaints, compaction equipment on low settings) are included in the amended Environmental Management Programme for the project and the proposal is implemented in accordance with the EMP.

The EPA considers that disposal off-site would reduce the number and period of noise and vibration - generating activities on the site by limiting all those activities associated with the construction, placement, compaction and capping of the proposed cell. Additional impacts of road truck loading and local travel would need to be appropriately managed.

3.6 Social surrounds

Description

Community concerns identified in previous environmental assessments for the project and re-iterated by the Committee in its review of the current proposal are:

- concern for public health and amenity due to dust, noise and vibration impacts;
- concern in relation to ongoing environmental risk to the groundwater and the Swan River; and
- concern in relation to increase in long term financial liability, particularly with respect to monitoring, implementation of contingency measures and the close proximity of houses to the proposed new cell.

The risks to groundwater and the Swan River discussed in Sections 3.2 and 3.3, and the potential dust, noise and vibration impacts discussed in Section 3.4 and 3.5, are relevant to this factor.

Assessment

The community which could be affected by the proposal are the local residents, school children and residents and carers at Rocky Bay village adjacent to the project. Concern with issues associated with environmental risk to groundwater, the Swan River and long term financial liability are relevant both within the local community and elsewhere in Perth.

The EPA's objective with respect to this factor is ensure that the contaminated material is treated and/or disposed of in a manner that does not pose an unacceptable risk to public health, and which poses minimal environmental risk in the long term.

It should be noted that the completion of the site remediation will result in a real reduction in the risk posed to the community by the historical contamination of the site.

The EPA notes the community's concern with respect to ongoing environmental risk. The EPA considers, in agreement with the Committee's advice, that off-site disposal of the additional material described in this proposal removes the environmental risk to groundwater and the Swan River.

Having particular regard for:

(a) community concerns; and

(b) advice from the Committee concerning the current proposal,

although the risk is low and the proposal as submitted meets the appropriate technical criteria, the alternative of off-site disposal better meets the EPA's objective with respect to minimal environmental risk in the long term.

4. Conditions and procedures

In the EPA's opinion, if the proposal to manage additional wastes on-site in a new cell immediately adjacent to the existing cell (with a contingency for off-site disposal in appropriately licensed landfills of excess wastes which cannot be accommodated) is implemented the existing conditions and procedures applying to the project (Ministerial Statements 338 and 409) should be amended as follows:

Proponent commitments

Condition 1 should be amended such that the proponent's existing commitments, together with the proponents' additional commitments and undertakings contained in their documents dated February 1997 and April 1997 be made a requirement of the environmental approval, and should be enforceable.

Proposal, documents and commitments

Conditions 2 and 5 should be amended to allow disposal of the additional contaminated material in accordance with the proponents' reports of February 1997 and April 1997.

Environmental management programme

Condition 3-1 with respect to the Environmental Management Programme should be amended to include transport of materials to the site, and transport and disposal of wastes off-site, and the amended condition be made enforceable.

Conditions 3-2 with respect to the Environmental Management Programme should be amended to include the following aspects pertaining to the proposal, and the amended conditions be made enforceable:

Cell Construction

- containment cell description, waste deposition, capping details and cadastral arrangements;
- capping material selection and placement, and independent auditing of these activities;
- procedures for assessment of contamination in the area of the new cell;
- preparation of an "as constructed" drawing showing changes, the locations and details of waste placed in the cell; and
- registration of the final cell locations on the land title with the Department of Land Administration

Environmental Monitoring

- dust management and monitoring procedures, as revised during the previous cleanup operations and as recommended in section 3.5 of this EPA report;
- periodical assessment of dust monitoring results by the DEP;
- noise and vibration management and monitoring as revised during the previous cleanup operations;
- settlement, moisture content and erosion monitoring of the cell cover;
- monitoring of the moisture content of the wastes in the cell;
- groundwater monitoring, including locations and construction of monitoring wells, and sampling and analytical protocols;
- inclusion of cyanide in the groundwater monitoring programme; and
- procedures for evaluation and reporting monitoring results.

Environmental monitoring response action plan

- environmental monitoring response action plan, including:
  - definition of action levels in relation to monitoring results;
  - the specific actions, such as further investigations, cell cover repairs or groundwater recovery, required for each action level to the satisfaction of the WRC; and
  - reporting protocols.

Long term risk management

- long term site risk management strategy containing, but not limited to:
  - placement of memorials on title;
  - protocol for site disturbance;
  - contingency for cap restoration following disturbance;
  - availability of EMP; and
  - revision of EMP.

Off-site waste disposal

- off-site transport management plan using the structure presented in the proponent's report dated April 1997;

- sampling, testing and material classification protocols for stockpiled wastes to be disposed off-site, in accordance with guidelines of the Waste Management Division of the DEP; and
- sampling, testing and material classification protocols for re-evaluation of classification of existing stockpiled wastes.

Environmental reporting

- protocols for reporting environmental management of the operations to the DEP, including the results and evaluation of monitoring data.

  Conditions 3-3 with respect to the environmental management plan be amended to include the implementation of the amended Environmental Management Programme, and the amended condition be made enforceable.

5. Other advice

This proposal considers a contingency for off-site disposal material which cannot be accommodated in the proposed new cell, to approved and licensed landfills, and the creation of a new cell immediately adjacent to an existing cell.

The Technical Review Committee advised that:

"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 initiatives should continue as a matter of utmost urgency to locate a suitable site or sites that could receive contaminated waste material and that it be stored, treated/or disposed of in a manner that is environmentally and socially acceptable.

As an option is now available for this additional contaminated material to be removed from the site, the committee finds that off site disposal (with or without treatment or interim storage) rather than the establishment of a new cell, is the preferred option in terms of risk and potential impact on the environment. This option would also be more socially acceptable".

The EPA agrees with the Committee's views. Disposal of the additional contaminated material off-site at an approved landfill site presents lesser environmental risks in the long term and avoids the need for increased monitoring and management which is necessary if the material is buried on-site. The EPA is strongly of the view the material should be taken off the site.

6. Recommendations

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment note the relevant environmental factors and the EPA's objective for each factor as set out in Section 3 of this report.

Recommendation 2

That the Minister for the Environment note that although the environmental risk of the proposal as submitted is low and meets technical criteria, the alternative of off-site disposal better meets the EPA's objectives of presenting minimal environmental risk in the long term and of meeting the public's concern with respect to environmental risk.

Recommendation 3

That if the proposal is implemented as submitted the Minister for the Environment imposes the conditions and procedures set out in Section 4 of the report.

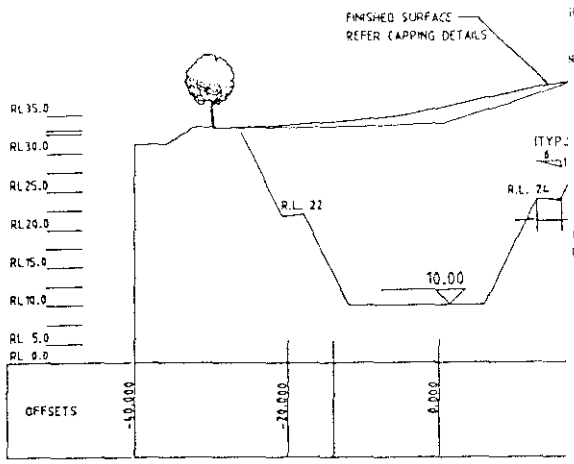
Recommendation 4

Notwithstanding Recommendation 2 that the environmental risk of the proposal submitted is low, the Minister for the Environment note that disposal off-site of the excess contaminated material is now a practical option because of the availability of appropriate disposal sites, and that the EPA prefers this option.

Appendix 1

Figures

DRAWING No. 7529-C048



SECTION B
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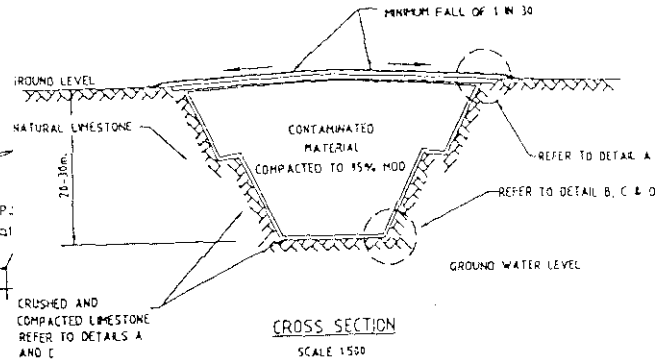
C003



CROSS SECTION
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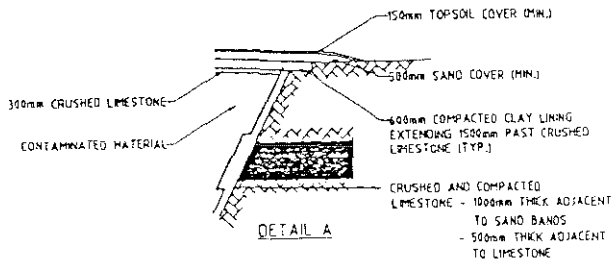
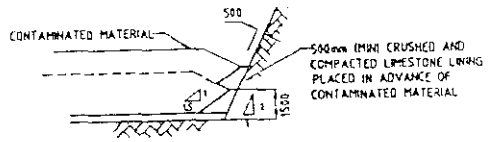


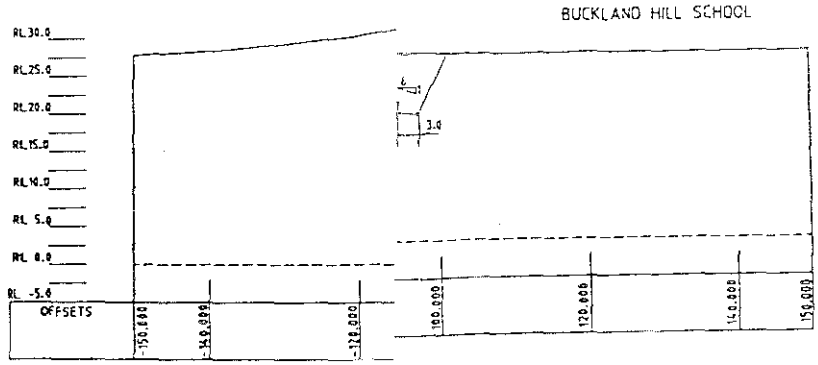
DETAIL A



DETAIL B

CONTAINMENT CELL
LINER AND CAPPING DETAILS

BUCKLAND HILL SCHOOL



PROJECT	McCABE STREET CLEANUP
TITLE	CONTAINMENT CELL CROSS SECTIONS SHOWING CAPPING DETAILS AND FINAL LEVELS
SURVEY INFORMATION	WHELANS
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JOB No.	E7529A
SCALE	1:500
DATUM	A.M.D.
DRUID	
REV.	0

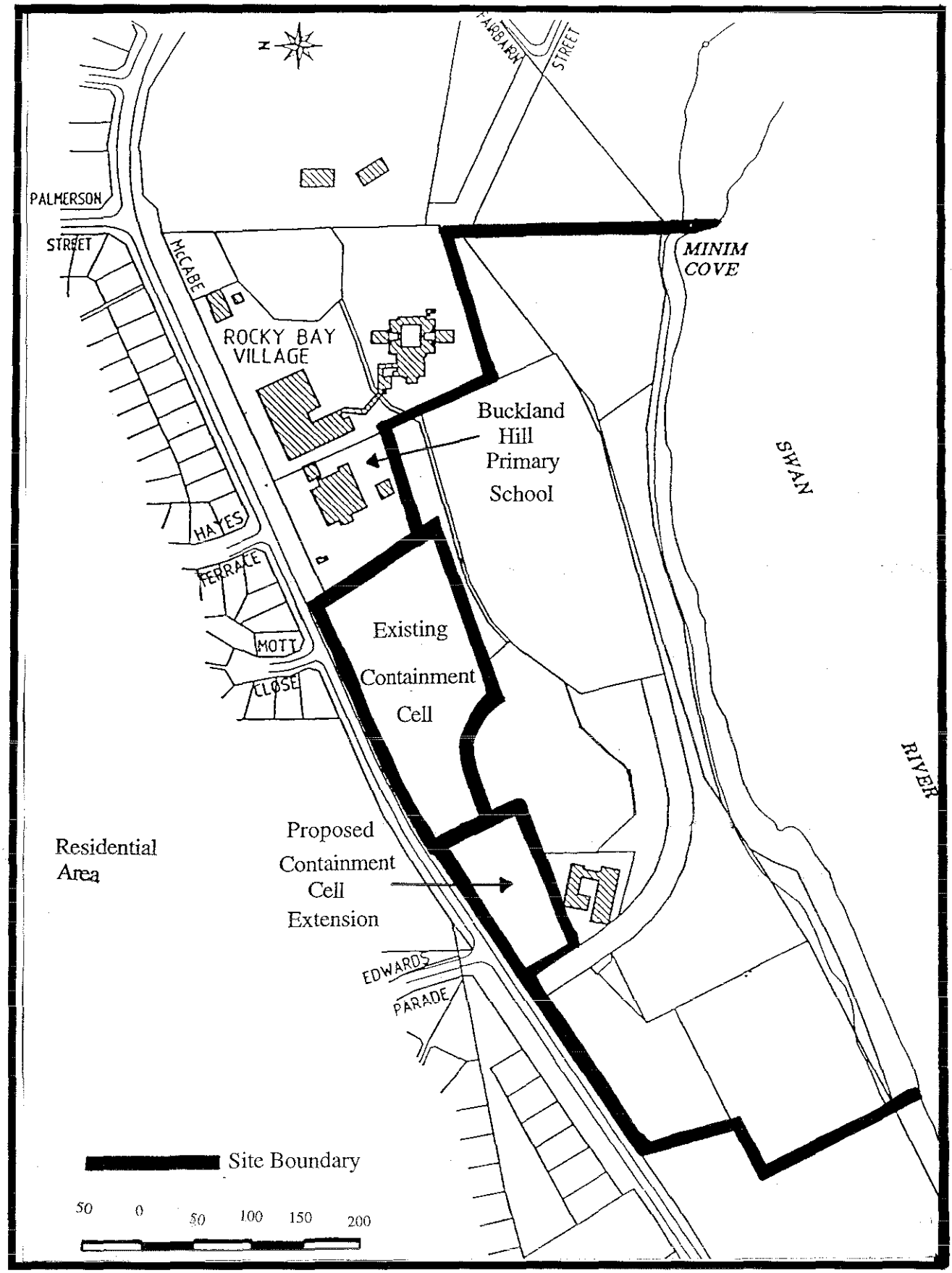

Figure 1. Location of the proposed containment cell extension, McCabe St, Mosman Park. (Modified from Halpern Glick Maunsell 1992).

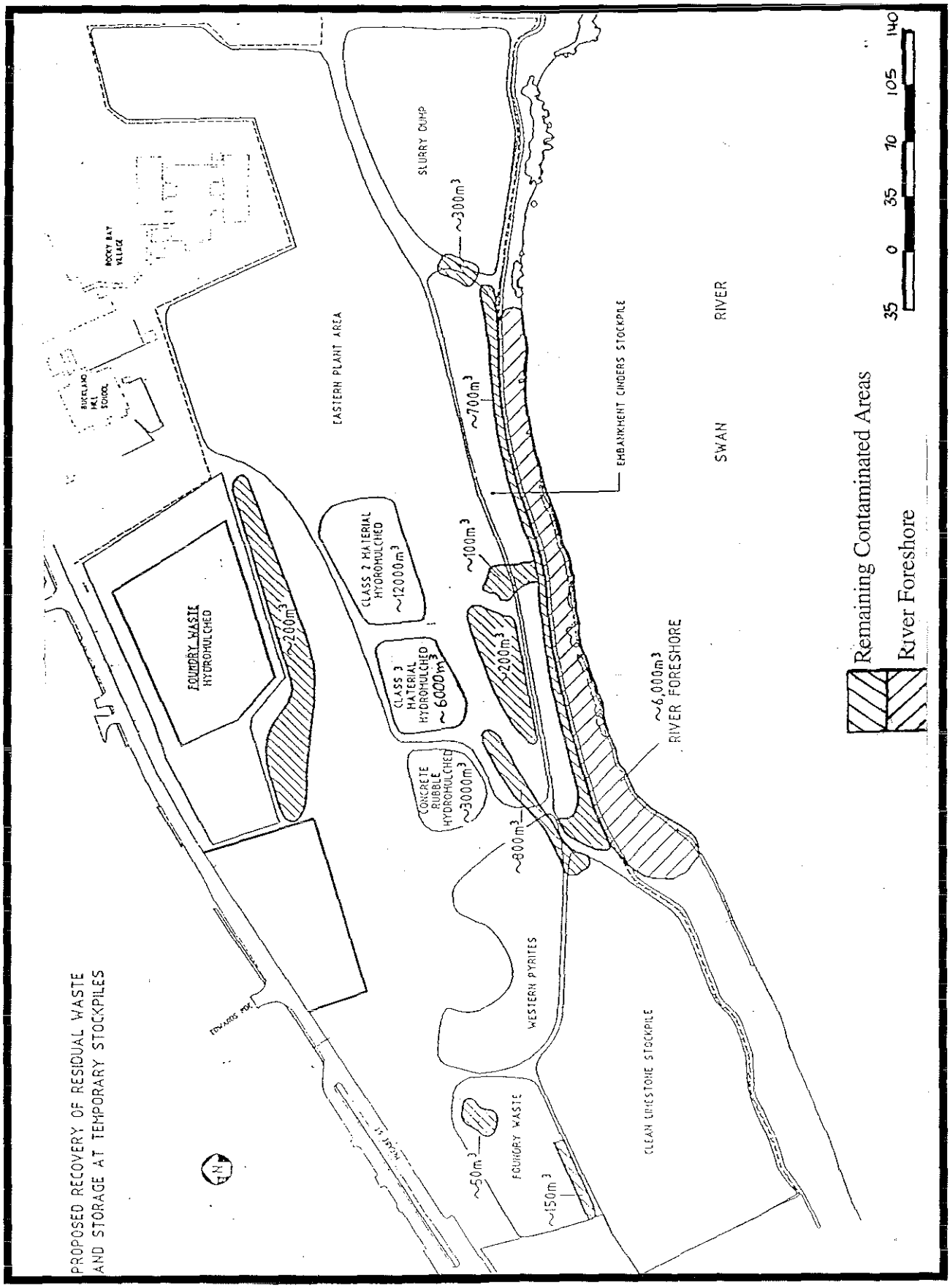

Figure 2. Location of additional contaminated materials, McCabe St, Mosman Park. (Modified from Halpern Glick Maunsell 1997a).

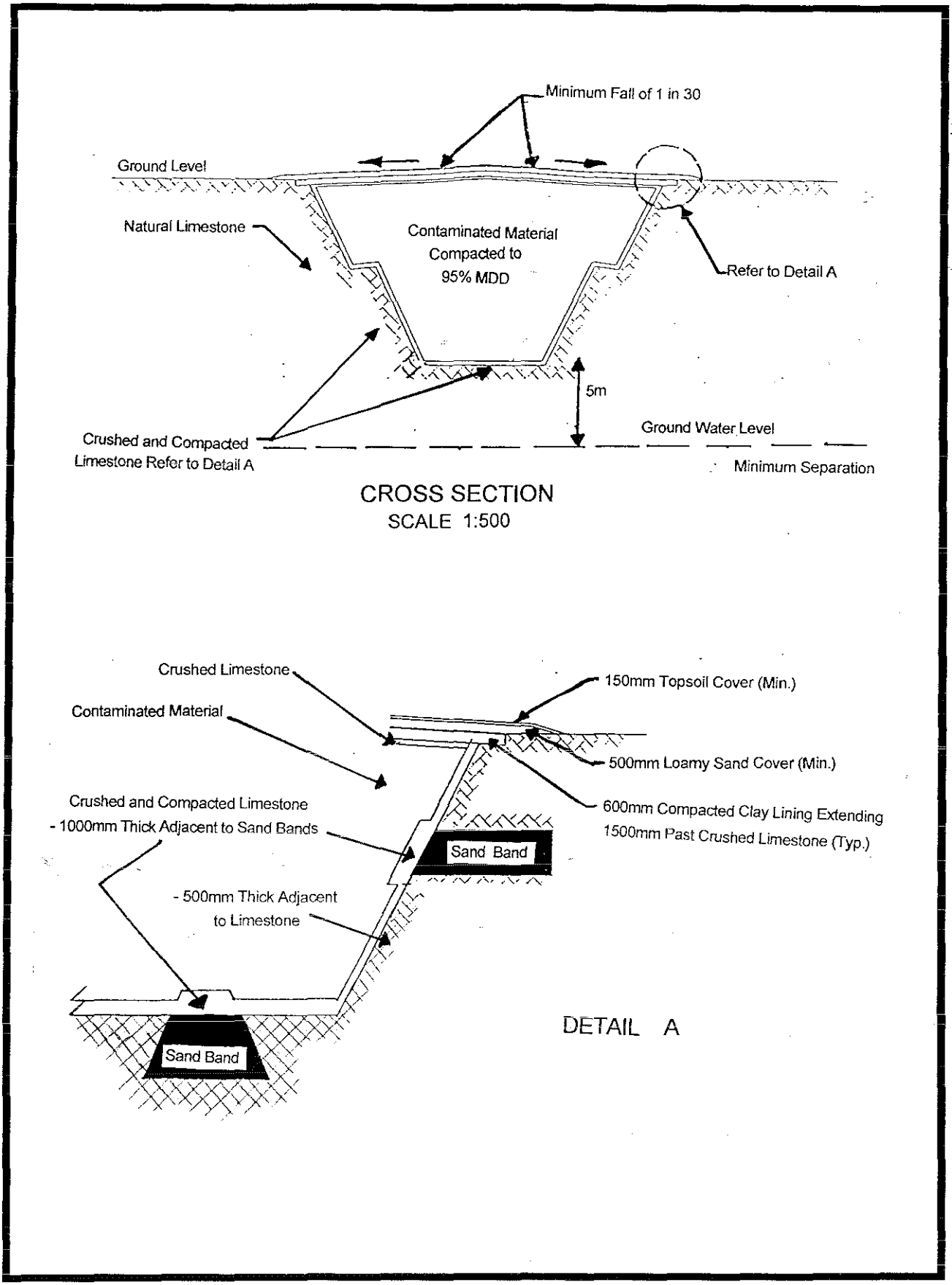

Figure 3. Typical cross section through containment cell, McCabe St, Mosman Park. (Modified from Halpern Glick Maunsell 1997a).

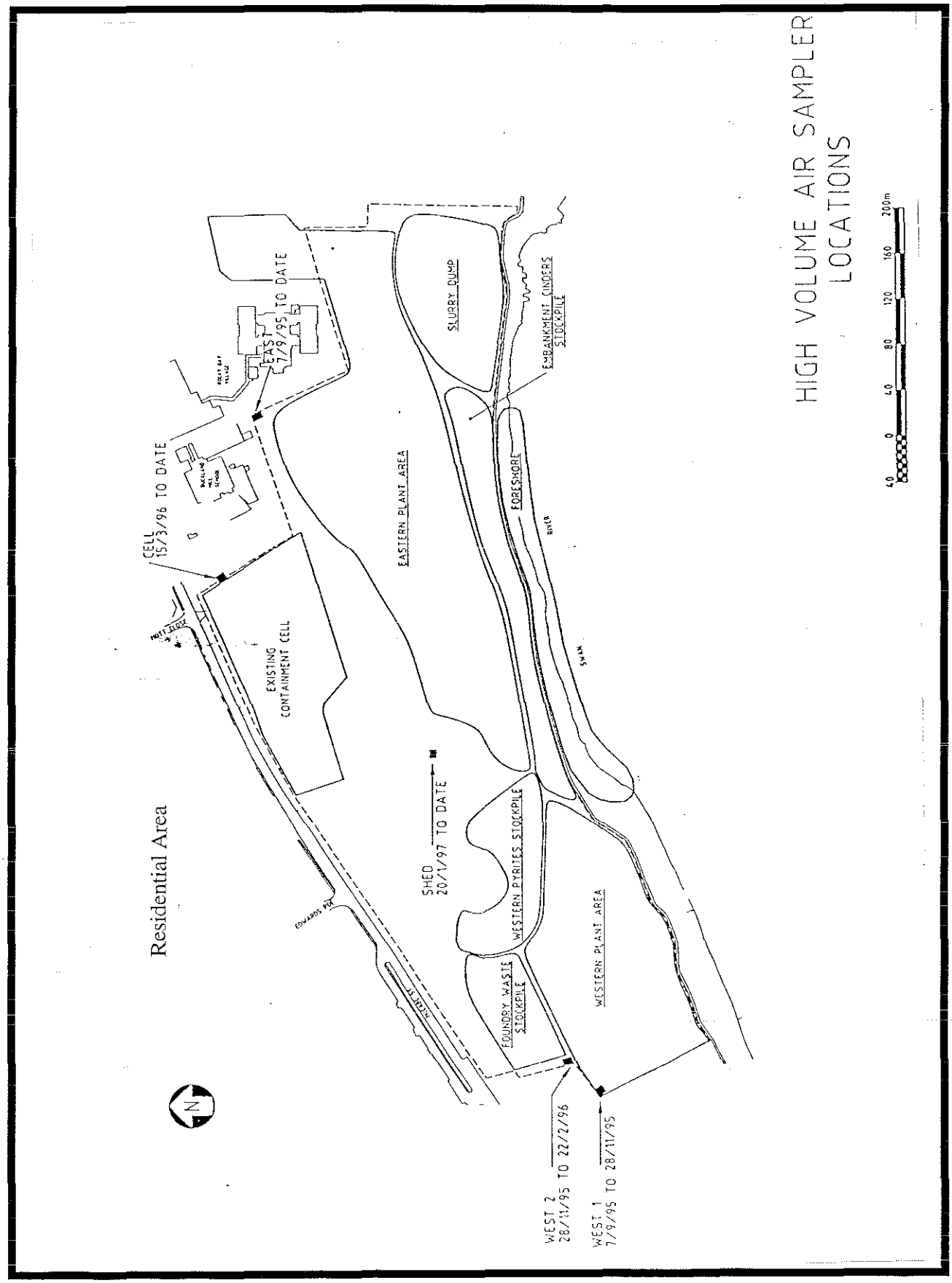

Figure 4. High volume air sampler locations, McCabe St, Mosman Park. (modified from Halpern Glick Maunsell, unpublished communication).

Appendix 2

Summary of previous proposals and decisions

SUMMARY OF PREVIOUS PROPOSALS AND DECISIONS

Proposal	*Decision*	*Waste Volume (m^3)*	*Reference/ Comment*
Public Environmental Review, November 1987	Town of Mosman Park did not support proposal. Ministerial Statement not issued	Not presented in PER	Environmental Protection Authority Bulletin 324, August 1988
Consultative Environmental Review, September 1992	Shire of Williams withdrew support for disposal site. Environmental Protection Authority did not report on proposal	120,000	No Environmental Protection Authority report
Consultative Environmental Review, July 1993	Ministerial Statement, 1 February 1994	170,000	EPA Bulletin 699, August 1993
Environmental Management Programme, as amended	Ministerial conditions 2-1, 3-2 and 5-3, 1 February 1994	202,300	EMP approved August 1995
Notice of intent to increase the size of the cell, January 1996	Ministerial Statement 15 March 1996	242,425	EPA Bulletin 807, February 1996
Application to EPA and Town of Mosman Park to increase the size of cell, August 1996	Refused by Town of Mosman Park	about 275,000	Not pursued further by proponents

Appendix 3

Existing conditions applying to the project

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.

K. J. Minson

Kevin Minson MLA
MINISTER FOR THE ENVIRONMENT

- 1 FEB 1994

MINISTER FOR THE ENVIRONMENT WESTER

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

Condition 1 is amended to read as follows:

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 (February 1996), which will be audited by the Department of Environmental Protection is attached.

Condition 5 is amended to read as follows:

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. (See commitments 22 to 25).

Published on

15 MAR 1996

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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 and the Water and Rivers Commission 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 and the Water and Rivers Commission 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 minimize the generation of dust. This reviewed programme to address any special health issues; and

4 Installation of additional dust sampler(s) to monitor any dust carried by southerly winds.

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 which may involve off-site disposal of uncontaminated materials, such as concrete and rubble.

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.

The following procedure is inserted following procedure 2:

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.

Peter Foss

Hon. Peter Foss QC MLC
MINISTER FOR THE ENVIRONMENT

15 MAR 1996

Appendix 4

EPA Review Committee members and terms of reference

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

Member	Expertise/Representative
Mr Ken Webster	Chairman
Mr Trevor Harken	Town of Mosman Park
Dr John Rogers	Community
Mr John Ripp	Community
Dr Raymond Perry	Groundwater
Dr Donald Watts	Chemistry
Mr Robert Taylor	Contaminated Site Remediation
Dr Klaus Hirschberg	Geologist

Mr Taylor provided written comments to the Committee because he was not able to attend the meeting. Dr Klaus Hirschberg provided advice to the Committee at the meeting on contaminated site remediation issues because Mr Taylor was not available to attend.

Environmental Protection Authority

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Facsimile Transmission
Facsimile Number: 384 7915
Number of Pages: 2

Mr K Webster
20 Freshwater Parade
CLAREMONT WA 6010

Dear Ken

Further to your telephone conversation of April 7 1997 with Peter Skitmore , please find enclosed the terms of reference for the reconstituted committee to review the construction of a new containment cell and to allow for the option of contaminated material being taken off-site - McCabe Street, Mosman Park.

I have forwarded a copy of this letter to the members of the committee.

Terms of appointment will be the same as for the original committee.

Yours sincerely

R K Steedman
CHAIRMAN

10 April 1997

Enc

V009.9/281295/A

ENVIRONMENTAL PROTECTION AUTHORITY REVIEW COMMITTEE

TERMS OF REFERENCE DATED 10 April 1997

Proposal by LandCorp and Octennial Holdings Pty Ltd to construct a new containment cell and to allow for the option of contaminated material being taken off-site - 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 construct a new containment cell and to allow for the option of contaminated material being taken off-site -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 volume and characteristics 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 assess the performance of the new cell, or to detect any migration from the new 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 new the containment cell) may have on the existing approved cell;

   (f) the Committee may seek existing information from government agencies through the EPA; and

   (g) the adequacy of proposals and environmental management for allowing contaminated material to be taken off-site.

3. Provide a written report to the EPA by close of business, April 22 1997, noting that the Committee's report may be published with the EPA's advice to the Minister for the Environment.

Notes

1. That relevant components from any public or 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 April 17 1997.

2. The members shall assume that the size, design and construction of the existing containment cell for the assessed contaminated material is satisfactory as approved.

3. Should a member have a view which differs from that of the committee, they should advise the chairman of the review committee and put those views in writing, for EPA consideration.

Appendix 5

EPA Review Committee report to the EPA

Dr Ray Steedman
Chairman
Environmental Protection Authority
Westralia Square
141 St Georges Tce
Perth WA 6000

Dear Dr Steedman,

EPA REVIEW COMMITTEE ON THE MC CABE STREET PROJECT - PROPOSED MANAGEMENT OF ADDITIONAL CONTAMINATED WASTE

I refer to your letter of April 10 1997, regarding proposals for dealing with additional contaminated material at the Mc Cabe Street development site.

The Committee has considered the proposals in accordance with the terms of reference and attached is the committee's report.

Yours sincerely

Ken Webster
Chairman
EPA Review Committee on The Mc Cabe Street Project

28 April 1997

Proposal by LandCorp and Octennial Holdings Pty Ltd to construct a new containment cell and to allow for the option of contaminated material being taken off-site - McCabe Street, Mosman Park

EPA REVIEW COMMITTEE REPORT

APRIL, 28 1997

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 received a briefing from officers of Halpern Glick Maunsell on the proposal and on other technical information as required. The committee also received oral technical advice from Dr Klaus Hirschberg, who was contracted by the EPA to provide independent technical advice on hydrogeological and contaminated site matters to the review committee.

1. *Review specific information supplied by the EPA and the proponent regarding the proposal by Landcorp and Octennial Holdings Pty Ltd to construct a new containment cell and to allow for the option of contaminated material being taken off-site - McCabe Street, Mosman Park.*

The committee has reviewed the information supplied by the Environmental Protection Authority and the proponent regarding the proposal.

(a) Adequacy of the site investigation undertaken to enable a reliable estimate to be made of the volume and characteristics of the contaminated material;

Information on the amount of contaminated material that has been excavated and placed in stockpiles is a reasonable estimate of contaminated material to be disposed of.

Adequate information on the potential amount of contaminated material on the site of the new cell has not been provided by the proponent.

Should the proposed cell not be approved, further site investigation should be completed in accordance with the 12.5m grid validation and certification protocol which applies to the whole site.

Should the proposed cell be approved, further site investigation to assess if any contaminated material exists in the area of the new cell and if so its volume, should be completed, as a condition of approval. These investigations should include surface and deep drilling samples. If contaminated material is found in excess of the estimates (and contingency) made by the proponent, that excess material should be dealt with by removal off site in accordance with the proponents contingency plan.

2.(b) Adequacy of the dimensions of the containment cell to contain all of the contaminated material assessed in item 2(a) above;

Subject to the completion of additional testing as required under the Committee's recommendation in item 2(a), the committee acknowledges that the cell as designed should accept a volume of 80,000m^3 of contaminated material within the area as indicated on figures 5.1 and 5.2 of the proposal document dated April 1997.

2 (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);

The committees notes that the material proposed to be placed in the new cell generally contains lower levels of residual sulphur than material placed in the original cell and also it is unlikely to contain materials which have been treated with cyanide.

The committee reiterates its recommendation of January 1996 with respect to the new cell as follows:

"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 land over the lay cap should be prepared in association with the Department of Land Administration and the Mosman 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 new cell 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 Land Administration), an as constructed drawing of the containment cell, showing the location and details of all waste placed in the cell."

The committee noted that the new cell has the potential to impact on a new and wider front of groundwater flow than that of the present cell.

It also notes that the new cell will be placing known contaminated material onto a site considered by the proponent to be an area where only minor surface contamination is likely to exist.

2.(d) *Adequacy of the proposed monitoring to assess the performance of the new cell, or to detect any migration from the new containment cell and consider any contingency plan should monitoring results exceed agreed standards;*

The monitoring proposed by the proponent in its documentation dated April 1997 is considered adequate by the Committee. The committee notes that the Water and Rivers Commission has accepted the groundwater monitoring as proposed.

The committee reiterates its recommendation of January 1996 as applicable to the new cell, as follows:

"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."

It further notes that the other options for contingency applicable to the original proposal have not yet been put forward as previously recommended by the Committee.

It is noted that the proximity of proposed housing to the new cell is likely to complicate any proposal to relocate the material in the cell should this be required in the future. Similarly, the proximity of proposed housing may constrain any other options for contingency planning or for major repairs or modifications to the capping system.

The final groundwater contingency plan should be approved by the Water and Rivers Commission.

Monitoring for cyanide should be included in the list of parameters to be analysed in the groundwater.

2 (e) Identify any technical implications that the committee's findings (with respect to the new containment cell) may have on the existing approved cell;

The selection and placement of cover and capping materials should be subjected to a best practice quality assurance programme and independent auditing by an appropriately qualified person.

2 (f) The committee may seek existing information from government agencies through the EPA; and

No additional information was required or sought by the committee, but it was provided with oral technical advice from the independent consultant Dr Klaus Hirschberg during its meeting.

2 (g) The adequacy of proposals and environmental management for allowing contaminated material to be taken off site.

The committee notes that the contaminated material remaining to be disposed of comprises material primarily of Classes II and III with some Class IV (Table 10.1 in the April 1997 document). Consequently, the option exists for most of this material to be taken off site and disposed of in existing Class II and Class III landfill sites. The committee notes that there is currently no approved Class IV landfill site, but there is one proposed, and if approved, is planned to be in operation in about 12 months. The committee also notes that the Department of Environmental Protection is investigating other potential locations for a Class IV landfill. In addition, it is noted that this material generally contains lower concentrations of contaminants than the bulk of material placed in the original cell.

This situation now presents a further option to the proposed creation of a new cell on the site, namely; all remaining contaminated materials be disposed of off site with or without treatment, or interim storage of Class IV material.

The committee emphasises to the EPA that this situation is fundamentally different to it's earlier assessment, where off-site disposal to existing landfill sites for the bulk of the contaminated material was not an option. This was the case because the material was originally classified as mostly Class IVa with some Class V (now Classes IV and V respectively) and there were no definite plans for establishment of a Class IVa landfill.

The proposals for managing the environmental implications of off-site disposal are noted and supported but need further development and detail. This matter should be the subject of a detailed management programme approved by the EPA on the advice of the Town of Mosman Park, consistent with the Structure Outline contained in section 10 of the proponent's document dated April 1997. The committee noted that emphasis on adequate management of interim stockpiling was required due to the requirements and delays associated with analysis and approval of off-site waste consignments so that potential dust generation and associated impacts are minimised. The committee also prefers that any treatment of material is undertaken off site as this would eliminate the potential impacts of dust generation on site during the treatment process and reduce the amount of traffic associated with the off-site disposal option.

CONCLUSION

The committee concluded that the option of constructing a new cell on the site in accordance with the proposal put forward, was similar, and possibly lesser, in its environmental implications, to the existing cell. However, as a consequence, it can only increase the amount of contaminated material stored on what is essentially an urban site. It will therefore proportionally increase the inherent environmental risks, ongoing monitoring and maintenance requirements and contingency liability associated with such a cell in such a location.

The committee reiterates its previous advice of January 1996 to the EPA in this regard:

"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 form urban development."

The committee recommends that initiatives should continue as a matter of utmost urgency to locate a suitable site or sites that could receive contaminated waste material and that it be stored, treated/or disposed of in a manner that is environmentally and socially acceptable.

As an option is now available for this additional contaminated material to be removed from the site, the committee finds that off site disposal (with or without treatment or interim storage) rather than the establishment of a new cell, is the preferred option in terms of its risk and potential impact on the environment. This option would also be more socially acceptable.

The EPA should note that the committee has not made an economic analysis of off-site disposal versus on-site disposal but recognises that its preferred option may have some economic implications.

OTHER ISSUES

1. The committee noted that stringent requirements are already in place to control the generation of dust from the site. However, it is also aware that dust levels are of continuing concern to nearby residents. The committee recommends that the success of dust control measures should be periodically assessed by the proponent and the Department of Environmental Protection and improved as necessary.

2. The committee notes that the request for funding long term monitoring, maintenance and contingency measures, will need to be increased and agreed upon if the new cell proceeds in whole or in part.

3. The committee notes the proponent's contingency plan; that should any additional material be found on the site that it will be disposed of off site. The committee endorses this as appropriate.

4. The committee reiterates its advice of January 1996 that "the Town of Mosman Park, the Ministry for Planning and the Department of Land Administration public plans and files should be marked to clearly show the ;existence and extent of the containment cell land 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 *Provide a written report to the EPA by close of business, April 28, 1997, noting that the committee's report may be published with the EPA's advice to the Minister for the Environment.*

The committee provided its report to the EPA on April 28, 1997.

Appendix 6

Detailed descriptions of additional wastes

Table 1.1a
Additional Waste Volumes

	Volume m^3	Contingency %	Volume plus Contingency m^3
High Confidence Items			
Contaminated Limestone			
"Class 2" Stockpile	12,000	10	13,200
"Class 3" Stockpile		10	6,600
Temporary Storage Facility			
Material from Foreshore	6,500	10	7,150
Sand Lining to Cell	2,200	10	2,420
Extra Material on Storage Cell*			
Foundry Waste	21,400	10	23,540
Pyrite Cinders	4,000	10	4,400
Contaminated Limestone	4,600	10	5,060
TOTAL	56,700		62,370
Medium Confidence Items			
Concrete Stockpile			
Concrete Rubble	3,000	20	3,600
Underlying Contamination	2,000	50	3,000
TOTAL	5,000		6,600
Low Confidence Items			
Foundry Waste Area			
Failed Area	50	200	150
Under Haul Road	150	200	450
Slurry Dump	300	200	900
Foot of Embankment	700	200	2,100
Pyritic Cinders	800	200	2,400
Under Temporary Storage Facility	200	200	600
Discharge Channel	100	200	300
Surface Contamination on Hill	200	200	600
Site Hut Area	1,000	200	3,000
TOTAL	3,500		10,500
Total Volume Contaminated Material	65,200		79,470

*Total revised from 30,000m^3 to 32,500m^3, 20/5/97. See attached table.

McCABE STREET CLEANUP
EXISTING CELL QUANTITIES

ITEM	DESCRIPTION			QUANTITY M^3
1.0	"Air Space" volume			265,000
1.1	"Above Cut Surface" volume (original surface - excavated surface)		255,000	
1.2	Contour smoothing (approved by Town of Mosman Park)		10,000	
2.0	Cover	(As designed)		25,500
2.1	Topsoil	150mm	2,500	
2.2	Sand Cover	500mm	8,000	
2.3	Compacted clay	600mm	10,000	
2.4	Crushed Limestone	300mm	5,000	
3.0	Limestone Base and liner	(As built)		14,000
3.1	Base (1.0m thick)		6,000	
3.2	Sides		8,000	
4.0	Approved waste volume (1.0-2.0-3.0)			225,500
5.0	Surveyed "Air Space" volume actually used (survey 24.9.96)			272,000
6.0	Limestone base and liner	(As built)		
6.1	Base		6,000	
6.2	Sides		8,000	
7.0	Actual volume of waste (5.0-6.0)			258,000
8.0	Excess waste above approved (7.0-4.0)			32,500

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Table 10.1
Offsite Disposal Options

Material	Volume (m^3)	Anticipated Contaminated Level
Contaminated Limestone		
"Class 2" Stockpile	12,000	2and 3t
"Class 3" Stockpile	6,000	3t
Temporary Storage Facility	6,000	3t
Extra Material on Storage Cell *	32,500	
Foundry Waste		3 and 4 **
Pyrite Cinders		
Contaminated Limestone		
Concrete Stockpile		
Concrete Rubble	3,000	1 and 2t
Underlying Contamination	2,000	2 and 3t
Foundry Waste Area		
Failed Area	50	2t
Under Haul Road	150	4
Slurry Dump	300	3t
Foot of Embankment	700	2 and 3t
Pyritic Cinders	800	4
Under Temporary Storage Facility	200	2 and 3t
Discharge Channel	100	3t
Surface Contamination on Hill	200	2t
Site Hut Area	1,000	2 and 3t

** Estimated to be 70% Class 3, 30% Class 4, ie. approx. 22750 & 9750 m^3

* Total of 30,000m^3 revised to 32,500m^3 20/5/97

t Total Class III and less: = 31,550m^3
(separate stockpiles and locations)

** Total Class IV only = 950m^3
(separate stockpiles and locations)

Appendix 7

References

Australian and New Zealand Environment and Conservation Council / National Health and Medical Research Council (ANZECC / NHMRC) (1992), *Guidelines for the Assessment and Management of Contaminated Sites.*

Environmental Protection Authority (EPA) 1992, *The Western Australian Environmental Protection Policy (Atmospheric Wastes) Kwinana.*

Environmental Protection Authority (EPA) 1993a, *Report and Recommendations of the Environmental Protection Authority, Cleanup of Contaminated Site McCabe Street, Mosman Park,* Bulletin 699.

Environmental Protection Authority (EPA) 1996, *Report and Recommendations of the Environmental Protection Authority, Increase in Size of Containment Cell and Changes to Removal of Drainage Outfalls at McCabe Street, Mosman Park, Proposed Changes to Environmental Conditions,* Bulletin 807.

Environmental Protection Authority (EPA) 1993b, *Draft Western Australian Water Quality Guidelines for Fresh and Marine Waters, Bulletin 711.*

Department of Environmental Protection (DEP) 1996a, *Landfill Classification and Waste Definitions.*

Department of Environmental Protection (DEP) 1996b, *A Guideline For The Prevention Of Dust And Smoke Pollution From Land Development Sites In Western Australia .*

Department of Environmental Protection (DEP)1996c, *Draft Environmental Protection (Noise) Regulations.*

Halpern Glick Maunsell (HGM) 1997a, *Rehabilitation of Former Industrial Land, McCabe Street, Mosman Park, Management of Additional Waste Volumes*, February.

Halpern Glick Maunsell (HGM) 1997b, *Rehabilitation of Former Industrial Land, McCabe Street, Mosman Park, Management of Additional Waste Volumes, Additional Information,* April.

Halpern Glick Maunsell (HGM 1995, *McCabe Street Cleanup, Environmental Management Programme (EMP).*

Standards Australia (1990), Australian Standard AS 2670.2 - 1990, *Evaluation of Human Exposure to Whole Body Vibration. Part 2: Continuous and Shock-Induced Vibration in Buildings (1 to 80 Hz)*

Addendum to Answers to submissions by proponent

1. Question 19,
   Paragraph 2 Line 2
   "..... material conform the lack ....."
   Should read
   "..... material confirm the lack ....."

2. Question 51
   Revise answer to read as follows:
   "The Leighton Peninsula Park proposal provided for the retention of the limestonehillock on the McCabe Street site as part of the regional open space. The currentsubdivisional plans of the proponents accommodate this with no intention to fence off the hillock or to prevent public access to it."