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Transpacific Waste Management

Northward Fill - EIS Amendment to Accommodate Additional Waste Types

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Executive Summary

Introduction

Transpacific Waste Management (TWM) proposes to enhance its operations at the Northward Fill site (Inkerman) by an amendment to its current Development Authorisation and Environment Protection Authority (EPA) Licence to permit the receipt of low level contaminated wastes (LLCW).

Accordingly, TWM has prepared this EIS Amendment document as the mechanism to vary its existing authorisation to allow the receipt of LLCW at Inkerman.

The nature of the waste will be LLCW consisting primarily of soils and waste residues, including residues from liquid treatment plant operations, containing low levels of contamination and meeting the relevant EPA LLCW criteria. Wastes of other types and from other sources may be received at the site, as long as they comply with the relevant EPA LLCW criteria.

It is expected that an additional 20,000 tonnes per annum is likely to be received at the site. This amount, in conjunction with current volumes being received at the facility, is well within the range contemplated by the original approvals for the facility. The disposal of LLCW is proposed for approximately 30-40 years, in accordance with the overall anticipated life of the landfill facility.

The accommodation of these additional waste types at the Inkerman landfill provides a highly engineered and environmentally sound disposal option for the needs of state-wide authorities. The proposal responds to market demand and provides a commercial opportunity to maximise the waste disposal opportunities of the site. In addition to this, Transpacific Industries operates its own Liquid Treatment Plant and the disposal of this waste at the Inkerman facility offers a safe and orderly disposal option that will improve operating efficiencies of this facility. Operation of the LLCW containment cell within the approved footprint of the existing site takes advantage of the operational controls and the high level of environmental management practice already in place. The proposal also takes advantage and builds upon the proponent's proven performance record in waste management and leadership role in both the South Australian and National waste management sector.

Environmental Management

The approved landfill site is appropriately located and ensures the highest integrity and environmental protection for the long term management of these materials. The additional waste will be handled and disposed within the footprint of the approved landfill site. The LLCW will be disposed of into cells that are specifically designed to provide significant groundwater protection and leachate control, based on engineering principles already approved and used elsewhere in the state for the handling of these material types.

Management of environmental effects are already covered in the existing approved site Landfill Environmental Management Plan (LEMP). In accordance with EPA Licence requirements, the LEMP is reviewed annually and updated as necessary. This allows

for the incorporation of adjustments to environmental monitoring and auditing, changes to relevant legislation, policies, guidelines and performance requirements and conditions of licence. This also allows for the adoption of new technologies and methods as they become available in accordance with principles of using BACT (Best Available Control Techniques). Best Practice is not a fixed set of standards that are globally applied, but evolve and are applied within particular local ecosystems, community expectations and regulatory regimes.

In relation to the proposed LLCW operations, a new section in the LEMP has been prepared to include additional management measures specifically for the operation of the LLCW cell, "EMM 14 – Operation of Cells to Receive LLCW". Specifically, this includes the following issues:

- Leachate Management and Groundwater Protection;
- Landfill Gas Management; and
- Litter Management.

Details of the additional management measures are outlined in this report and are summarised below.

In relation to groundwater protection and leachate management, the barrier system and leachate monitoring system are specifically varied for the LLCW cells to provide a higher level of performance than that required for other waste types. The engineering approach adopted is used elsewhere in South Australia for the disposal of LLCW materials and put forward as the benchmark by EPA during consultation with regard to this proposal. The approach consists of a secondary clay liner overlain by a primary composite liner (comprising a HDPE geosynthetic / clay liner) separated by a "geogrid" geo-composite drainage layer. The lining system is overlain by a cushion geotextile protection layer and leachate collection system.

In relation to landfill gas management, whilst the composition of the gas generated from LLCW may vary from that generated by other waste types, it can best be managed by incorporation into the overall site gas extraction and treatment system based upon TWM operating experience at similar facilities. Gas generated from the site will be monitored on a regular basis, to ensure gas quality is maintained and that effective gas destruction methods (flaring, power generation, etc) can occur. Should monitoring indicate an issue with gas quality, sampling ports in the LLCW gas infrastructure upstream of interconnections with other portions of the landfill can be utilised, and if required, the LLCW gas infrastructure can be isolated from the LFG system servicing the remainder of the site, and operated independently.

In relation to litter management, the LLCW material is not expected to contain appreciable quantities of litter, therefore use of litter control techniques such as the existing litter net system will not be used in the LLCW cells.

In relation to traffic and access of the site, the amendment would result in 6 truck loads per day, assuming that the total annual volume is disposed within a 6 month period as a worst case scenario. These traffic movements are still well within the range contemplated as part of the original Development Authorisation.

An analysis of state and local planning strategies has also been undertaken in relation to the site. The receipt of LLCW is in accordance with policy objectives.

1 Introduction

1.1 Background

Transpacific Waste Management (TWM) is developing the Northward Fill (formerly Inkerman Landfill Depot) a landfill at Inkerman, 85 km north-west of Adelaide in a Primary Industry Zone. The Northward Fill lies within the area of the Wakefield Regional Council, which incorporates the previous District Council of Wakefield Plains. The location plan is shown in Figure 1.

The Northward Fill landfill currently provides a disposal facility for Adelaide's putrescible and inert waste for approximately 30 years (dependant on received volumes) with a waste capacity of approximately 12,000,000 m^3. The Northward Fill currently receives and disposes of:

- Waste from the Adelaide Metropolitan Area that has gone through a Resource Recovery and Waste Transfer Facility;
- Waste from regional areas that:
  - has been through a kerbside recycling service comprising at least 2 mobile garbage bins with a maximum 140 litre weekly waste collection and a minimum 240 litre fortnightly recycling collection; or
  - has been through a mobile garbage bin kerbside recycling system that yields at least 4 kg per household per week for recycling, excluding contamination; or
  - has been processed through a resource recovery facility / transfer station prior to being transported for disposal.
- Shredded Tyres with other approved waste, for a period of three years after which the proponent must apply for additional development approval;
- Non-friable asbestos subject to handling and disposal procedures for non-friable asbestos as provided in the specific Environmental Management Measure (EMM) prepared for that waste in the Landfill Environmental Management Plan (LEMP);
- Quarantine waste subject to approval from AQIS to receive and dispose of quarantine waste as provided in the specific EMM in the LEMP that deals with that waste; and
- Foundry sands as provided in the specific EMM in the LEMP.

TWM now seeks to obtain approval to receive an additional waste type that is not currently permitted at the facility, being LLCW. The receipt of LLCW is proposed to operate for the extent of facility's approved lifetime which is approximately 30-40 years.

This report has been prepared by QED Pty Ltd, Golder Associates Pty Ltd, and Tonkin Consulting on behalf of TWM to seek approval to amend the current planning consent to receive and dispose of LLCW into specially designed and constructed cells at the Northward Fill facility.

This report builds upon the existing Environmental Impact Statement and other environmental, engineering and planning information that has been developed as part development of the facility.

This report provides an overview of the process to amend the current approvals, including:

- Details of the site and its operations;
- Information on the proposed wastes;
- Detailed design information;
- Potential effects and management of waste disposal; and
- Planning analysis.

1.2 EIS Amendment Purpose and Process

Section 47 of the Development Act provides for an amendment to an EIS and related Assessment Report for various purposes. In this instance, the purpose of this EIS Amendment report is to seek approval and to provide detailed information to amend the current planning consent to enable low level contaminated waste to be received at the Inkerman landfill facility.

1.3 The Proponent

The owner and Licensee of the Northward Fill Landfill is Waste Management Pacific (SA) Pty Ltd (WMP). WMP is a wholly owned subsidiary of Transpacific Industries Pty Ltd (TPI). Operating the site is an operating division of TPI - TWM.

TWM is a leading provider of comprehensive waste and environmental services in Australia, New Zealand and Asia Pacific. It is committed to protecting and enhancing the environment now and for future generations. TWM applies principals of Ecologically Sustainable Development throughout its activities, particularly through recycling and reducing landfill with ever improving waste management practices. It recognises the importance of providing safe and effective environmental practices and implementing environmental management measures which mitigate any potential environmental effect occurring through its activities.

Industry Leader and Best Practice

TWM's Inkerman landfill has been constructed and operated in a manner that has been recognised at a State and National level as being amongst the best in Australia. So much so that in the inaugural National Landfill Excellence Awards conducted by the Waste Management Association of Australia (WMAA), the site won the Silver Award.

In establishing the National Landfill Excellence Award, the WMAA hoped to showcase the best that landfills have to offer, informing others in the industry and for the general public. It also wished to acclaim those landfill sites that are exceptional. Key factors in winning the award covered:

- Design and Construction;
- Environmental Controls;
- Compliance with Wider Waste Management Policy;
- Operations, Training and Management;

- Utilisation of Equipment/Systems Facilities and New Technologies;
- Public Acceptance, Appearance and Restoration;
- Innovation and Creativity; and
- Submission Quality.

To complement TWM's success in winning the Silver award for the National Landfill Excellence Awards, the Inkerman site has also won the South Australian Case Earth Award for Construction Excellence, as well as winning the Case Earth Award for Environmental Excellence. The Case Earth Awards recognise advancements in construction practices as well as the impact of projects on the environment. Conducted by Case Construction Equipment and the Civil Contractors Federation (CCF) each year, they are awards designed to reward companies performing at the highest standards of civil construction.

1.4 The Proposal Overview

The application to receive and dispose of LLCW at the Northward Fill facility will make available the best technical and environmentally sound disposal methodologies for low level contaminated waste in South Australia. The site already receives a range of waste types and operates under strict environmental and planning guidelines. This report provides further design and management information on how the facility will meet the requirements of the EPA and other regulatory bodies for the additional waste. This includes a liner design for the LLCW cell.

2 Subject Site and Authorisations

2.1 Description of Site

The Northward Fill site is located approximately 85 km north-west of Adelaide at Inkerman. The landfill itself is 1.2 km east of Port Wakefield Road. It is opposite the Army Proof and Experimental Establishment Range.

The Certificates of Title for the land are provided in Appendix A and include:

- Allotment 9 in Deposited Plan 32395. Certificate of Title: Volume 5974 Folio 868;
- Sections 390 and 393. Certificate of Title: Volume 5974 Folio 869;
- Allotment 57 in Deposited Plan 34319. Certificate of Title: Volume 5417 Folio 367;
- Allotment 11 in Deposited Plan 45788. Certificate of Title: Volume 5401 Folio 364; and
- Allotment 58 in Deposited Plan 34319. Certificate of Title: Volume 5417 Folio 336.

In terms of services, the site has electricity, mains pressure water, telephone services and a septic tank for sewerage from the amenities. There is a fully serviced staff amenities facility, an administration building at the weighbridge and a fully equipped workshop. A sealed road extends from the secure entry gates, past the gatehouse to the existing wheelwash. The road extends further into the site as a specifically designed and constructed all weather access road.

The predominant surrounding land uses are livestock grazing and cereal cropping, with some intensive animal keeping. Climate, soil and landform characteristics of the area are not favourable for many types of activities in the region and as such agricultural production and the grazing of livestock are the primary local land use.

The nearest residence is 500 m from the waste disposal area, three other (occupied) residences are 830 m, 1030 m and 1 500 m from the site, a Mineral Lease Area on the Northern property boundary and Grazing/agricultural intensive animal keeping is within 1 kilometre of the other property boundaries including a piggery to the north.

2.2 Development Authorisation

The Inkerman landfill received Government Development Approval on 21 January 1999 when the Governor of South Australia granted a Development Authorisation to construct a waste management facility south of Inkerman in the Wakefield Regional Council. Since then amendments to the development authorisation have been grated by the DAC in June 2004, October 2004, April 2006, September 2007, and more recently in June 2008.

2.3 EPA Licence

The facility is licenced by the EPA under the Environmental Protection Act 1993 (Schedule 1, Part A, clause 3 (3)) as a Waste or Recycling Depot (EPA Licence number 14463).

A copy of the current EPA Licence can be found in Appendix B.

2.4 Site Selection for Additional Waste Types

The proposed site to receive the additional waste types is within the footprint of the approved landfill site. A full description of the site, its environment and the facility's operation has been previously comprehensively documented as part of the original approvals process.

The Northward Fill has been subject to the following approval process:

- The Environmental Impact Statement (EIS) for the Northward Fill was published in October 1995 by Path Line Australia Pty Ltd;
- Following a statutory period for public comment, a Supplement to the EIS was published in June 1996;
- Thirty submissions were received by the then Department of Housing and Urban Development (DHUD), now the Department of Environment, Heritage and Aboriginal Affairs (DEHAA). The Supplement to the EIS responded to public submissions and government comments on the EIS;
- DHUD published an Assessment Report in April 1997, which had a number of detailed comments on the proposal. This report recommended that further investigation, design and development of operational procedures were needed to warrant approval;
- Path Line Australia Pty Ltd addressed these comments in the Final EIS document dated June 1998;
- As a result of information contained in that document the Governor of South Australia granted development approval for the Northward Fill on 21 January 1999;
- Since development approval was granted, several gazettal notices have been issued for the following reasons;
  - Revised base liner profile (South Australian Government Gazette (14 October 2004)),
  - Trailer Transfer Area (South Australian Government Gazette (17 June 2004)),
  - Change in leachate collection system and operating hours (South Australian Government Gazette (13 April 2006)), and Additional Waste which may be received (Non-Friable Asbestos Waste, Quarantine Waste, Used Foundry Sand, Shredded Tyres, Wastes from non-metropolitan areas) and revised leachate transfer pipework location, (South Australian Government Gazette (20 September 2007)), (South Australian Government Gazette (5 June 2008)).

The actions associated with the development of the landfill that have been implemented to date include:

- LEMP first issued to the EPA in July 1999;
- EPA Licence 14463 issued in accordance with the statutory requirements, in particular the Environment Protection Act (1993);
- Detailed engineering design for various stages of the landfill and the Trailer Transfer Area (TTA) had been developed, documented and approved by the EPA for the implementation of the proposed operation;
- Construction of the landfill commenced in July 2003; and
- Landfill activities commenced following EPA approval for the As Construct Report for Stage 1 and then onto subsequent stages, currently operating in Stage 3.

The reports and process listed above involved an assessment of a wide range of social, environmental and economic effects that might arise due to the establishment of the waste facility. This included investigations of the site's geology, hydrogeology and meteorology for the area and then determining how the landfill operations would impact upon these elements.

3 Nature of Amendment and Rationale

3.1 Rationale for Proposed Amendment

The accommodation of additional waste types at the Inkerman landfill provides a highly engineered and environmentally sound disposal option for the needs of state-wide authorities. The proposal responds to market demand and provides a commercial opportunity to maximise the waste disposal opportunities of the site. In addition, TPI operates its own Liquid Treatment Plant and the disposal of this waste at the Inkerman facility offers a safe and orderly disposal option. Expanding the existing site takes advantage of the operational controls and the high level of environmental management practice already in place. The proposal also takes advantage and builds upon the proponent's proven performance record in waste management and leadership role in the waste industry.

The proposed amendment relates to the receipt of waste types that are not currently permitted for disposal at the site. The site's current operations and description of the proposed additional waste are described below.

3.2 Current Facilities and Operations

Waste types that are currently disposed of at the Northward Fill are identified in Section 1 of this report.

TWM currently operates the Inkerman landfill site in strict accordance with its EPA approved and endorsed LEMP, which details the strategies and procedures to manage potential effects of the its activities at the site. The LEMP is an evolving document and since its original preparation the LEMP has been reviewed and updated to include operational and environmental improvements. It remains the key document for the management of the environment at the site. A new section in the LEMP has been prepared to include additional management measures specifically for the operation of the LLCW cell, "EMM 14 – Operation of Cells to Receive LLCW", as provided in Appendix C.

3.3 Proposed Additional Waste Type

The nature of the waste will be LLCW consisting primarily of soils and waste residues, including residues from liquid treatment plant operations, containing low levels of contamination and meeting the relevant EPA LLCW criteria. Wastes from of other types and from other sources may be received at the site, as long as they comply with the relevant EPA LLCW criteria.

It is expected that an additional 20,000 tonnes per annum is likely to be received at the site. This amount, in conjunction with current volumes being received at the facility, is well within the range contemplated by the original approvals for the facility. The disposal of LLCW is proposed for approximately 30-40 years, in accordance with the overall anticipated life of the landfill facility.

4 LLCW Cell Design

4.1 Cell Location and Buffers

It is proposed to dispose of the LLCW in a designated area separate to other waste types at the facility. The location of the proposed LLCW cells is shown in Figure 2 and forms part of the existing approved facility, situated adjacent to the intersection of Port Wakefield Road and Primes Road, Inkerman. The LLCW disposal area has a capacity of approximately 1.2 million cubic metres of airspace.

LLCW cells will be specifically designed and constructed in accordance with the new provisions of the LEMP (EMM 14) within the approved landfill footprint.

In order to ensure effective segregation of the LLCW from other waste disposal areas on the site, a bund wall will be constructed of clay soil progressively as waste disposal operations occur.

Following completion of filling in a LLCW cell, the area will be capped which when combined with the low permeability lining system underlying the site, will effectively encapsulate disposed waste material.

4.2 Cell Design Features

In addition to the engineering design of the LLCW cells outlined in this section, within proposed LEMP (EMM 14) further environmental management measures are proposed. These are described further in Chapter 5.

The barrier system and leachate monitoring system are specifically varied for the LLCW cells to provide a higher level of performance than required for cells receiving other waste types. The LLCW cell has been designed to ensure the lining system maintains a 2 metre separation between the groundwater and the underside of the standard liner profile.

The engineering approach adopted for the liner is that used elsewhere in the state for the disposal of LLCW materials and put forward as the benchmark by EPA during consultation with regard to this proposal. The approach consists of a secondary clay liner overlain by a primary composite liner (comprising a HDPE geosynthetic / clay liner) separated by a “geogrid” geo-composite drainage layer. The lining system is overlain by a cushion geotextile protection layer and leachate collection system. This liner profile is substituted for the 1m thick low permeability clay liner approved for cells receiving approved waste types.

In accordance with EPA requirements, the proposed concept design of the profile of the liner and leachate collection system for the LLCW cell comprises the following:

- A geotextile separation layer; underlain by
- 0.3m thickness of leachate drainage layer; underlain by
- A cushion geotextile protection layer; underlain by
- A HDPE geomembrane; underlain by

- A 0.6m thick compacted clay liner with a permeability of $< 1x\ 10^{-9}$ m/s
- A leakage detection layer in the form of a geonet
- A secondary 0.6m thick compacted clay liner with a permeability of $< 1x\ 10^{-9}$ m/s which has a minimum separation distance to groundwater of at least 2m based on the highest groundwater elevations previously recorded at the site.

5 Environmental Management

5.1 Environmental Management and Best Practice

The Inkerman Landfill facility was originally designed and constructed to meet the principles contained within the EPA Guidelines for Major Landfills, which has since been superseded. Amendments to the licence and engineering specifications have occurred such that the facility now meets the requirements of the 2007 EPA Guidelines "Environmental Management of Landfill Facilities for (municipal solid waste and commercial and industrial general waste).

Landfill Environmental Management Plan

As stated earlier in this report, the Inkerman landfill site is operated in strict accordance with the EPA approved and endorsed LEMP. As it is a dynamic document it is upgraded on a regular basis, thereby ensuring continuous improvement on an ongoing basis. The proponents strive to not only meet the required environmental and other regulatory requirements, but also aim to be leaders through the adoption of appropriate best practice to waste disposal in South Australia.

Essentially, the LEMP provides a summary of issues that will require consideration during the construction, operation and post-closure of the facility. It identifies commitments made by TWM and is used as a checklist by TWM, the EPA, Planning SA and the public, to monitor environmental management performance of the facility.

In accordance with EPA Licence requirements, the LEMP will be reviewed and updated (if required) annually. This will allow for the incorporation of adjustments to environmental monitoring and auditing, changes to relevant legislation, policies, guidelines and performance requirements and conditions of licence.

The original LEMP was prepared in consultation with the EPA prior to commencement of receiving waste at the site. The LEMP covers the following issues:

- Operational Details.
- Environmental Management Systems.
- Stormwater and Erosion Management.
- Groundwater and Leachate Management.
- Landfill Gas Management.
- Noise Management.
- Dust and Mud Management.
- Odour Management.
- Litter Management.
- Visual Impacts and Revegetation Management.
- Fire Risk Management.
- Aboriginal Heritage Management.
- Closure and Post Closure.

In relation to the LLCW, there is the potential for a number of environmental impacts to be generated and therefore careful management and appropriate control measures will be adopted to ameliorate potential impacts. Accordingly, TWM has updated the LEMP to incorporate environmental management measures for the LLCW.

A new section in the LEMP has been prepared to include additional management measures specifically for the operation of the LLCW cell, "EMM 14 – Operation of Cells to Receive LLCW". This includes the following issues:

- Leachate Management and Groundwater Protection;
- Landfill Gas Management; and
- Litter Management.

The additional environmental management information for the LEMP will be assessed by the EPA.

The following sections provide information on the existing environment, followed by the proposed management measures that will be adopted in relation to LLCW. These specific management measures are variations (additions) to the existing LEMP.

5.2 Background - Physical Environment

Information on the existing environment has been previously documented in the LEMP and key features relevant to this report are described below.

5.2.1 Local Topography and Landuse

The current visual appearance of the site is one of undulating land broken by sand dunes, which rise to RL 20 m AHD, i.e. 20 m above Sea Level, or approximately 10 m above the natural ground level adjacent to Port Wakefield Road. Further to the east of the site, these dunes present themselves to a height of RL 25 m AHD, providing an irregular raised profile. The dunes are not cultivated but are vegetated with scattered native trees and some native grassing. The surrounding fields, where planted, exhibit as cereal crop farmland, and vary in appearance as the seasons prevail and range from the mid winter green crops to yellow summer stubble to bare earth. The area adjacent to the Port Wakefield Road, abutting the western boundary of the site, has significant native vegetation and tree and shrub plantings in place which acts as a visual and noise buffer from the traffic.

5.2.2 Geology and Hydrogeology

Geology

The Adelaide 1:250,000 geological map sheet indicates that the geology of the site consists of aeolian Fulham Sand and possibly Molineaux Sand (dunefield sands) underlain by (possibly) aeolian calcareous sand of the Woorinen Formation and Bakara Soil/Ripon Calcrete. Beneath these surficial deposits is a substantial thickness of Hindmarsh Clay, described as grey and red-brown mottled sandy clay (MESA,

1969). These recent and Quaternary aged sediments, plus the underlying Tertiary age units are known as the St Vincent Basin.

Records from installation of groundwater monitoring wells at the site indicate that high plasticity Hindmarsh Clay has been encountered to a depth of about 20 m below the surface.

The uppermost Tertiary unit in the St Vincent Basin in this area is the Port Willunga Formation (MESA, 1995), which consists of fossiliferous sandy limestones, sands and sandstones. It is underlain by siltstones and limestones of the Blanche Point Formation (MESA, 1983), which in turn is underlain by sands, clays and coal seams of the South Maslin Sands, Clinton Formation, and North Maslin Sands (MESA, 1969).

A summary of the subsurface conditions is provided in the table below:

Table 1 – Description of subsurface material

Unit		Description	Depth of Top of Unit
A	Topsoil	Sand, fine to coarse grained, brown	-
B1	Calcrete	High strength Calcrete	0.15 – 0.2 m
B2	Calcareous Soils	Sandy Clay, low plasticity, white, with fine to coarse sands, trace of fine to medium gravel, calcareous	0.55 – 0.6 m
C	Sandy Clay	Sandy Clay, high plasticity, mottled red brown and grey, fine to coarse grained sand. Boreholes were terminated in this unit at depths of 13.5 m for W24, 13.5 m for W26 and 12 m for W27.	1.5 m – 2.0 m

Aquifers within these sediments include thin sand or gravel beds within the Hindmarsh Clay, the uppermost Tertiary aquifer within the North Maslin Sands and South Maslin Sands. In the Inkerman area, the salinity of groundwater is generally well in excess of 6000 mg/L in both Tertiary and Quaternary aquifers and is therefore not used for potable water or irrigation.

Local Hydrology

The site is located in an area with an average annual rainfall of 331 mm and pan evaporation of 1,820 mm, measured at the Port Wakefield Post Office and Price (Ocean Salt) respectively. Most rainfall occurs in the winter months.

The site does not function as a typical catchment. There are no defined flow paths discharging to receiving waters. The nearest river, River Wakefield, lies 15 km to the north of the site. Rainfall infiltrates into the sandy surface soils with no runoff. The landform is generated by wind erosion rather than water erosion. There are many entrapped low spots between the dunes, and in some the underlying Hindmarsh Clay is exposed as a claypan. These shallow claypans occasionally contain shallow water due to direct precipitation and some seepage from the adjacent dunes.

Hydrogeology

Groundwater in the vicinity of the site has been previously documented in the original EIS report (1998). That report outlined that the groundwater flows in a general north-westerly direction (Coffey 1997 in Final EIS 1998). As part of the original EIS (1998), a groundwater flow model was constructed to investigate the movement of water from the site to Gulf St Vincent. The model indicated that it would take tens of thousands to millions of years for groundwater to flow from the site to the sea at Gulf St Vincent. This information was used to determine that the pollution potential of the site to the marine environment to be considered low.

Information from groundwater monitoring activities on site since 1998 indicates the following:

- A groundwater flow direction generally from east to west
- Salinity levels in monitoring wells completed in the Quaternary aquifer vary across the site and have been measured between 12,000 mg/L and 66,000 mg/L
- Salinity levels have been measured between 10,000 mg/L and 13,000 mg/L in monitoring wells completed in the Tertiary aquifer.
- There is not a distinctive change in groundwater monitoring results since landfill operations commenced at the site.

5.2.3 Wind

Winds are predominantly from the south and south-west during summer and the north and north-east during winter.

5.3 Additional Environmental Management Measures for the LLCW

A new section (Environmental Management Measure - EMM) in the LEMP has been prepared as part of this amendment to include management and handling procedures for the LLCW. These are outlined below.

5.3.1 Leachate management and groundwater protection

The following information is proposed as a variation (addition) to the existing LEMP to manage potential effects of LLCW on groundwater.

General

The barrier system and leachate monitoring system are specifically designed for the LLCW cells to provide a higher level of performance than approved for cells receiving other approved waste types.

It is proposed that LLCW cells will only be established in perimeter cells with perimeter sumps.

Base Liner and Leachate Collection System

In accordance with EPA requirements, the landfill base will be lined with a composite liner comprising a layer of 2.0mm thick (nominal) HDPE geomembrane overlying 1.2m of low permeability compacted clay liner (CCL), with a geogrid drainage geo-composite layer located at the midpoint of the CCL as shown in Figure 3.

The CCL forming part of the composite liner will be constructed from the same site clays used to construct the 1m CCL used elsewhere on the site. Transpacific has implemented a proven methodology to achieve the permeability performance requirement for the CCL during construction of several hectares of existing cells.

A minimum distance of 2 m between the design base of the clay liner and the upper groundwater system is part of the design features of the LLCW cells.

The proposed implementation of this cell liner system in Stage 4 Cell 1 (LLCW), its interface with adjacent cells and separation to groundwater is shown in Figure 3 and Figure 5.

Construction of the composite lining system shall be in accordance with plans and specification as approved by the EPA and as required by the EPA licence.

LLCW cell perimeter sumps are of a double composite lined type as shown in Figure 3 and Figure 4. A drainage collection point is provided at each perimeter sump to monitor and collect fluid present below the primary liner.

Leachate levels in the sumps will be monitored and leachate levels maintained at a level that ensures build up of leachate does not exceed 300mm on the floor of the LLCW cell.

LLCW Cell Isolation

The perimeter of LLCW Cells shall coincide with ridges in the lining system. Each LLCW Cell shall drain to its own sump.

LLCW Cells shall be isolated from non-LLCW cells by a compacted sandy clay soil layer or bund. This layer shall be a minimum of 1m thick. The isolation layer shall be constructed progressively as detailed in Figure 5, and be continuous from the top of the liner to the underside of the cap.

Leachate Treatment

Leachate from LLCW Cells shall be pumped to dedicated LLCW Cell leachate collection ponds.

LLCW Leachate pond sizing will be based upon the existing approach as described in EMM 03 of the current LEMP.

Groundwater Monitoring

The groundwater monitoring program shall be varied for wells located down gradient of LLCW cells to include analysis of Volatiles as a trigger parameter.

Existing groundwater and monitoring wells are shown in Figure 6.

Leachate Monitoring

The leachate monitoring program shall be varied to include analysis of Volatiles as a trigger parameter.

5.3.2 Landfill Gas Management

The following information is proposed as a variation (addition) to the existing LEMP to manage potential effects of the LLCW on landfill gas.

Infrastructure Requirements

Due to the different composition of LLCW from other wastes received on-site, the landfill gas extraction system for the LLCW cell shall include the following features:

- Sampling ports in the gas infrastructure upstream of interconnection with infrastructure receiving LFG from other portions of the landfill; and
- Be capable of being isolated from the LFG system servicing the remainder of the site, and operated independently if required.

LFG Treatment

It is common practice for the LFG system servicing LLCW cells to be combined with the whole of site LFG system.

Should monitoring of the performance of the LFG system indicate that combined operation is resulting in unsatisfactory performance, a dedicated flaring system or approved alternative shall be established.

LLCW Cell Isolation

LLCW Cells shall be isolated from non-LLCW cells by a compacted sandy clay soil layer or bund. This layer shall be a minimum of 1m thick. The isolation layer shall be constructed progressively as detailed in Figure 5, and be continuous from the top of the liner to the underside of the cap.

5.3.3 Litter Management

The following information is proposed as a variation (addition) to the existing LEMP to control litter as a result of receiving LLCW.

Litter Control Measures

The LLCW material is not expected to contain appreciable quantities of litter, therefore litter management measures such as the litter net system used elsewhere on the site will not be used in the LLCW cells.

5.3.4 Management of the Receipt of LLCW

LLCW will only be received on site by prior arrangement to ensure that wastes are appropriately classified prior to arrival.

Where project specific receival and handling procedures require changes to standard site acceptance and handling procedures to meet an approved projects environmental management plan or to respond to an EPA request, this will be subject to prior approval of project specific handling procedures by the EPA approval.

Should any staging of materials be required on-site in accordance with the above, it will only occur in a level area provided within the LLCW cell footprint specifically for this purpose.

Site procedures require that odorous or dusty materials shall not be left uncovered at the end of any working day.

6 Transportation of Proposed Additional Waste

6.1 Expected waste volumes and transport needs

Through this application, it is anticipated that an additional 20,000 tonnes per annum (tpa) is likely to be received at the site. Original approvals for the facility anticipated 700,000 tonnes being disposed of annually however even with this additional material being delivered to the facility, disposal activities will still be less than half of that originally approved.

Based on approximately 20,000 tpa, it is estimated that approximately 670 loads per annum will be delivered to site, assuming 30 tonnes per load. In a worst case scenario, ie no disposal during the wetter months of the year, the majority of this material would come to site over a six month period. This equates to approximately 27 truck loads per week or 6 loads per day.

The movement of vehicles that are transporting the additional waste will use existing approved traffic routes and based on the above analysis, the number of additional trucks transporting the additional waste will not exceed current approved numbers.

6.2 Traffic Implications

The Inkerman landfill is serviced by Port Wakefield Rd (National Highway 1), a double lane, separated dual carriageway designed to handle significant traffic volumes. Previous research indicates that Port Wakefield Road currently has in excess of 7,300 traffic movements per day. Assuming the above worst case scenario whereby waste disposal of the proposed additional waste streams is occurring all at the same time, this would equate to an additional 6 loads per day to and from the site.

This represents an increase of 0.01% over existing traffic volumes.

Implications to current traffic movement along the routes will be negligible and the numbers of trucks do not exceed the current approvals.

The subject amendment will not require any additional access or egress points to the site. The on-site provision for parking, loading, unloading and turning of vehicles will safely and conveniently accommodate the increased traffic movements as well as the on-site movements of vehicles hauling waste.

7 Planning Assessment

7.1 Introduction

The proposal to receive low level contaminated waste constitutes an amendment to an approved Major Development, pursuant to Section 47 of the Development Act, 1993.

From a planning perspective it is appropriate for the proposal to be assessed against the relevant provisions of the Planning Strategy for Regional South Australia and the specific local policies prescribed within the Wakefield Regional Council Development Plan, as the site is situated with the Wakefield Regional Council area.

7.2 Planning Strategy for Regional South Australia

The Planning Strategy for Regional South Australia is the principle document that provides a framework for the State Government's visions for the development of the state.

The Inkerman Landfill currently provides a critical service to the State by receiving a substantial portion of the waste generated within the Metropolitan area. This application to receive additional waste will expand the waste receiving potential of the facility and will reinforce key Strategic Directives espoused within the Planning Strategy for Regional South Australia. The following discussion provides an overview of the proposed amendments in relation to the key aspects of the Planning Strategy.

Economic Activity

The proposed amendment to enable additional waste to be accommodated at the Inkerman landfill will enhance the existing range of services provided by the facility, and importantly will ensure the future viability of the facility. The Inkerman Landfill, and the parent company TPI, is a significant employer of local and regional people, and will continue to invest resources within the region. This amendment is sought as an orderly and economic development of facilities at the existing site where all operational management and licensing control mechanisms are well established.

Environment and Resources

The additional opportunity to receive the proposed additional waste will ensure that such waste can be adequately disposed of within an EPA approved facility, and will negate the requirement to dispose the waste elsewhere. The operation of the Inkerman Landfill continues to meet the very highest environmental management standards and makes use of evolving technologies and is therefore very well placed to handle the disposal of the additional waste. The facility has been subject to a previous assessment and it is considered that the facility will not have an adverse environmental impact. The proposed amendments will not fundamentally alter this position.

Importantly, the proposal suitably accords with the intent of the relevant provisions regarding waste by ways such as a adopting a regional approach, using and

developing existing resources, utilising modern waste management infrastructure, providing the highest level of environmental protection, and utilising appropriately located land.

Infrastructure

The proposed amendment to the Inkerman landfill current authorisations will assist in the state's development and the maintenance of quality infrastructure, which plays a crucial role in the state's economic development. The proposal will build upon the current infrastructure at the site, rather than become a burden to it.

The subject land is contained within the Yorke Peninsula Planning and Development Area. The prescribed key Planning Strategies do not necessarily envisage development of the nature proposed, however it is our contention that the proposed amendments will not jeopardise the intent of other key strategies identified for the region in relation to economic activity, environment and resources and people, towns and housing.

7.3 Development Plan Considerations

The subject land is situated within the Primary Industry Zone of the Wakefield Regional Council Development Plan (Consolidated - 25 January, 2007).

The relevant provisions of the Development Plan that are considered to be relevant for the site include the following:

Council Wide

Objectives - 1, 2, 4, 6, 7, 8, 35, 36, 37, 38, 39 & 40

Principles of Development Control - 45, 46, 176, 177, 178, 180, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 199, 200, 201 & 202

To adequately address all relevant provisions of the Development Plan, the planning assessment will be discussed under the following separate key headings:

- Form of Development.
- Use of land.
- Transport and Parking.
- Environment and Conservation.

Form of Development

The Inkerman Landfill established within the Primary Industry Zone and was the subject of a previous major development approval gazetted on 21 January 1999. The proposed amendment will allow the site to receive low level contaminated waste. This amendment is sought as an orderly and economic development of facilities at the existing site where all operational management and licensing control mechanisms are well established.

It will allow the site to service the growing need for affordable waste management in South Australia. Accordingly the Inkerman Landfill site will continue to strengthen the regional economy by developing its capacity to handle additional waste types, enable its future commercial success and provide additional secure employment to people within the Wakefield Council Area. This variation will not fundamentally alter the approved land use.

As such, the proposal satisfies the requirements of the following Council Wide Objective 1, 2, 4, 6, 7 and 8, as demonstrated below:

COUNCIL WIDE

General

Objective 1: ***Satisfaction of the social, educational, cultural, employment, recreational and economic, needs of people living within the council area.***

An integral part of this plan is the need to promote employment opportunities through economic strategies, strong employment prospects will permeate through the community and lead to satisfaction with the social, cultural, economic and recreation needs of residents.

As mentioned above, the handling of additional waste at the facility will further strengthen its commercial success and provide additional employment, while maintaining the highest level of environmental and aesthetic protection.

Objective 2: ***Development in accordance with the Structure Plan for the Wakefield Regional Council (Map WakR/1(Overlay 1)).***

The district comprises a diversity of features, and the Structure Plan, Maps WakR/1 (Overlay 1) and Enlargements A, B and C seeks to illustrate such key features as road/rail networks, mineral and coal resources, areas of significant vegetation, the towns of Balaklava, Snowtown, Port Wakefield, Hamley Bridge, Brinkworth, Blyth, Owen, Lochiel, Avon, Pinery, Halbury, Bowmans, Kybunga, Hoyleton and Beaufort, the Proof and Experimental Range, areas of inundation and the main river systems. This plan is general in nature and needs to be read in conjunction with the township structure plans and zone descriptions and maps.

This variation to the existing approvals will not fundamentally alter the approved land use that has already been assessed and approved against the Structure Plan.

Objective 4: An awareness of the future implication from the Adelaide metropolitan area.

Within the next decade of so, pressures from metropolitan Adelaide will place demands on the district for affordable residential development, recreation, waste disposal and raw materials. Access via the national Highway will further reduce access time to the city and

metropolitan area, and flexibility to accommodate change will be required. At the same time, fragmentation of land holdings and premature development creates potential for on going management problems which can be avoided through sound decisions based on effective policies.

The ongoing demand for disposing of the state's waste within a purpose built facility that meets the highest technical and environmental standards is met by the Inkerman facility. The acceptance of additional waste at this facility further secures a high level of waste management for the state's waste. It makes sound use of existing public and private infrastructure and prevents the unfavourable fragmentation of the state's landuses.

Economy

Objective 6: ***To create a diverse but integrated competitive economy with emphasis on value added products, aquaculture, tourism and recycling.***

Objective 7: ***To facilitate enterprise through the creation of a positive environment for economic growth built from the districts assets, and by minimising negative factors impacting on the area.***

The economic thrust for the district is considered vital for its long-term viability and sustaining its close knit community. Every opportunity should be taken to enhance employment opportunities except where they interfere with the environment. The strength of the rural economy is recognised and it is not intended to undertake a dramatic shift from these fundamental activities, but rather, extend and enhance where possible through value adding industries, export opportunities, and expanding activities such as intensive animal keeping. Further desired areas to facilitate development opportunities will be created with suitable controls to ensure appropriate development.

Objective 8: ***Promotion of local employment opportunities.***

The Wakefield Regional Council district has an important position in the region and provides employment in the agricultural sector, e.g. saleyards and silos, small-scale service industry, repair or engineering works. There is scope for increasing employment in selected industries such as those associated with processing local produce, raw materials, mineral developments and service industries. New developments connected with the tourist industry may provide additional employment opportunities.

The handling of additional waste at the Inkerman facility further strengthens its commercial performance, its input into the economy and in providing employment opportunities, while maintaining the highest level of environmental protection.

Use of Land

This site is contained within the Primary Industry Zone and has already been subjected to a rigorous assessment as part of a previous major development application. It is considered that the subject land is an appropriate site for a major waste management facility. The proposed amendment does not seek to expand outside of the existing approved footprint of the facility. As such, the amendment satisfies the requirements of Council Wide Objectives 35 and 36 and complies with the Principles of Development Control 178, 180, 183, 184, 185 and 186:

Objective 35:	***The orderly and economic development of waste management facilities in appropriate locations.***
Objective 37:	***Waste management facilities to be protected from incompatible development.***
PDC 178	***Waste management facilities should be located, sited, designed and managed to minimise adverse impacts on both the site and surrounding areas due to generation of surface water and ground water pollution, traffic, noise, odours, dust, vermin, weeds, litter, gas and visual impact.***
PDC180	***Waste management facilities should be provided with appropriate separation distances to minimise adverse impacts on the surrounding area and land uses.***
PDC 183	***Organic waste processing facilities for the composting of waste should be located at least a distance of 500 metres from the nearest dwelling, shop, office, public institution or other building designed primarily for human occupation. A lesser distance may be provided where the processing operations and technologies are considered compatible with the surrounding area, land uses and activities. Alternatively, a greater distance may be required where the processing operations are considered incompatible with the surrounding area, land uses and activities.***
PDC 184	***Landfill and associated facilities for the handling of waste, should be located at least a distance of 500 metres from the boundaries of the landfill site. A lesser distance may be provided within the land-fill site where the land-fill facility is considered compatible with the surrounding area, land uses and activities so that an effective minimum separation distance of 500 metres can be provided and maintained between the land-fill facility and potentially incompatible land uses and activities.***
PDC 185	***The area of landfill operations on a site should:***

(a) be located a minimum distance of 100 metres from any river, creek, inlet, wetland or marine estuarine area and not within the area of a 1 in 100 year flood event; and

(b) not be located on areas with ground slopes of greater than 10 percent except where the site incorporates a disused quarry; and

(c) not be located on land subject to land slipping; and

(d) not be located within three kilometres of an airport used by commercial aircraft. If located closer than three kilometres the land-fill operations should incorporate bird control measures to minimise the risk of bird strikes to aircraft.

PDC 186 The area of the organic waste processing facilities on a site should:

(a) be located a minimum distance of 100 metres from any dam, river, creek, natural watercourse, channel or bore, and not within the area of a 1 in 100 year flood event; and

(b) not be located on areas with ground slopes of greater than 6 percent; and

(c) not be located on land subject to land slipping; and

(d) not be located within three kilometres of an airport used by commercial aircraft. If located closer than three kilometres the organic waste processing operations should incorporate bird control measures to minimise the risk of bird strikes to aircraft; and

(e) not be located within 250 metres of a public open space reserve, a forestry reserve, a National Park, a Conservation Zone or Policy Area.

Transport and Parking

Section 6 of this report addresses the transport impacts of this amendment. Assuming a worst case scenario, ie. Total volume disposed within a 6 month period, the amendment would result in an additional 6 loads per day. This represents an increase of 0.01% over existing traffic volumes on the Port Wakefield Road which services the Inkerman landfill.

The subject amendment will not require any additional access or egress points to the site. The on-site provision for parking, loading, unloading and turning of vehicles will safely and conveniently accommodate the increased traffic movements as well as the on-site movements of vehicles hauling waste.

As such, the subject amendments satisfy the Council Wide Objectives 38, 39, 40 and Principles of Development Control 45, 46, 49, 176, 187, 189, 196, 199, 200 and 201:

Objective 38: *The safe and efficient movement of people and goods by road. The primary and secondary road network for the District is shown on Map WakR/1 (Overlay 1). The primary network is related to the dominant flow of traffic along north to south routes and also provides for east to west movement.*

Objective 39: *The free flow of traffic on roads by minimising interference from adjoining development.*

Where necessary, in both urban and rural areas, development adjoining roads should be set-back from the road frontage to enable proper traffic circulation. In some instances it may be necessary, in the interests of safety and the free flow of traffic, to restrict access to or from a road, particularly arterial roads. This may be achieved by the use of service roads or only allowing direct access to local roads. Direct access to arterial roads should only be approved in safe locations where there is adequate sight distance and reasonable distance from side roads.

Some kinds of development attract large numbers of vehicles, which create traffic hazards and congestion on roads in the vicinity, unless special provision is made to accommodate them. Off-street parking should be provided in association with business, industrial, recreational and other forms of development so that roads can provide for the safe and efficient flow of traffic.

Objective 40: *Safe access to and from development. The roads of the district, and especially the arterial roads, which are the principal traffic routes in the council area, need protection for hazardous road entrances.*

PDC 45 *Access to and from public roads should be safe and convenient and not cause conditions that interfere with the safe and efficient movement of traffic on abutting roads.*

PDC 46 *Development should not generate traffic volume which cannot safely and conveniently be accommodated on the adjoining road system.*

PDC 49 *Development should include appropriate on-site provision for parking, loading, unloading, turning and fuelling of vehicles.*

PDC 176 *Development in the form of waste disposal or waste storage should:*

(b) have a 20 metre wide landscaped buffer planted with trees and shrubs around the perimeter of that part of the site to be used for the disposal of waste or storage of waste;

(c) have a two metre high chain mesh fence or similar enclosing the waste disposal and waste storage area;

PDC 187 *The waste management site should be landscaped to screen views of the processing facilities and operational areas*

PDC 189 *Noise reduction treatments comprising separation distances and the incorporation of on-site treatments should be provided to ensure noise generation associated with the waste management operation does not result in an adverse impact to any existing or future development on an adjacent allotment.*

PDC 196 *Fencing to a minimum height of two metres should be erected on the perimeter of a waste management site to prevent access other than at appropriate entries. For landfill sites, the fencing should be of chain wire mesh or pre-coated painted metal construction.*

PDC 199 *Waste management sites should be accessed by an appropriately constructed and maintained road.*

PDC 200 *Traffic circulation movements within the waste management site should be adequate in dimension and construction to support all vehicles hauling waste and to enable forward direction entry to and exit from the site.*

PDC 201 *Suitable access for emergency vehicles to and within the waste management site should be provided.*

The proposed amendment will continue to comply with these planning controls by providing safe and adequate access to the site without causing interference to other road traffic, will not generate traffic numbers that cannot be accommodated by the road system, and it will continue to provide adequate space and facilities for vehicles at the site. Similarly it will continue to provide adequate landscaping, screening buffers, noise control, access control, and adequate emergency vehicle access.

Environment and Conservation

As detailed in Section 5 of this report, an approved Landfill Environmental Management Plan (LEMP) sets out management measures at the facility. As part of this amendment, the LEMP has been revised to include a new section that outlined specific management measures relating to the proposed LLCW.

As such, these amendments satisfy the requirements of Council Wide Objective 36 and Principles of Development Control 176(a-i), 177, 190, 191, 192, 193, 194, 195 and 202.

Objective 36: Minimisation of environmental impacts from the location and operation of waste management facilities.

PDC 176 Development in the form of waste disposal or waste storage should:

(a) have a site area of not less than 100 hectares;

(b) have a 20 metre wide landscaped buffer planted with trees and shrubs around the perimeter of that part of the site to be used for the disposal of waste or storage of waste;

(c) have a two metre high chain mesh fence or similar enclosing the waste disposal and waste storage area;

(d) ensure all exposed waste disposal and waste storage areas are covered on a daily basis with at least 500 millimetres of soil or similar covering;

(e) revegetate all waste disposal and waste storage areas by covering the area with at least 500 millimetres of topsoil, grassed and/or landscaped once the waste disposal and waste storage use of the area has ceased;

(f) have available an adequate water supply to enable dust suppression during unfavourable conditions;

(g) ensure the perimeter of the waste disposal and waste storage area is not less than 500 metres from the boundaries of the Landfill site;

(h) have a sealed access road over the subject site from a public road;

(i) be located, sited, designed and managed to minimise adverse impacts on surrounding areas due to surface water and ground water pollution, traffic, noise, fumes, smell, dust, vermin, weeds, litter, Landfill gas and visual impact; and

(j) not include hazardous or listed wastes.

PDC 177 An application for waste disposal or waste storage activities should include an appropriate Management Plan detailing all operational and management arrangements including:

(a) the prevention of contamination, including those matters listed in Principle 176(i) above;

(b) the prevention of unsanitary conditions;

(c) recycling materials;

(d) fire safety;

(e) security;

(f) landscaping; and

(g) maintenance of the site, landscaping and access in good condition.

PDC 188 *Sufficient area should be provided within the waste management site to ensure on-site containment of potential groundwater contaminants and for the diversion of stormwater.*

PDC 190 *Litter control measures which minimise the incidence of windblown litter should be provided on the site of a waste management operation.*

PDC 191 *Leachate from waste management activities should be contained within the property boundary of the waste management site and should not contaminate surface water or ground water.*

PDC 192 *A leachate barrier should be provided between the operational areas and the underlying soil and groundwater of organic waste processing operations.*

PDC 193 *The interface between any engineered landfill liner and the natural soil should be:*

(a) greater than 15 metres from unconfined aquifers bearing ground water with a water quality of less than 3000 milligrams per litre of total dissolved salts; or

(b) greater than five metres from ground water with a water quality between 3000 milligrams per litre of total dissolved salts and 12 000 milligrams per litre of total dissolved salts; or

(c) greater than two metres from ground water with a water quality exceeding 12 000 milligrams per litre of total dissolved salts.

PDC 194 *Surface water run-off from the waste management operations should not cause unacceptable sediment loads in receiving waters.*

PDC 195 *Landfill activities that have a total storage capacity exceeding 230 000 cubic metres should sustainably utilise landfill gas emissions. For smaller landfill activities, if the sustainable utilisation of the gas emissions is not practically feasible then controlled flaring is appropriate to avoid gases being vented directly to the air.*

PDC 202 ***A proposal to establish, extend or amend a waste management operation should include an appropriate Environment Management Plan that addresses the following:***

(a) The prevention of ground water and surface water contamination;

(b) The need to protect and enhance native vegetation;

(c) Litter control, dust control and sanitary conditions generally;

(d) Odour and noise control;

(e) Fire safety;

(f) Security;

(g) Maintenance of landscaping and the general condition of the site; and

(h) Final contour plan and rehabilitation proposals including soil cover, landscaping, drainage, the removal of any contamination or waste, restoration and the like to ensure compatibility with the surrounding landscape and to enable a suitable after use of the site.

The facility will continue to meet these planning controls by providing the highest standard of environmental management, as summarised below:

- Prevention of soil and water contamination – leachate control is crucial to ongoing environmental protection of the site and surrounding land. A liner system already in use and approved by the EPA at other sites for the management of this waste stream.;
- Protection of native vegetation – there is no native vegetation clearance required as a consequence of this amendment as it is within the footprint of existing approvals. The site will continue to be maintained and improved with its ongoing planting program
- Fire safety – the site will continue to apply appropriate fire control and safety measures, as detailed in the LEMP
- Litter and dust control – the proposed amendment is not expected to alter the current operations in terms of managing dust. Since the LLCW material does not contain appreciable quantities of litter, a litter net system will not be used in the LLCW cells.
- Odour and noise control – the proposed amendment is not expected to alter the current operations in terms of managing odour and noise.
- Access and security – the site will continue to provide appropriate accessibility for its operations as well as adequate controls for security.

7.4 Planning Conclusion

The proposed amendment to receive low level contaminated waste at the existing Inkerman Landfill operation will utilise the best technological and environmentally sound disposal methodologies for such material in South Australia. The subject land is remotely located, has safe road access and suitable site geology.

This proposal is generally consistent with the spirit and intent of the relevant provisions of the Wakefield Regional Council Development Plan (Consolidated - 25 January, 2007).

The environmental management practices contained in this report demonstrates that the Inkerman Landfill can accept the additional material without significant impact on regional traffic flows, or the natural environment including water catchment, air, soil and general rural amenity. Accordingly the proposed amendment complies with the relevant requirements of the Development Plan, and the Planning Strategy for Regional South Australia and warrants approval being granted.

8 Post Closure Management

Details about post closure management are included in the existing approved LEMP. Those management measures will also apply to the LLCW.

This broadly includes developing a Closure Plan for the Northward Fill which will include detailed design and post closure monitoring as required in the LEMP. The plan will comply with the rules and principles established in this LEMP and subsequent EPA Licence Conditions.

The Closure Plan will ultimately replace the LEMP.

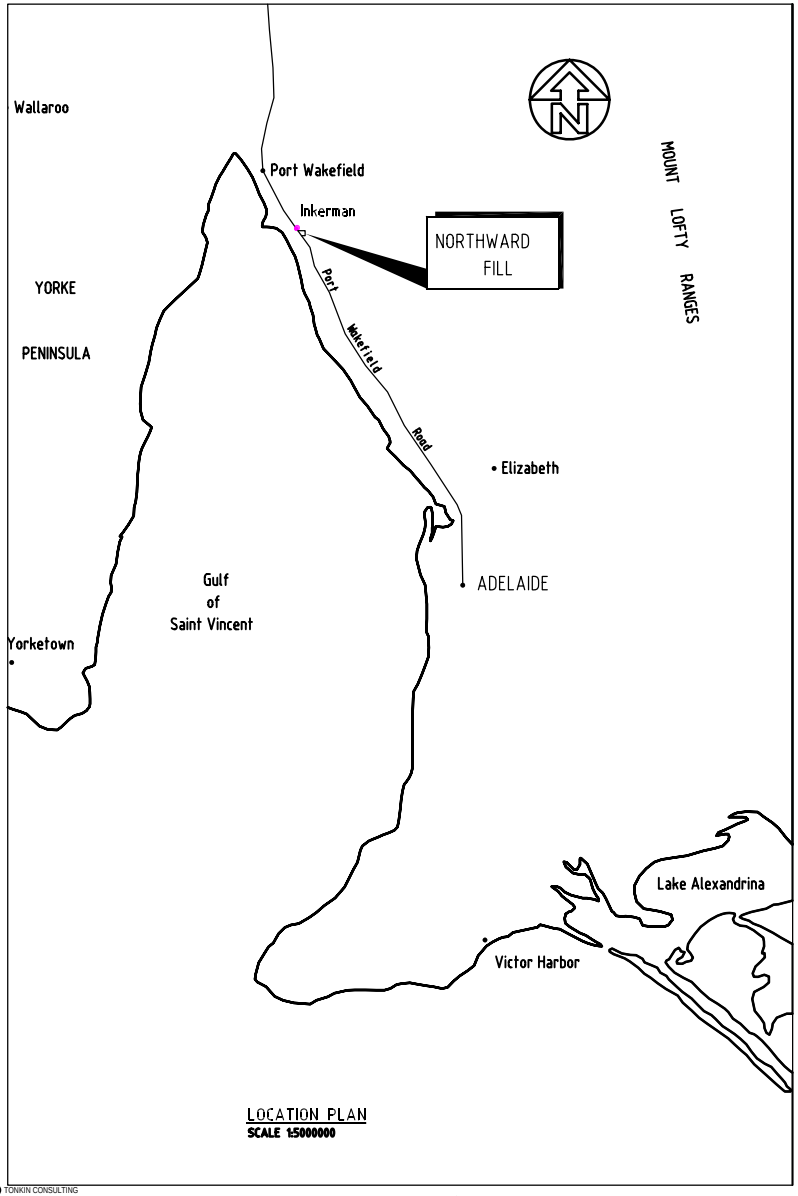
9 Conclusion

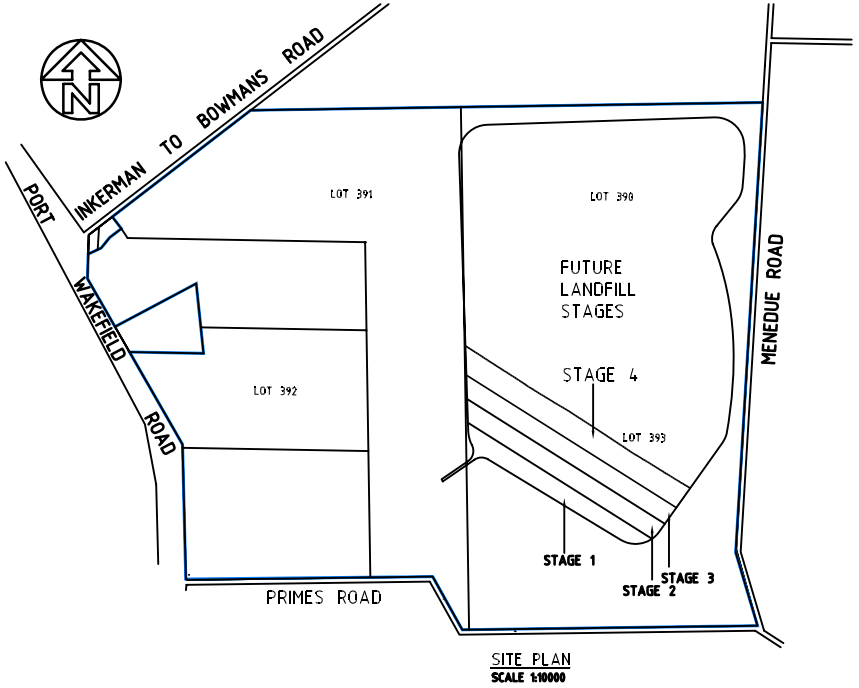
The addition of LLCW at the Northward Landfill, with the amended LEMP to provide appropriate environmental management, provides a safe disposal option for the needs of state-wide authorities. There is a growing need for safe and orderly disposal of this waste, and expansion of the existing site takes advantage of the operational controls already in place and builds upon the proponent's exceptional performance record.

The site has already undergone a thorough environmental assessment in terms of its suitability as a landfill and operates in strict accordance to its EPA licence.

The volume of additional waste at the facility will still be within the original approvals. Ongoing environmental protection will continue and additional control measures have been introduced to manage the LLCW. This includes the design of designated cells to dispose of the LLCW based upon approved designs and systems for sites already receiving these types of materials. A number of key environmental issues are addressed in this report, including a high level of groundwater protection, landfill gas management, litter management, while other issues are already adequately covered in the existing LEMP. The transportation of waste assessment shows that the additional truck movement is well within approvals and road capacities. An assessment of state and local planning strategies has also been undertaken and this indicates the receipt of LLCW is in accordance with policy objectives.

It is therefore concluded that the Northward landfill, with its existing and proposed management regime, is a suitable facility for receiving LLCW.





REVISION	AMENDMENT / REASON FOR ISSUE	APPROVED	DATE
1	ISSUED FOR COMMENT	H.S.	18.09.08

NOTES:
- BASED ON MAUNSELL McINTYRE CONCEPT DESIGN DRAWING OF SAME SHEET NUMBER
- ORIGINAL CONCEPT DESIGN BY MAUNSELL McINTYRE, MARCH 2000

ALL LEVELS TO A.H.D.
100mm ON ORIGINAL DRAWING — DO NOT SCALE

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- CIVIL INFRASTRUCTURE
- STRUCTURAL
- ENVIRONMENTAL
- WATER RESOURCES
- STORMWATER MANAGEMENT
- ROAD SAFETY & TRAFFIC
- BUILDING SURVEYING
- SPATIAL INFORMATION
- ELECTRICAL, MECHANICAL AND AUTOMOTIVE

SCALE:	SHEET SIZE: A1
DESIGNED: A.M.	DRAWN: A.M.
PROJECT MANAGER: P.J.L.	SENIOR DRAFTER:
SURVEYED: -	SURVEY DATE: -
APPROVED:	DATE:

WASTE MANAGEMENT PACIFIC (S.A.) PTY.LTD.

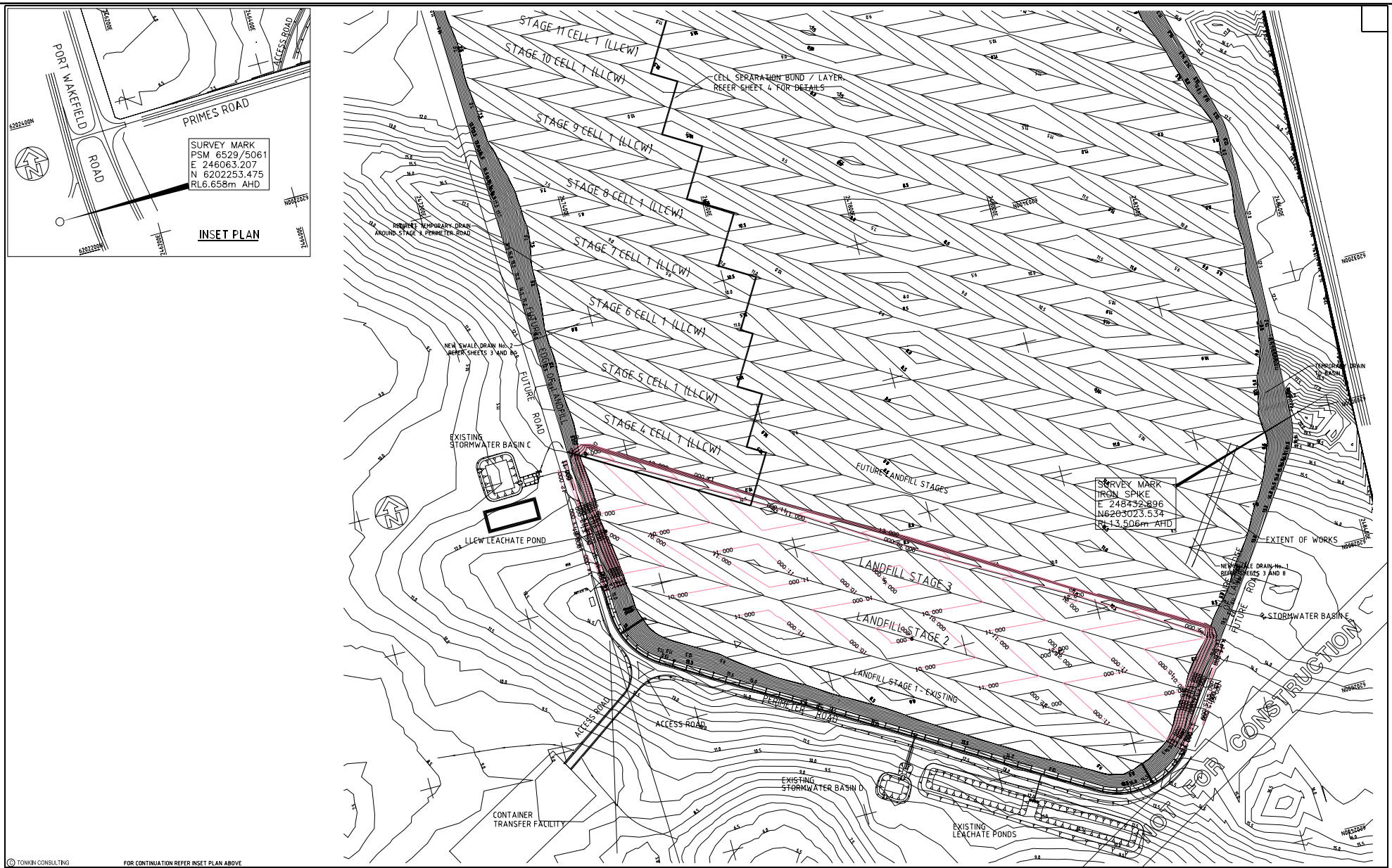
NORTHWARD FILL STAGE 4
DETAILED DESIGN- LLCW CELL
INDEX AND LOCALITY PLAN

CAD REFERENCE: 20080323_01.dwg	SHEET NUMBER	JOB NUMBER	REVISION
XREFS:	5	2008.0323	1

Northward Fill - Inkerman EIS Amendment

Figure 1 - Regional Location

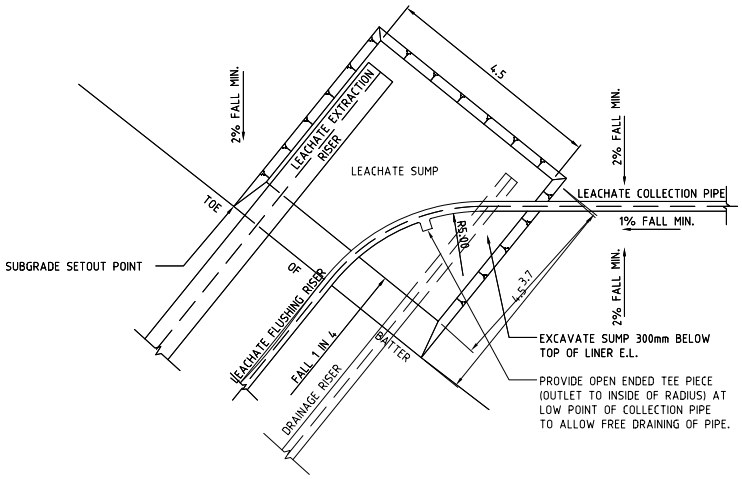
QEDptyltd



Northward Fill - Inkerman EIS Amendment

Figure 2 - Location of LLCW Cells

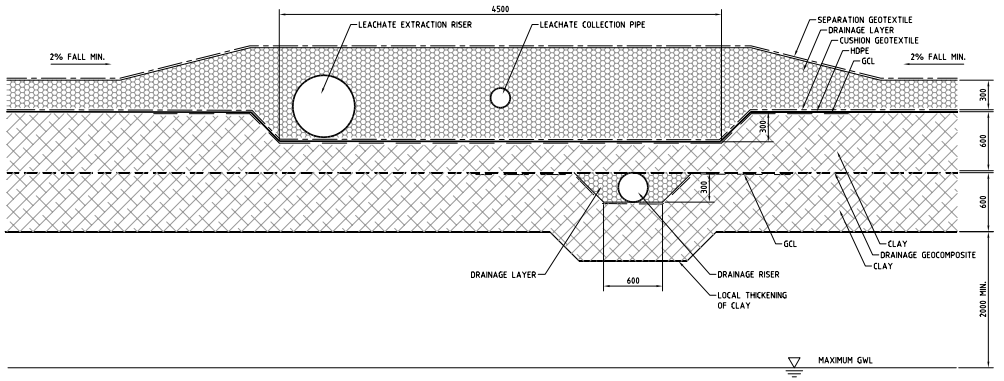
QEDptyltd



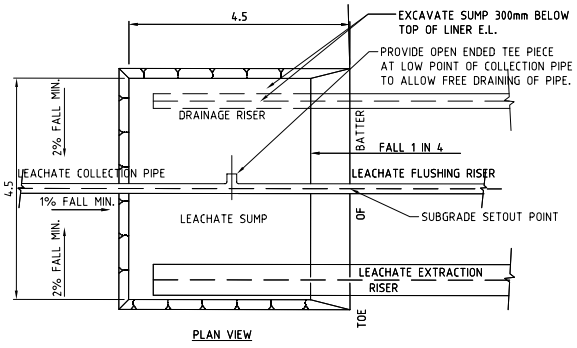
PLAN VIEW

TYPICAL EDGE SUMP ARRANGEMENT (WESTERN SIDE)

SCALE 1:50



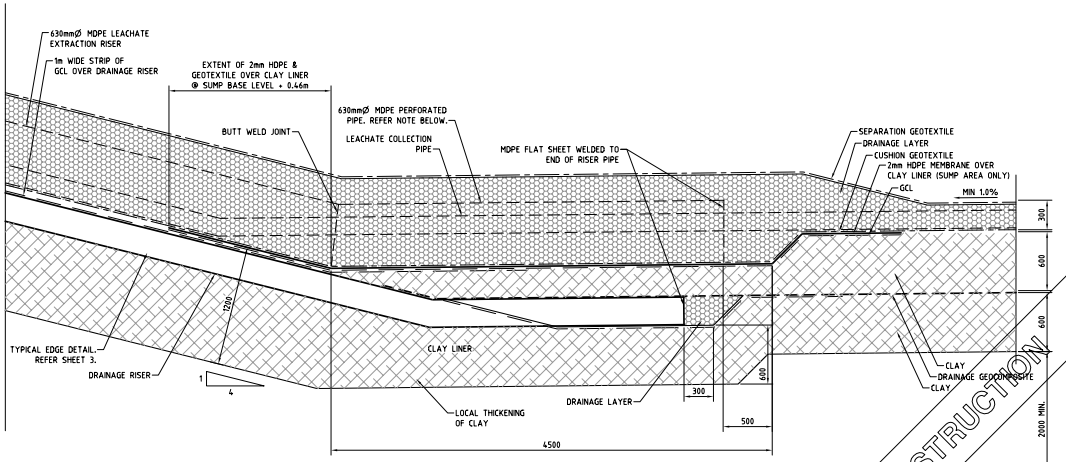
TYPICAL EDGE SUMP CROSS SECTION



PLAN VIEW

TYPICAL EDGE SUMP ARRANGEMENT (EASTERN SIDE)

SCALE 1:50



NOTES:
HORIZONTAL SECTION OF HDPE EXTRACTION RISER IN THE SUMP SHALL BE PERFORATED WITH EVENLY SPACED 12mm DIAMETER HOLES. HOLE SPACING SHALL BE 150mm ALONG 8 ROWS EVENLY DISTRIBUTED AROUND PIPE CIRCUMFERENCE. GEOTEXTILE AND HDPE LAYERS ARE DRAWN TO AN EXAGGERATED SCALE TO MAKE THEM MORE CLEARLY VISIBLE

ENLARGEMENT (A)

SCALE 1:25

NOT FOR CONSTRUCTION

REVISION	AMENDMENT / REASON FOR ISSUE	APPROVED	DATE
1	ISSUED FOR COMMENT	P.J.L.	14.08.08

NOTES:

ALL LEVELS TO A.H.D.

100mm ON ORIGINAL DRAWING — DO NOT SCALE

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- CIVIL INFRASTRUCTURE
- STRUCTURAL
- ENVIRONMENTAL
- WATER RESOURCES
- STORMWATER MANAGEMENT
- ROAD SAFETY & TRAFFIC
- BUILDING SURVEYING
- SPATIAL INFORMATION
- ELECTRICAL, MECHANICAL AND AUTOMATIC

SCALE:	SHEET SIZE: A1
DESIGNED:	DRAWN:
PROJECT MANAGER:	SENIOR DRAFTER:
SURVEYED:	SURVEY DATE:
APPROVED:	DATE:
CAD REFERENCE:	
XREFS:	

WASTE MANAGEMENT PACIFIC (S.A.) PTY.LTD.

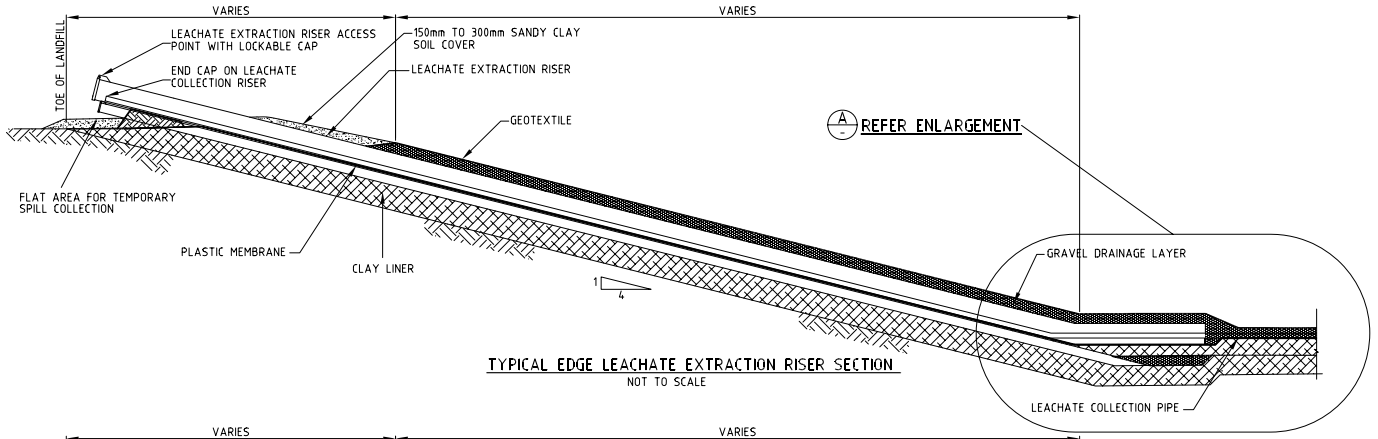
NORTHWARD FILL
DETAILED DESIGN - LLCW CELL
LEACHATE MANAGEMENT - DETAILS 1

SHEET NUMBER	JOB NUMBER	REVISION
2	2008.0323	1

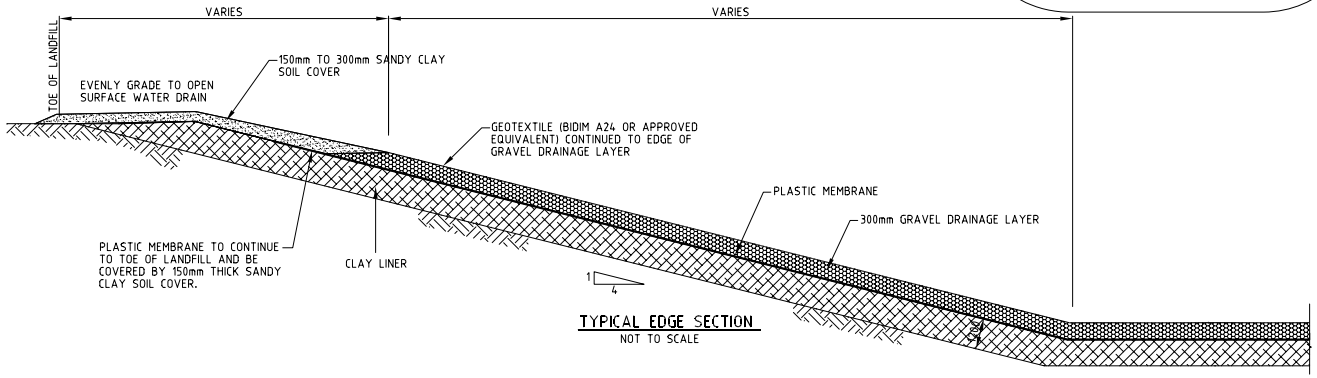
QEDptyltd

Northward Fill - Inkerman EIS Amendment

Figure 3 - LLCW Cell Liner System



TYPICAL EDGE LEACHATE EXTRACTION RISER SECTION
NOT TO SCALE



TYPICAL EDGE SECTION
NOT TO SCALE

NOT FOR CONSTRUCTION

REVISION	AMENDMENT / REASON FOR ISSUE	APPROVED	DATE
1	ISSUED FOR COMMENT	P.J.L.	14.08.08

NOTES:

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- STORMWATER MANAGEMENT
- ROAD SAFETY & TRAFFIC
- BUILDING SURVEYING
- SPATIAL INFORMATION
- ELECTRICAL, MECHANICAL AND AUTOMOTIVE

SCALE:	SHEET SIZE: A1
DESIGNED: A.M.	DRAWN: A.M.
PROJECT MANAGER: P.J.L.	SENIOR DRAFTER:
SURVEYED:	SURVEY DATE:
APPROVED:	DATE:

WASTE MANAGEMENT PACIFIC (S.A.) PTY. LTD.

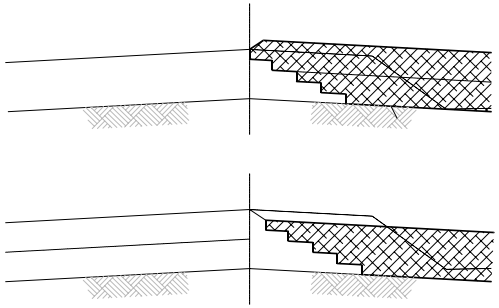
NORTHWARD FILL
DETAILED DESIGN
LEACHATE MANAGEMENT - DETAILS 2

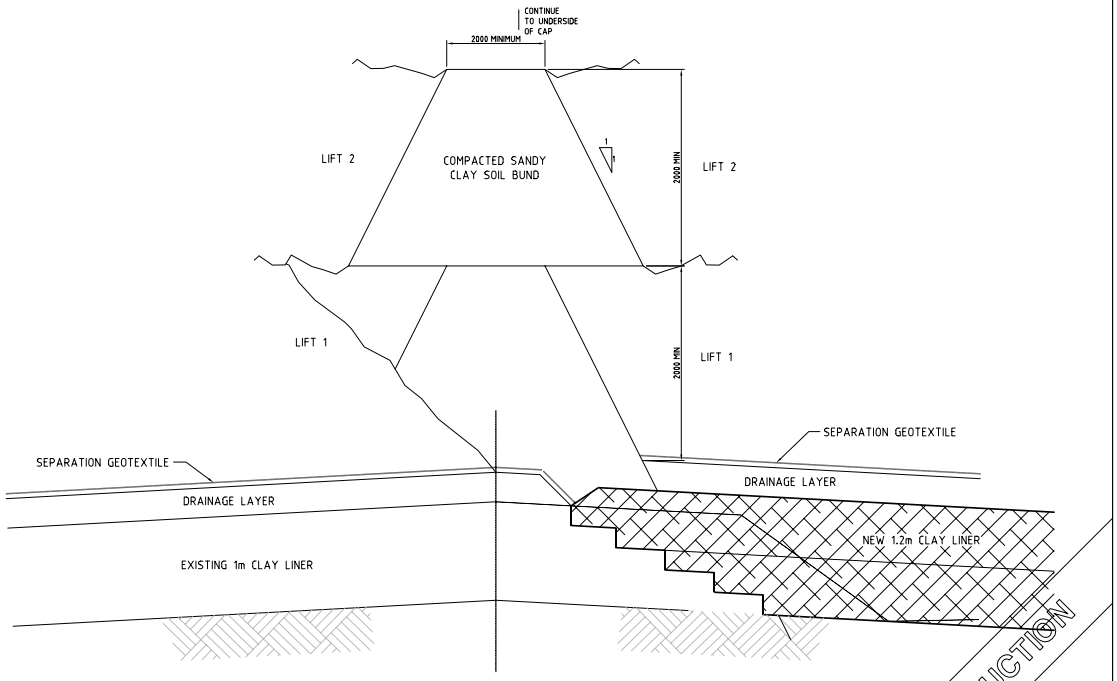
CAD REFERENCE: / XREFS:	SHEET NUMBER	JOB NUMBER	REVISION
20080323_DETAILS.dwg	3	2008.0323	1

Northward Fill - Inkerman EIS Amendment

Figure 4 - LLCW Cell Isolation Perimeter Sumps

QEDptyltd





CELL SERARATION BUND

SCALE 1:50

NOT FOR CONSTRUCTION

REVISION	AMENDMENT / REASON FOR ISSUE	APPROVED	DATE
1	ISSUED FOR COMMENT	P.J.L.	14.08.08

NOTES:

ALL LEVELS TO A.H.D.

100mm ON ORIGINAL DRAWING

DO NOT SCALE

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- STORMWATER MANAGEMENT
- ROAD SAFETY & TRAFFIC
- BUILDING SURVEYING
- SPATIAL INFORMATION
- ELECTRICAL, MECHANICAL AND AUTOMOTIVE

SCALE:	SHEET SIZE: A1
DESIGNED:	DRAWN:
PROJECT MANAGER:	SENIOR DRAFTER:
SURVEYED:	SURVEY DATE:
APPROVED:	DATE:

WASTE MANAGEMENT PACIFIC (S.A.) PTY.LTD.

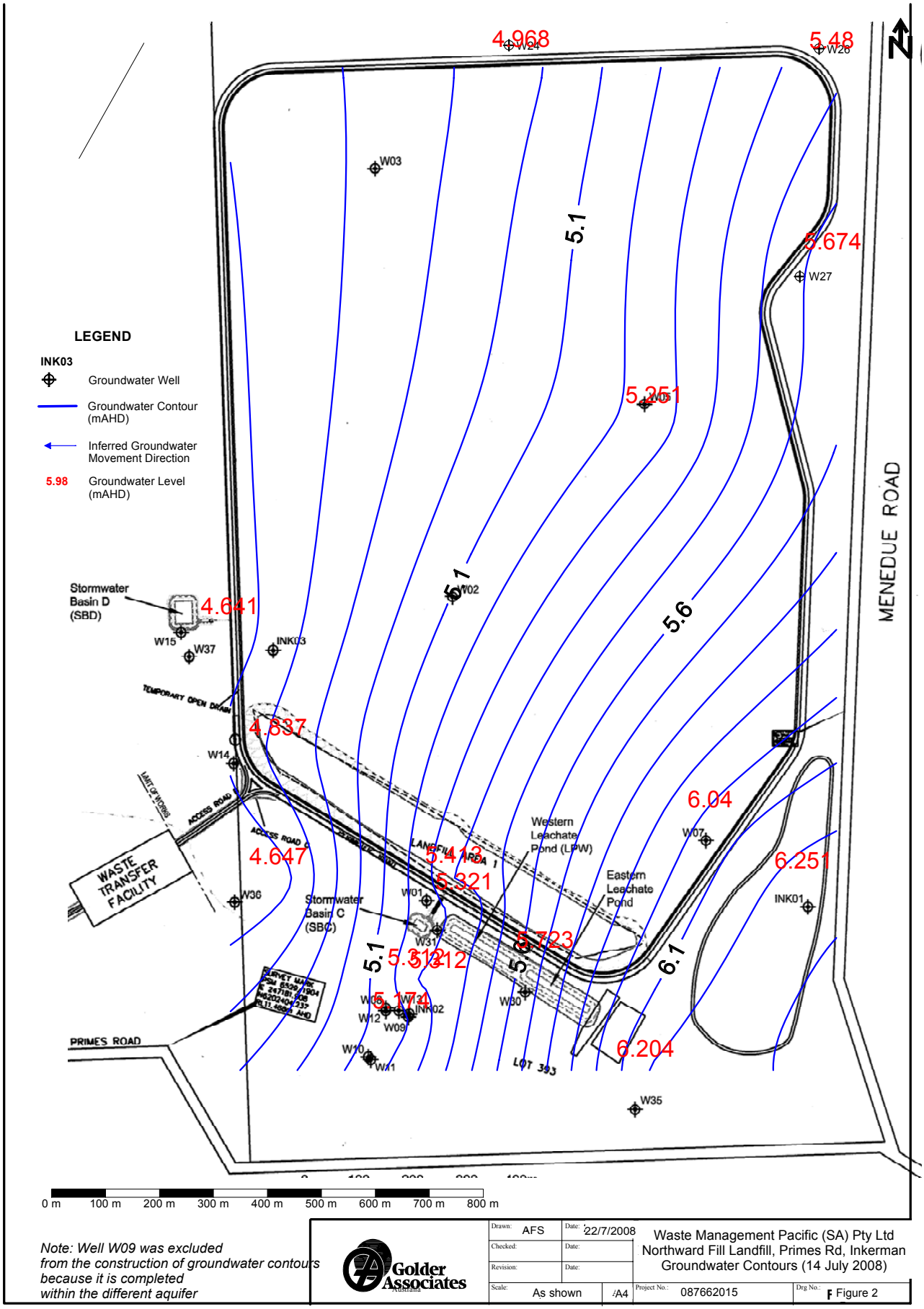
NORTHWARD FILL
DETAILED DESIGN - LLCW CELL
LEACHATE MANAGEMENT - DETAILS 3

CAD REFERENCE: 20080323_Details.dwg	SHEET NUMBER	JOB NUMBER	REVISION
XREFS:	4	2008.0323	1

Northward Fill - Inkerman EIS Amendment

Figure 5 - LLCW Cell Isolation Layer

QEDptyltd



Note: Well W09 was excluded from the construction of groundwater contours because it is completed within the different aquifer

Golder Associates Australia

Drawn: AFS	Date: 22/7/2008	Waste Management Pacific (SA) Pty Ltd Northward Fill Landfill, Primes Rd, Inkerman Groundwater Contours (14 July 2008)	
Checked:	Date:		
Revision:	Date:		
Scale: As shown	A4	Project No.: 087662015	Drg No.: F Figure 2

Northward Fill - Inkerman EIS Amendment

Figure 6 - Groundwater and Monitoring Wells

QEDptyltd

Appendix A

Certificates of Title

Title Register Search

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5974 FOLIO 868 *

COST : $17.40 (GST exempt)	PARENT TITLE : CT 5417/305
REGION : FAX 82270271	AUTHORITY : TG 10491444
AGENT : QED2P BOX NO : 000	DATE OF ISSUE : 10/11/2006
SEARCHED ON : 18/09/2008 AT : 13:36:42	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

WASTE MANAGEMENT PACIFIC (S.A.) PTY. LTD. OF 29-31 BINARY STREET YATALA QLD 4207

DESCRIPTION OF LAND

ALLOTMENT 9 DEPOSITED PLAN 32395
IN THE AREA NAMED INKERMAN
HUNDRED OF INKERMAN

EASEMENTS

SUBJECT TO THE EASEMENT OVER THE LAND MARKED A (TG 10491444)

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

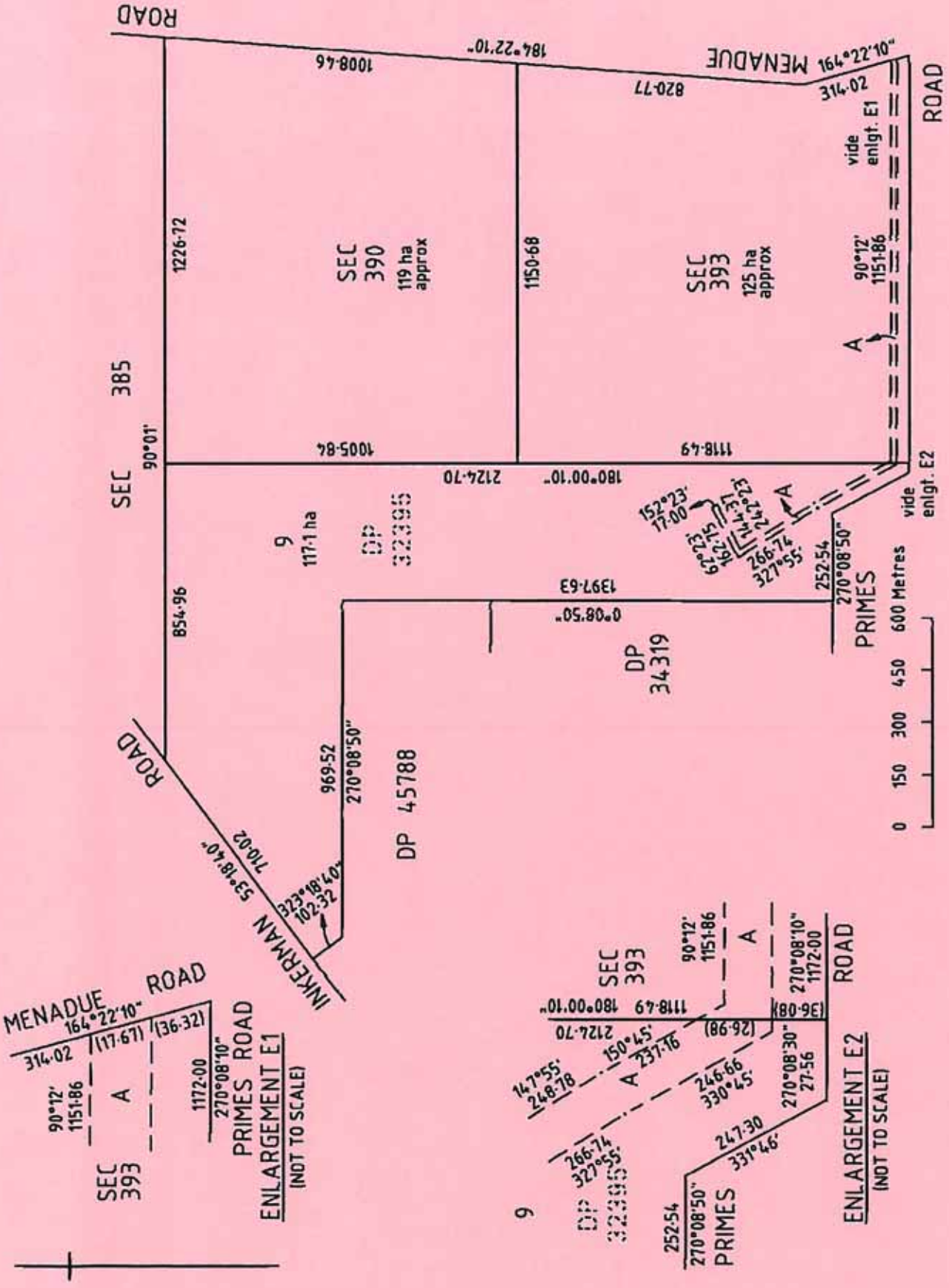
NIL

END OF TEXT.

LANDS TITLES OFFICE ADELAIDE SOUTH AUSTRALIA

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5974 FOLIO 868

SEARCH DATE : 18/09/2008 TIME: 13:36:42



Title Register Search

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5974 FOLIO 869 *

COST : $17.40 (GST exempt)	PARENT TITLE : CT 5417/411
REGION : FAX 82270271	AUTHORITY : TG 10491444
AGENT : QED2P BOX NO : 000	DATE OF ISSUE : 10/11/2006
SEARCHED ON : 18/09/2008 AT : 13:39:47	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

WASTE MANAGEMENT PACIFIC (S.A.) PTY. LTD. OF 29-31 BINARY STREET YATALA QLD 4207

DESCRIPTION OF LAND

SECTIONS 390 AND 393
HUNDRED OF INKERMAN
IN THE AREA NAMED INKERMAN

EASEMENTS

SUBJECT TO THE EASEMENT OVER THE LAND MARKED A (TG 10491444)

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

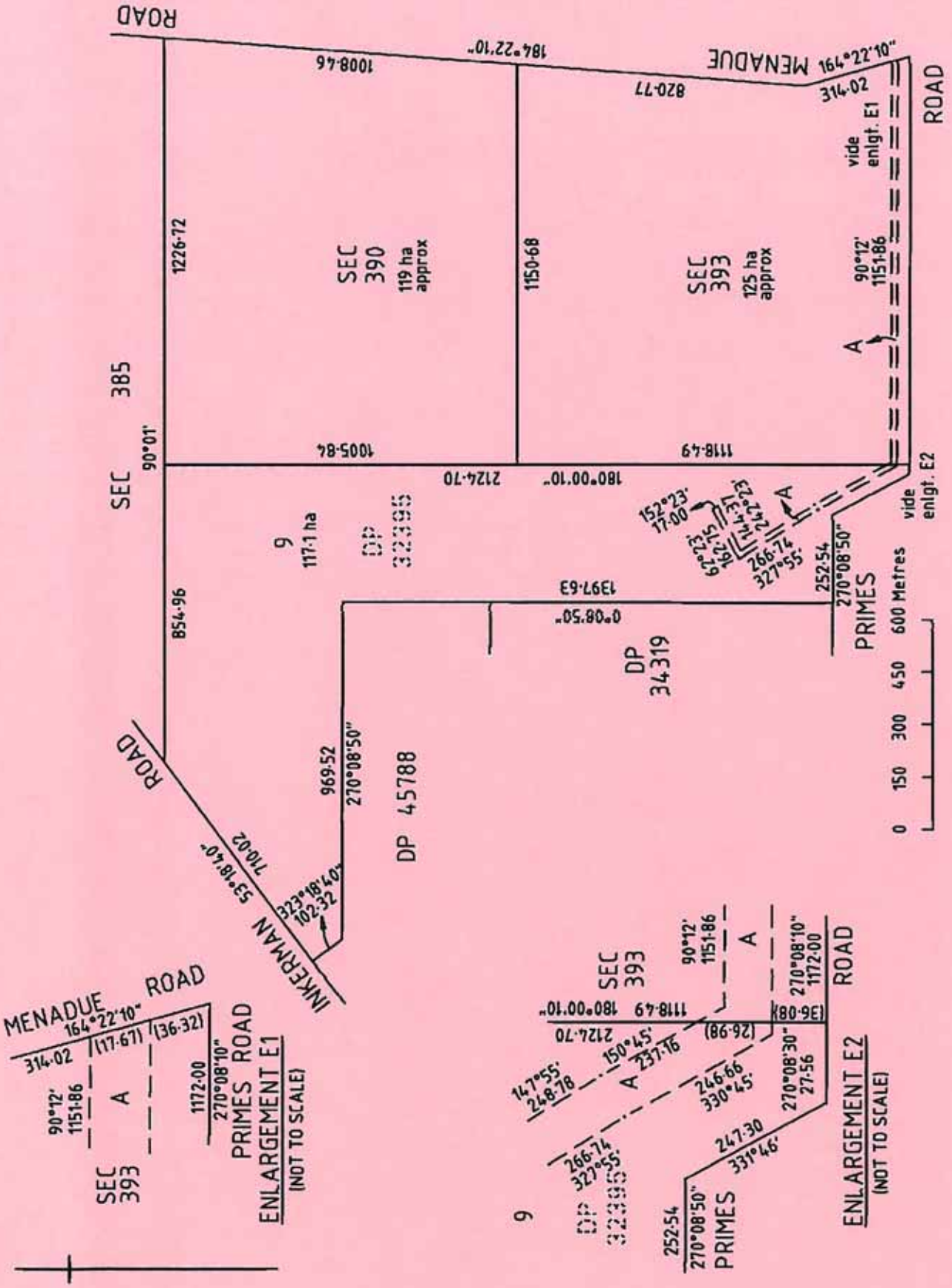
NIL

END OF TEXT.

LANDS TITLES OFFICE ADELAIDE SOUTH AUSTRALIA

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5974 FOLIO 869

SEARCH DATE : 18/09/2008 TIME: 13:39:47



Title Register Search

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5417 FOLIO 367 *

COST : $17.40 (GST exempt)	PARENT TITLE : CT 4399/221
REGION : FAX 82270271	AUTHORITY : CONVERTED TITLE
AGENT : QED2P BOX NO : 000	DATE OF ISSUE : 05/05/1997
SEARCHED ON : 18/09/2008 AT : 13:40:08	EDITION : 4

REGISTERED PROPRIETOR IN FEE SIMPLE

WASTE MANAGEMENT PACIFIC (S.A.) PTY. LTD. OF 29-31 BINARY STREET YATALA QLD 4207

DESCRIPTION OF LAND

ALLOTMENT 57 DEPOSITED PLAN 34319
IN THE AREA NAMED INKERMAN
HUNDRED OF INKERMAN

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

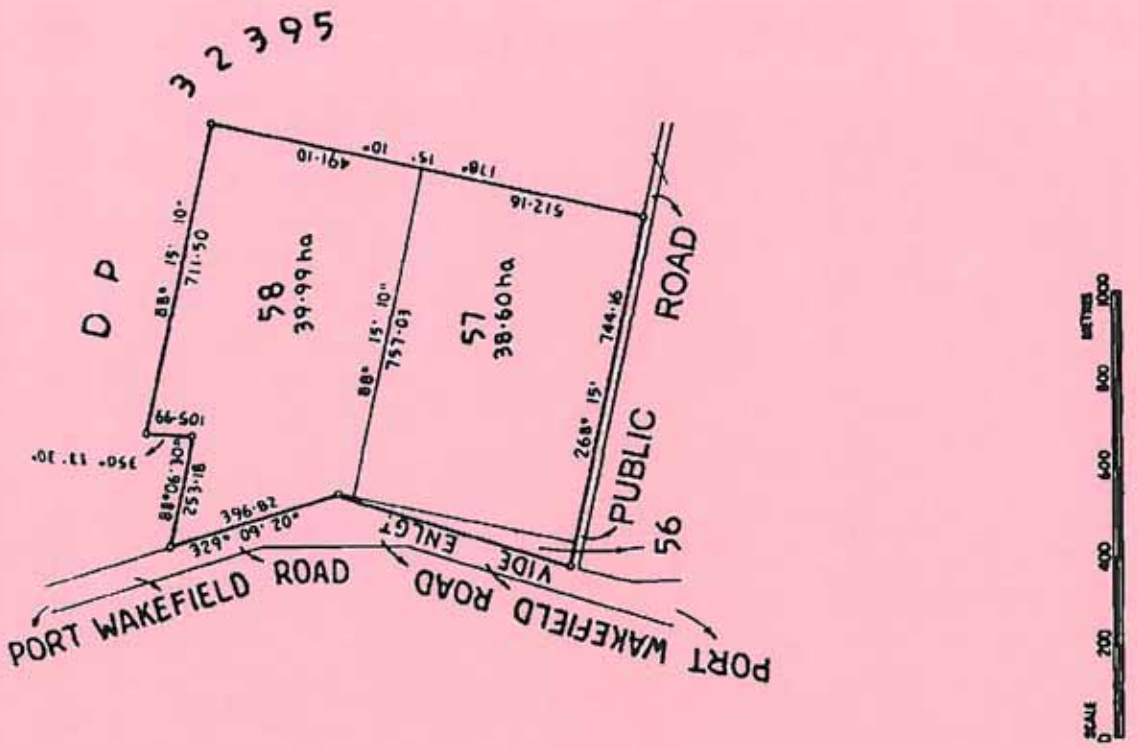
CONTROLLED ACCESS ROAD VIDE PLAN 128
AMENDMENT TO DIAGRAM VIDE 444/2001

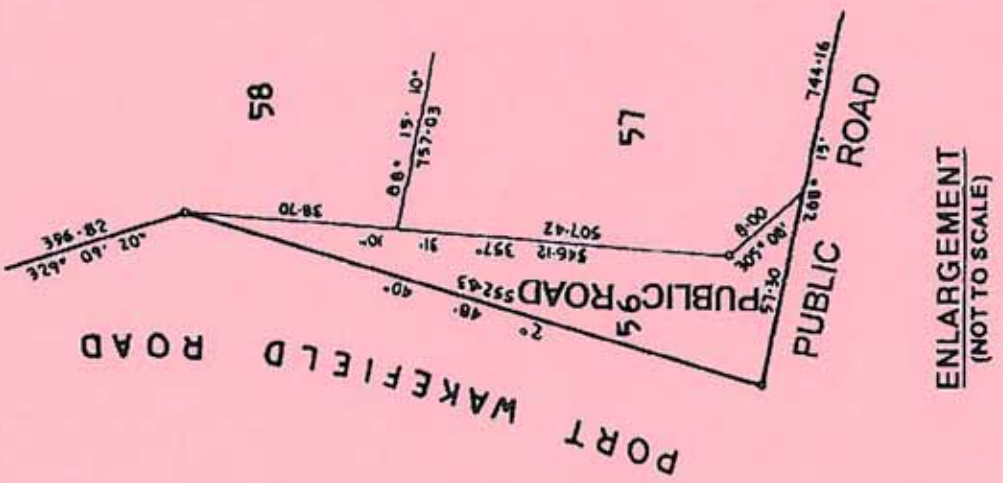
END OF TEXT.

LANDS TITLES OFFICE ADELAIDE SOUTH AUSTRALIA

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5417 FOLIO 367

SEARCH DATE : 18/09/2008 TIME: 13:40:08





Title Register Search

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5401 FOLIO 364 *

COST : $17.40 (GST exempt)	PARENT TITLE : CT 4390/325
REGION : FAX 82270271	AUTHORITY : RTC 8128728
AGENT : QED2P BOX NO : 000	DATE OF ISSUE : 03/03/1997
SEARCHED ON : 18/09/2008 AT : 13:40:26	EDITION : 4

REGISTERED PROPRIETOR IN FEE SIMPLE

WASTE MANAGEMENT PACIFIC (S.A.) PTY. LTD. OF 29-31 BINARY STREET YATALA QLD 4207

DESCRIPTION OF LAND

ALLOTMENT 11 DEPOSITED PLAN 45788
IN THE AREA NAMED INKERMAN
HUNDRED OF INKERMAN

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

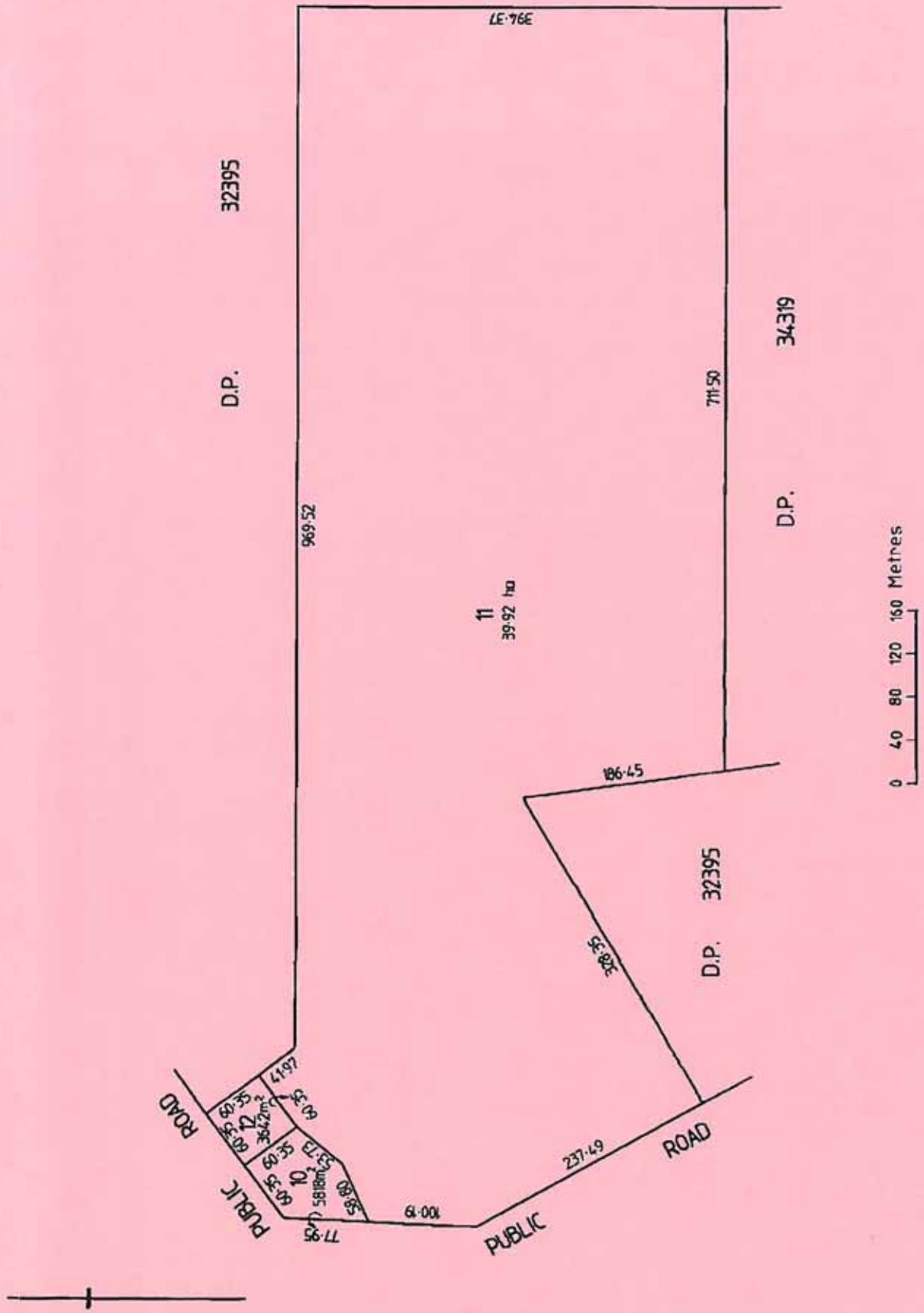
NIL

END OF TEXT.

LANDS TITLES OFFICE ADELAIDE SOUTH AUSTRALIA

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5401 FOLIO 364

SEARCH DATE : 18/09/2008 TIME: 13:40:26



Title Register Search

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5417 FOLIO 336 *

COST : $17.40 (GST exempt)
REGION : FAX 82270271
AGENT : QED2P BOX NO : 000
SEARCHED ON : 18/09/2008 AT : 13:40:42

PARENT TITLE : CT 4399/220
AUTHORITY : CONVERTED TITLE
DATE OF ISSUE : 05/05/1997
EDITION : 4

REGISTERED PROPRIETOR IN FEE SIMPLE

WASTE MANAGEMENT PACIFIC (S.A.) PTY. LTD. OF 29-31 BINARY STREET YATALA QLD 4207

DESCRIPTION OF LAND

ALLOTMENT 58 DEPOSITED PLAN 34319
IN THE AREA NAMED INKERMAN
HUNDRED OF INKERMAN

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

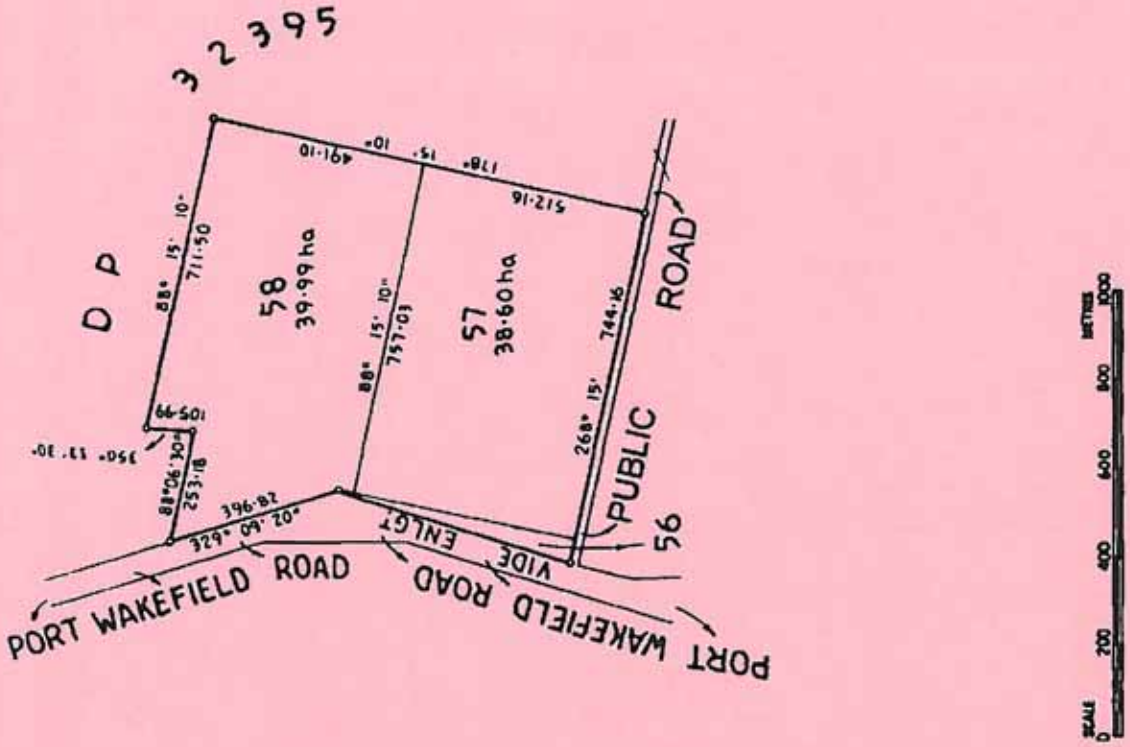
AMENDMENT TO DIAGRAM VIDE 444/2001

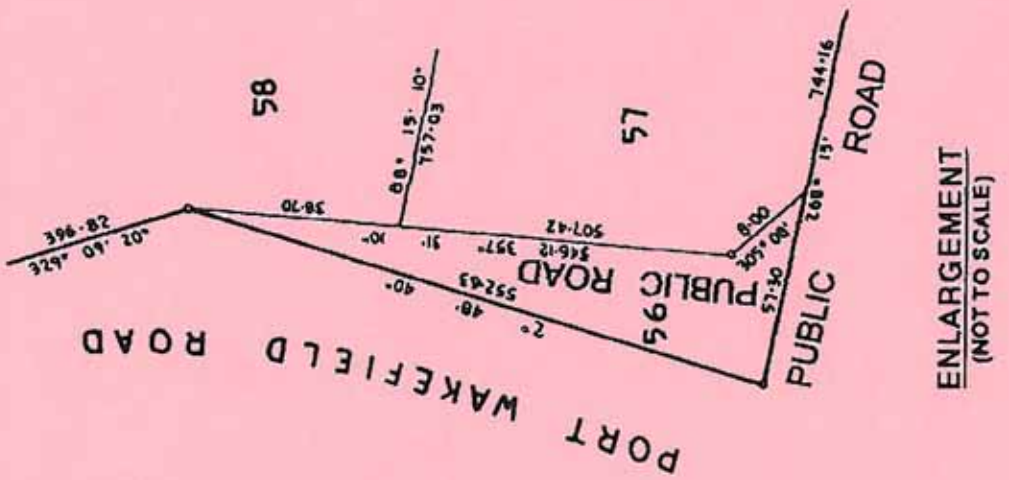
END OF TEXT.

LANDS TITLES OFFICE ADELAIDE SOUTH AUSTRALIA

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5417 FOLIO 336

SEARCH DATE : 18/09/2008 TIME: 13:40:42





ENLARGEMENT
(NOT TO SCALE)

Appendix B

EPA Licence

ENVIRONMENT PROTECTION AUTHORITY
SOUTH AUSTRALIA

Environmental Authorisation under Part 6 of the Environment Protection Act 1993:

LICENCE

EPA 14463

Waste Management Pacific (SA) Pty Ltd

P O Box 331
DUBLIN SA 5501

Location

Inkerman Road, INKERMAN 5550 SA

Licensed Activities

The Licensee(s)

- Waste Management Pacific (SA) Pty Ltd

is (are) authorised to undertake the following activities of environmental significance under Schedule 1 Part A of the Environment Protection Act 1993 (the Act), subject to the conditions of licence set out in the attached pages:

3(3) Waste or Recycling depot

Term of Licence

Commence Date: 01-AUG-2007

Expiry Date: 31-JUL-2012

Delegate Ilania Wagner
Environment Protection Authority
This licence is not valid unless signed

30 July 2007
Conditions of licence to follow

Licence Coordinator: Patrick Nganga (08) 8204 1639

Definitions

"the Act" means the Environment Protection Act 1993.

"the Authority" means the Environment Protection Authority established under Division 1 of Part 3 of the Act.

"the Premises" means, at the time of issue of this authorisation, the whole of the land comprised in Titles Register - Certificate of Title, Crown Lease and Crown Record:

List of Titles

CT 5401/364
CT 5417/336
CT 5417/367
CT 5974/867
CT 5974/868
CT 5974/869

"Authorisation Fee Payment Date" means the anniversary of the grant or renewal of this licence.

"Commercial Waste" means the component of waste stream originating from wholesale, retail or service establishments.

"Construction and Demolition Waste" means materials in the waste stream which arise from construction, refurbishment or demolition activities.

"Domestic Waste" means the waste stream derived from households.

"Industrial Waste" means the component of the waste stream arising from industrial processes and manufacturing operations.

"Interim cover ." means a compacted layer of at least 0.30 metres of soil or functionally equivalent depth of other material approved, in writing, by the Authority that meets the physical and chemical characteristics in Tables 1 and 2 (attached to this licence) for use in sealing solid waste that has been deposited and to which no additional waste will be added within the following 30 days.

"Intermediate Landfill Cover" means a compacted layer of at least 0.30 metres of soil or functionally equivalent depth of other material approved, in writing, by the Authority for use in sealing solid waste that has been deposited and to which no additional waste will be added within the following 30 days (refer to Table 2, attached to this licence).

"intermediate landfill cover." means waste soil that meets the physical and chemical criteria set out in Tables 1 and 2, attached to this licence.

"Liquid Waste" means waste classified in accordance with the assessment process set out in EPA Guideline entitled 'Liquid waste classification test' re-issued March 2003.

"Listed Waste" means any waste listed in Schedule 1 Part B of the Act.

"Medical Waste" is as defined in the Environment Protection (Waste Management) Policy 1994.

"Municipal Solid Waste" means the solid component of the waste stream arising from all sources within a defined geographic area.

"Pathline LEMP" means the document entitled "Pathline Australia Pty Ltd, Northward Fill, Volume 1: Landfill Environmental Management Plan, Volume 2: Specification Guidelines and Technical Guidelines, Volume 3: Drawings" revision B dated July 2000.

"Putrescible Waste" means the component of the waste stream liable to become putrid (usually applies to food and animal product).

"Resource, Recovery and Transfer Facility" means a facility licensed by the Authority for the receipt of waste, recycling of waste material, recovery of resources and transfer of waste.

"Waste Fill" means waste consisting of clay, concrete, rock, sand, soil or other inert mineralogical matter in pieces not exceeding 100 millimetres in length and containing chemical substances in concentrations (calculated in a manner determined by the Authority) less than the concentrations for those substances set out in Table 2, but does not include waste consisting of or containing asbestos or bitumen.

"waste fill." means waste consisting of clay, concrete, rock, sand, soil or other inert mineralogical matter in pieces not exceeding 100 millimetres in length and containing chemical substances in concentrations (calculated in a manner determined by the Authority) less than the concentrations for those substances set out in Table 2, but does not include waste consisting of or containing asbestos or bitumen.

Acronyms

"AHD" means Australian Height Datum

"dB(A)" means decibel A-weighted noise.

"HDPE" means High Density Polyethylene.

"NATA" means National Association of Testing Authorities.

"NEPM" means National Environment Protection Measure.

"WTF" means Waste Tracking Form.

Explanatory Notes

(NB. - Explanatory Notes do not constitute a part of this Authorisation)

1. This licence does not permit any activity in breach of any other approval by any other authority. For example, this licence does not permit any activity on the Premises which is not authorised under the Development Act 1993. It is the responsibility of the Licensee to ensure that any action or activity referred to in this licence is permitted by, and is carried out in compliance with, statutory requirements.

2. This licence is subject to the Act.

3. Conditions of this licence can be varied by the Authority in accordance with section 45 of the Act.

4. This licence can be suspended, cancelled or surrendered during the term of the licence in accordance with sections 55 and 56 of the Act.

5. The Licensee must report to the Authority all incidents causing or threatening serious or material environmental harm, upon becoming aware of the incident, in accordance with section 83 of the Act.

6. 1. The Licensee must be aware of, and comply with:

   1.1 the requirements of the Environment Protection Policies which operate pursuant to the Act; and
   1.2 the requirements of any National Environment Protection Measure which operates as an Environment Protection Policy under the Act.

   2. These requirements govern permissible procedures and protocols, emission or concentration levels, as well as operation and/or maintenance standards of plant and equipment.

7. Should the conditions of this licence require that the Licensee submit a report or other information to the Authority, then that report or that information becomes the property of the Authority.

8. The Authority undertakes to provide written advice within 14 days of receipt of all information required for assessment.

9. WASTE DEPOT LEVIES AND RETURNS
   (1) Waste depot levies are payable under Regulation 14 of the Environment Protection (Fees and Levy) Regulations 1994. Penalty fees apply for non-payment of the levies.
   (2) Obligations to lodge waste returns apply unless you are entitled to be exempted under Regulation 16.
   (3) Non-lodgment of returns is an offence.

CONDITIONS OF LICENCE

The Licensee is authorised to conduct the prescribed activities as described in this licence on the Premises nominated, subject to the following conditions:

Compliance Date

1. (315-367) The Licensee must:

    1. establish, maintain and operate the waste depot in accordance with the Pathline LEMP (LEMP);

    2. Ensure that the height of the landfill, including capping, does not exceed 27 metres AHD;

    3. on or before 31 October each year, review the approved LEMP and submit any amendments to the Authority for its assessment and approval;

    4. ensure the reviewed LEMP accurately reflects the operations of the waste depot and is in accordance with Development Authorisations for the Premises and this licence; and

    5. Not implement any amendments to the LEMP unless the Authority has approved them in writing.

2. (330-41) The Licensee must only:

    1. receive waste between 6:00am and 7:00pm on any day; and

    2. operate the waste depot between 6:00am and 7:30pm on any day.

3. (67-832) The Licensee must display a sign at the entrance to the Premises clearly stating;

    1. That the Licensee holds an authorisation under the Act;

    2. The name of the Licensee;

    3. The number of that authorisation;

    4. The hours that the waste depot is open to receive waste;

    5. The types of waste prohibited from disposal; and

    6. The after hours phone number.

4. (67-703) The Licensee must lock all access gates when the Premises is unattended.

5. (67-702) SUPERVISION

The Licensee must supervise the receipt and disposal of waste at the Premises to ensure that it is managed in accordance with the conditions of this authorisation.

6. (67-509) The Licensee must not:

1. Dispose of any waste at the Premises other than waste that has been processed at a Resource Recovery and Transfer Facility; or
2. Receive waste directly from the general public.

7. (67-833) The Licensee may, subject to the conditions of this Licence, receive and dispose of the following wastes:

1. Domestic Waste;
2. Municipal Solid Waste;
3. Commercial and Industrial Waste;
4. Construction and Demolition Waste;
5. Green Waste;
6. Kerbside Collected Green Waste;
7. Waste Fill;
8. Intermediate Landfill Cover; and
9. Used Tyre pieces not exceeding 250 millimetres in any dimension.

8. (67-824) The Licensee must not receive the following types of waste:

1. Listed Waste;
2. Liquid Waste and sludges;
3. Soluble chemical waste;

6. Triple interceptor trap waste;

7. Grease trap waste;

8. Automotive batteries;

9. Whole automotive tyres and tyre pieces exceeding 250 millimetres in any dimension;

10. Motor vehicle bodies and chassis;

11. Soil exceeding Intermediate Landfill Cover criteria (refer Tables 1 and 2); or

12. Radioactive waste.

9. (67-504) The Licensee must not:

1. Landfill any waste beyond the landfill boundary depicted on Figure 33499/02 in Volume 3 of the Pathline LEMP;

2. Remove or expose any waste that has previously been disposed of with the exception of monofill, as approved by the Authority in accordance with condition 67-507;

3. Dispose waste into water at the Premises;

4. Dispose of waste within two metres of the standing groundwater level;

5. Allow the scavenging of waste at the Premises; or

6. Conduct recycling activities at the Premises

10. (67-709) The Licensee must not compost any waste at the Premises.

11. (67-507) The Licensee must:

1. Only dispose of Tyre pieces in a monofill cell that has been approved in writing by the Authority;

2. Survey and plot the monofill cell on a copy of Figure 33499/04 in Volume 3 of the Pathline LEMP and include it with a revised LEMP provided in accordance with condition 315-367.

2. Notify the Authority in writing no less than 28 days prior to exhuming any tyre pieces from the monofill cell and provide details of:

3.1. the proposed date of the exhumation;

3.2 the area to be exhumed;

3.3 the volume of waste to be exhumed;

3.4 the destination of the exhumed waste;

3.5 how the exhumation will be managed;

3.6 the management of any risks association with the exhumation; and

3.7 the rehabilitation of the exhumed area.

4. Not exhume any tyre pieces without approval in writing from the Authority.

5. Not monofill any waste other than tyre pieces.

12. (67-834) DAILY COVER

The Licensee must on or before the close of each days' operations, cover all waste disposed at the Premises with no less than 150 millimetres of Waste Fill or Intermediate Landfill Cover.

13. (67-835) INTERIM COVER

The Licensee must:

1. Ensure that an interim cover is applied to all areas at the Premises in which waste has been disposed and in which no additional waste will be disposed within the following 30 days.

2. Only apply interim cover that meets Waste Fill or Intermediate Landfill Cover criteria.

14. (67-511) The Licensee must:

1. Dispose of all waste within the Somernet litter control netting system;

2. Have two complete Somernet litter control netting systems and a spare net at all times;

3. Cover all waste with no less than150mm of Waste Fill or Intermediate Landfill Cover prior to lowering or moving the Somernet litter control netting;

4. Collect and dispose of any litter caught on the perimeter fence on or before the close of each day's operations;

5. Maintain the Somernet litter control system to ensure that litter does not escape.

6. Ensure all reasonable and practicable measures are taken to minimise the escape of litter from outside the active disposal area at the Premises; and

7. Ensure that any litter that escapes from the active disposal area or the Premises is collected and disposed of on or before the close of each day's operation.

15. (330-43) The Licensee must:

1. Maintain all trafficable areas to prevent the build up of waste, mud, dust or other debris.

2. Suppress dust build-up during dry or windy weather.

3. Implement measures to minimise the generation of dust during the unloading of any waste.

4. Take all reasonable and practicable measures to prevent the escape of dust from the Premises.

16. (330-153) VERMIN

The Licensee must take all reasonable and practicable measures to prevent the attraction and harbourage of vermin.

17. (330-154) ODOUR

The Licensee must take all reasonable and practicable measures to prevent the escape of odour from the Premises.

18. (325-38) The Licensee must ensure:

1. that close proximity and low impact directional reverse beepers are installed and utilised on all mobile plant associated with waste disposal operations on the Premises; and

2. that noise levels from activities at the Premises do not exceed 40 dB(A) between the hours of 10 p.m. and 7 a.m. on any day at the nearest sensitive receiver when measured (and adjusted) in accordance with the Environment Protection (Industrial Noise) Policy 1994.

19. (300-20) COMPLAINTS REGISTER

The Licensee must:

1. Maintain a register of complaints received regarding the Licensee's operations that sets out:

1.1 the date and time that the complaint was reported

1.2 details of the complaint

1.3 the name and address of the complainant (if permitted by the complainant)

1.4 the date and time of the events giving rise to the complaint

1.5 the likely cause of the events giving rise to the complaint

1.6 an estimate of the temperature, wind speed, wind direction and rainfall at the time of the events giving rise to the complaint

1.7 any action taken in response to the complaint and to prevent a recurrence of the events giving rise to the complaint.

2. The licensee must retain the register for the duration of this licence.

20. (67-836) HAZARDS

The Licensee must fence, mark or otherwise define:

1. Bore holes within the Premises;

2. All ponds or dams constructed for the collection of leachate or stormwater; and

3. Any other excavations within the Premises.

21. (67-837) FIRE

The Licensee must:

1. Not cause or permit any waste to be burned within the premises, and

2. Take immediate action to extinguish any fires at the premises, or where appropriate, notify emergency services, and

3. Notify the Authority no greater than 2 hours after becoming aware of a fire at the Premises, and

4. Provide a written incident report to the Authority within 72 hours after becoming aware of a fire at the Premises setting out:

4.1 The date of the fire;

4.2 The approximate time and duration of the fire;

4.3 The cause of the fire (if known);

4.4 The area of the Premises where the fire occurred;

4.5 Any measures that will be taken to prevent a recurrence of a similar fire at the Premises;

4.6 The extent of damage caused by the fire; and

4.7 How the burnt waste and any fire suppressant was, or is to be, managed.

22. (67-536) The Licensee must maintain a fire-break around the active landfill perimeter in accordance with section 3.1.2, volume 1 and drawing Number 33499/06 of volume 3 of the Pathline LEMP.

23. (67-45) RECEIPT OF WASTE SOIL

1. The Licensee must not receive waste soil at the Premises unless one of the following requirements 1.1, 1.2, 1.3, 1.4 or 1.5 is satisfied:

1.1 The Licensee has taken all reasonable and practicable measures to ensure that:

1.1.1 the waste soil does not exceed 100 tonnes from a single site;

1.1.2 the waste soil is not obviously discoloured or odorous;

1.1.3 the waste soil displays no other indication that contamination is likely to be present in the waste soil; and

1.1.4 receipt and disposal of the waste soil will not result in environmental harm at the Premises.

1.2 The Licensee has taken all reasonable and practicable measures to ensure that:

1.2.1 an environmental consultant has carried out a sampling programme in accordance with the sampling procedures and methodologies set out in Schedule B(2) of the Assessment of Site Contamination NEPM in relation to that waste soil, and has assessed the chemical analysis of those samples undertaken in accordance with paragraph 1.2.2 hereof;

1.2.2 chemical analysis of the samples referred to in paragraph 1.2.1 hereof is undertaken in accordance with Schedule B(3) of the Assessment of Site Contamination NEPM and by a laboratory accredited by NATA for all of the chemical analyses carried out, as applicable, to determine:

1.2.2.1 the concentrations (in milligrams per kilogram, dry weight) for all of the chemical substances in Table 2 attached to this licence ("Table 2") which the environmental consultant reasonably expects to be present in the waste soil, based on the source of that waste soil and any prior uses of that waste soil; and

1.2.2.2 the leachate concentrations in milligrams per litre using Australian Standard 4439.3 - 1997 (Preparation of Leachates - Bottle Leaching Procedure) for the chemical substances selected in paragraph 1.2.2.1 hereof, where provided for, in Table 2; and

1.2.3 the Licensee has received written, signed and dated certification from that environmental consultant stating that, based on the sampling programme and the assessment of the chemical analysis carried out in accordance with paragraphs 1.2.1 and 1.2.2 hereof, the waste soil complies with:

EITHER

1.2.3.1 both the physical characteristics set out for Waste Fill in Table 1 attached to this licence ("Table 1"), and the concentrations (in milligrams per kilogram, dry weight) set out for Waste Fill in Table 2 for all of the chemical substances in Table 2;

OR

1.2.3.2 the physical characteristics set out for Intermediate Landfill Cover in Table 1; the concentrations (in milligrams per kilogram, dry weight) set out for Intermediate Landfill Cover in Table 2 for all of the chemical substances in Table 2; and the maximum leachate concentrations (in milligrams per litre) set out for Intermediate Landfill Cover in Table 2 for all of the chemical substances that have a maximum leachate concentration provided in Table 2.

1.3 The Licensee has taken all reasonable and practicable measures to ensure that:

1.3.1 the waste soil has been produced from a site which has been assessed in accordance with Schedules A and B of the Assessment of Site Contamination NEPM; and

1.3.2 the Licensee has obtained written, signed and dated certification from an environmental consultant stating that, based on the assessment undertaken in accordance with paragraph 1.3.1 hereof and any other sampling or testing of the waste as required by the consultant, that waste soil complies with:

EITHER

1.3.2.1 both the physical characteristics set out for Waste Fill in Table 1 and the concentrations (in milligrams per kilogram, dry weight) set out for Waste Fill in Table 2;

OR

1.3.2.2 the physical characteristics set out for Intermediate Landfill Cover in Table 1, the concentrations (in milligrams per kilogram, dry weight) set out for Intermediate Landfill Cover in Table 2, and the maximum leachate concentration (in milligrams per litre), where provided, for Intermediate Landfill Cover in Table 2.

1.4 The Licensee has received a written, signed and dated certificate from the environmental consultant indicating that:

1.4.1 he/she is awaiting results in relation to testing of that waste soil in accordance with paragraphs 1.2.1 and 1.2.2 or paragraph 1.3.1 hereof; and

1.4.2 he/she is reasonably confident, based on knowledge of the site from which the waste soil has been removed, that the waste soil is likely to comply with the requirements of paragraph 1.2.3 or paragraph 1.3.2.

1.5 The Licensee has received approval in writing by the Authority permitting that waste soil to be received.

STORAGE OF WASTE

2. If the Licensee receives waste soil in accordance with paragraph 1.4 hereof:

2.1 the Licensee must store that waste soil at the Premises until the Licensee receives certification from the environmental consultant in accordance with paragraph 1.2.3 or paragraph 1.3.2 hereof; and

2.2 the Licensee must:

2.2.1 not store the waste soil longer than 60 days;

2.2.2 store the waste soil separately from any other waste;

2.2.3 cover the waste soil to prevent or limit emissions of vapours or particles and prevent the infiltration of water or other substances as soon as reasonably practicable after receipt of the soil at the Premises or, in any case, by the close of business on the day the waste soil is received at the Premises;

2.2.4 ensure that the area used to store the waste soil is:

2.2.4.1 surrounded by a bund that will contain stormwater and leachate and prevent infiltration of external stormwater; and

2.2.4.2 lined with a low permeability layer (such as a 0.5 metre thick layer of clay with a permeability not greater than 1E-9 metres per second, HDPE plastic sheeting, bitumen or concrete or some other layer that has been approved by the Authority) that extends over the bunded walls referred to in paragraph 2.2.4.1 hereof; and

2.2.5 dispose of all leachate and stormwater collected within the bunded storage area referred to in paragraph 2.2.4 hereof at a waste depot licensed by the Authority to receive that waste.

DISPOSAL OF WASTE

3. The Licensee must dispose of waste soil that satisfies the requirements of paragraph 1.1, 1.2, 1.3 or 1.5 hereof at least one metre below the final surface at the Premises.

4. If waste received in accordance with paragraph 1.4 hereof does not comply with paragraph 1.2.3 or paragraph 1.3.2 hereof following receipt of the certification from the environmental consultant, then the Licensee must:

4.1 notify the Authority prior to the removal of that waste from the premises; and then

4.2 return the waste soil to the person who generated that waste; or

4.3 dispose of the soil to a waste depot licensed by the Authority to receive that waste; or

4.4 dispose of the waste soil at the Premises.

RECORD KEEPING

5. The Licensee must:

5.1 ensure that all waste soil received:

5.1.1 in accordance with paragraph 1.1 from commercial or industrial premises; or

5.1.2 in accordance with paragraphs 1.2.3.2, 1.3.2.2, 1.4 or 1.5 hereof;

is accompanied by a WTF which already has Part A and Part B fully completed;

5.2 complete Part C of the WTF before the waste soil is received; and

5.3 retain the yellow copy of the WTF for no less than 12 months from the date of receipt of that waste soil; and

5.4 post or otherwise send the white copy of the WTF to the Authority within ten days of receipt of the waste soil.

6. The Licensee must keep all written certifications received pursuant to this condition for a period of not less than 12 months from the date of that document.

24. (67-838) The licensee must:

1. Dispose of all waste stored within the trailer transfer area on or before the close of each days operations;

2. Ensure that all waste transport vehicles accessing the landfill utilise

the wheel wash upon exiting the site; and

3. Treat all wastewater from the wheel wash as leachate and either transfer it to the leachate ponds or to a waste depot that is licensed by the Authority to receive that waste.

25. (330-42) The Licensee must:

1. Ensure that stormwater, washdown water or any other liquids which result from the waste depot operations are treated in accordance with the Pathline LEMP;

2. Ensure the stormwater treatment system is regularly maintained and kept clean to prevent litter, waste, soil or sediment entering the collection system;

3. Ensure that stormwater that has come into contact with waste is kept separate from stormwater that has not come into contact with waste; and

4. Dispose of any stormwater that has come into contact with waste in the leachate ponds as if it were leachate.

26. (305-105) STORMWATER AND SURFACE WATER MONITORING

The Licensee must:

1. monitor stormwater and surface water in accordance with section 6 of volume 1 of the Pathline LEMP;

2. undertake sampling and analysis of surface water at least twice each year when there is water present in the ponds;

3. submit the results of the monitoring to the Authority, along with additional information required in accordance with annual reporting requirements of condition 67-825 of this licence; and

4. notify the Authority immediately, but in case with two hours:

4.1 if stormwater or surface water contamination occurs; or

4.2 if any event occurs that has the potential to cause stormwater and surface water contamination.

27. (305-375) GROUNDWATER MONITORING

The Licensee must:

1. install the groundwater monitoring bores in accordance with section

12 volume 2 and section 7 volume 1 of the Pathline LEMP;

2. ensure that monitoring of groundwater in all groundwater bores installed at the Premises:

2.1 is conducted in accordance with section 7.3 Vol. 1 of the Pathline LEMP; and

2.2 that the sampling and analysis of the water quality in all groundwater monitoring bores is conducted at six monthly intervals;

3. monitor the levels in all groundwater bores:

3.1 at three monthly intervals between 1 February 2006 and 31 January 2007; and

3.2 at six monthly intervals after 31 January 2007; and

4. submit the results of the groundwater monitoring, undertaken in accordance with paragraph 2, to the Authority along with additional information required in accordance with annual reporting requirements of condition 67-825 of this licence.

28. (305-376) LANDFILL GAS

The Licensee must:

1. manage and monitor landfill gas at the Premises in accordance with section 8 of volume 1 the Pathline LEMP;

2. maintain the landfill gas control systems in effective working order;

3. implement measures to ensure the integrity of the landfill gas control system should subsidence occur;

4. implement measures to limit the build up of landfill gas below any on-site building or structures;

5. implement detection mechanisms for landfill gas should the control system fail;

6. install landfill gas monitoring bores around the perimeter of the Premises, and then undertake testing in accordance with the Pathline LEMP;

7. monitor the extraction bores and perimeter monitoring bores each week for the first six months following commissioning of the gas extraction system and once each month thereafter;

8. operate the gas extraction system so that the concentration of methane does not exceed 1% and the concentration of carbon dioxide does not exceed 1.5%;

9. in the event that the concentrations exceed the limits specified in paragraph 8, advise the Authority within 48 hours, and provide a plan of action to the Authority within 28 days that sets out how the Licensee will achieve compliance with paragraph 8;

10. enclose the flare system in a caged unit to prevent unauthorised access and prevent debris from entering the flare;

11. maintain a 30 metre buffer distance around the flare system; and

12. take all reasonable and practicable measures to prevent the emission of landfill gas.

29. (67-537) The Licensee must:

1. Install the leachate collection system in accordance with the approved Specification, condition 67-717, and section 7.2.4 volume 1 and section 5 volume 2 of the Pathline LEMP; and,

2. Construct the leachate and stormwater ponds in accordance with the approved Specification and section 7 volume 2 of the Pathline LEMP.

30. (67-806) MAINTENANCE

The Licensee must:

1. Flush the leachate drainage pipe in cell 1 of stage 1 with water once each July and January using high volume drain cleaning equipment;

2. Pump the water used for flushing to the leachate collection pond using a pump capable of handling slurry during the cleaning process; and

3. Continue flushing and pumping wastewater out of the drainage pipe until the collected water is free of debris from the drainage pipe.

31. (67-807) RECORDS

The Licensee must maintain written records for each drainage pipe flushing event (refer condition 67-806) detailing:

1. the condition of the water after it has been flushed through the pipe; and

2. any debris flushed from within the drainage pipe.

32. (67-808) REPORTING

The Licensee must report the results, as recorded in accordance with condition 67-807 of this licence, of the six-monthly maintenance to the Authority within one month of undertaking the maintenance;

33. (305-114) The Licensee must:

1. direct all leachate to collection ponds that have been constructed in accordance with condition 67-537 of this licence, via the leachate collection system;

2. ensure that leachate monitoring is carried out in accordance with section 7.4 volume 1 of the Pathline LEMP;

3. provide the results of leachate monitoring to the Authority, along with additional information required in accordance with annual reporting requirements of condition 67-825 of this licence;

4. not re-circulate any leachate within any landfill cell; and

5. take all reasonable and practicable measures to prevent the emission of leachate.

34. (305-359) LEACHATE MONITORING & MANAGEMENT

The Licensee must:

1. ensure that the head of leachate on the clay base liner in any parts of the landfill does not exceed 300 mm at any time;

2. monitor and record the head of leachate in leachate monitoring bores in all Stages:

2.1 weekly, when any contributing cells are operational;

2.2 monthly, when all contributing cells have an interim cover; and

2.3 quarterly, when all contributing cells have a final cap;

3. submit to the Authority as part of the annual reporting, required by condition 67-825 of this licence, for the previous 12 months:

3.1 all leachate level measurements (in metres AHD);

3.2 the corresponding height of the top of the clay liner at each measurement point in metres AHD; and

3.3 any remedial action undertaken to reduce the head of leachate including pumping records; and

4. if the maximum head of leachate in the sump of the liner exceeds the requirements of paragraph 1 of this condition, submit a report to the

Authority covering paragraphs 3.1, 3.2 and 3.3 within 14 days of receiving the results.

35. (315-422) The Licensee must:

1. develop appropriate procedures and controls to be implemented on the Premises to address potential risks or damage which may compromise the integrity of the leachate extraction system, including damage from vehicle traffic, Ultraviolet Radiation and any movements of the overland pipework, including interim flexible pipework used while cells are operational;

2. develop appropriate contingency procedures to address the potential for and response to any pipe rupture and leachate emission from the leachate pipes and extraction system; and

3. update the LEMP to incorporate paragraphs 1 and 2 of this condition.

36. (67-839) 1. The Licensee must ensure that the leachate drainage layer is constructed to at least the following specifications:

1.1. 300 millimetres in depth;

1.2. consist of clean, hard, durable, sound gravel, rock or aggregate;

1.3. be free from lumps of clay, organic or other deleterious material;

1.4. contain less than 1% organic material (using test method: AS 1289 4.1.1);

1.5. be free of fine material (no more than 2% passing through a 4.75 millimetre AS sieve);

1.6. be comprised of stone greater than 16 millimetres and less than 53 millimetres;

1.7. have a long term permeability of 1E-3 metres per second or greater;

1.8. contain less than 15% calcium carbonate by volume (test method: Rapid Titration Method, specified in 'Soil and Plant Analysis' by CS Piper); and

1.9. be non-soluble in acid (test method: AWWA B 100.96).

2. The Licensee must ensure that the aggregate for the drainage layer in each landfill cell is sampled at the Premises at a frequency of 1 sample per 500 m3 and tested for particle size distribution in accordance with Australian Standard 1289.1.1-2001.

37. (67-718) The Licensee must construct Stage 1 of the landfill in accordance with the document entitled 'Specification, Specification for Civil Works - Landfill Area 1, Northward Fill Landfill', Revision C, by Maunsell Australia Pty Ltd, dated July 2004 unless otherwise specified in this licence.

38. (67-716) CELL CONSTRUCTION -

PLANNING

1. The Licensee must no less than three months prior to construction of any landfill cell or stage at the Premises:

1.1 provide the Authority with a Specification document that provides a detailed design for the relevant cell or stage, including the interface between cells and between stages for the liner and leachate drainage system, which is in accordance with (except where amendments may be required by other legislation or by this licence):

1.1.1 the plans in the application (dated 4 March 1997 and 'Supporting Documentation for Development Application' dated 24 November 1998); (and/or except as varied by);

1.1.2 letters from the Licensee submitted to Development Assessment Commission dated 19 April 2004 and 19 May 2004; and

1.1.3 drawings listed below as Gazetted in South Australian Government Gazette No. 20 dated 13 April 2006,

- Drawing No. 40033003/005C dated 1 September 2003;

- Drawing No. 40033003/0080 dated 27 April 2004;

- Drawing No. 40033003/009 dated 27 April 2004;

- Drawing No. 40033003/013 dated 27 April 2004; and

- Drawing No. 40033003/014 dated 27 April 2004;

or as amended by the following drawings,

- Northward Fill Detail Design, Central Leachate Sump Details, Sheet 10 (Revision F) dated 10 May 2005;

- Northward Fill Detail Design, Leachate Management - Edge Sump Arrangement, Sheet 13 (Revision D), dated 10 May 2005; and

- Northward Fill Stages 2 and 3,Detailed Design Pipework Layout, Sheet 5 (Revision A), dated 7 February 2006;

1.2 include in the Specification, referred to in paragraph 1.1 of this condition, a certificate from a geotechnical engineer, together with

test reports that specify Atterberg limits, standard compaction, Optimum Moisture Content, dispersivity, percentage of clay by dry weight, permeability tests and linear shrinkage from a NATA accredited geotechnical testing laboratory, confirming the suitability of the materials used for the liner of each cell.

2. The Licensee must not construct the cell or stage unless prior written approval has been received from the Authority.

CONSTRUCTION

3. Subject to paragraph 1 of this condition the Licensee must:

3.1 construct the relevant cell or stage in accordance with the Specification and materials testing referred to in paragraphs 1.1 and 1.2 of this condition;

3.2 ensure that the construction of the liner for each cell is supervised by a geotechnical engineer in accordance with the requirements of Level 1 Supervision (as defined in the Australian Standard 3798-1996); and

3.3 ensure that the underside of the basal liner (including sump) is at least two metres above the maximum level of the underlying groundwater level at all times.

APPROVAL

4. Subject to paragraphs 1,2 and 3 of this condition and prior to receiving, storing, treating or disposing of any waste in the relevant cell or stage, the Licensee must:

4.1 provide to the Authority, an 'As Constructed Report' by an appropriately qualified and experienced consultant that includes details and certification, demonstrating and confirming that the liner has been constructed in accordance with the Specification as referred to in paragraph 1 of this condition and in accordance with paragraph 3 of this condition and which has:

4.1.1 a certificate from a geotechnical engineer that the liner of each cell has been compacted in layers not exceeding 200 millimetres deep;

4.1.2 records and confirmation that the construction of the liner for each relevant cell was supervised by a geotechnical engineer in accordance with the requirements of Level 1 Supervision (as defined in the Australian Standard 3798-1996);

4.1.3 a copy of certification that the liner for each landfill cell complies with the Pathline LEMP; and

4.1.4 evidence to demonstrate that the whole of the underside of the basal liner (including sump) is at least two metres above the maximum level underlying groundwater level at all times.

5. The Licensee must not receive any waste into the cell or stage unless written approval has been received from the Authority.

39. (67-719) CAPPING

PLANNING

1. No less than 3 months prior to commencing the capping of any cell or stage, the Licensee must:

1.1. Provide to the Authority, a Specification document that provides a detailed design for the capping of the relevant cell or stage and which is in accordance with:

1.1.1. this Licence;

1.1.2. section 7.2.2, volume 1 of the Pathline LEMP; and

1.1.3. section 4, volume 2 of the Pathline LEMP.

1.2. Provide to the Authority, a certificate from a geotechnical engineer, together with test reports specifying Atterberg limits, standard compaction, dispersivity, percentage by dry weight clay, permeability tests and linear shrinkage from a NATA accredited geotechnical testing laboratory, confirming the suitability of materials proposed for use in the clay layer of the capping.

2. The Licensee must not commence capping unless written approval of the Specification has been received from the Authority.

CONSTRUCTION

3. Subject to written approval by the Authority of the Specification and materials testing referred to in paragraph 1 of this condition (67-719), the Licensee must:

3.1. apply a clay cap for each cell in accordance with the Specification and materials testing referred to in paragraph 1 of this condition (67-719), and with section 7.2.2, volume 1 and section 4, volume 2 of the Pathline LEMP resulting in a capping permeability coefficient of 1E-9 metres per second or lower, within six months after the cell reaches its finished level of filling, such that a final height of 27 metres AHD, including rehabilitation, will not be exceeded; and

3.2. ensure that the construction of the clay capping for each cell is supervised by a geotechnical engineer in accordance with the requirements of Level 1 Supervision (as defined in the Australian Standard 3798-1996).

4. The licensee must:

4.1. cover the clay layer of the capping as soon as reasonably practicable and in any case within one month with soil suitable as a growing medium for vegetation and suitable for the control of moisture in the clay layer of the capping; and

4.2. apply the soil in accordance with section 7.2.2, volume 1 and section 4, volume 2 of the Pathline LEMP.

APPROVAL

5. The Licensee must provide to the Authority, as soon as reasonably practicable, and in any case within four weeks of finalising the cap for each cell, an 'As Constructed Report' by an appropriately qualified and experienced consultant that provides the details and certification which demonstrates and confirms that:

5.1. the cap for each cell has been constructed in accordance, and complies with, paragraphs 3 and 4 of this condition (67-719); and

5.2. the materials utilised are appropriate for construction of the cap in accordance with paragraph 1.2. of this condition (67-719).

40. (67-825) ANNUAL REPORT

1. The licensee must on or before 31 August each year, submit a written annual report that sets out for the previous Financial year:

1.1. a summary of Complaints and actions arising (refer Condition 300-20);

1.2. a summary of the results and interpretation and actions arising from Groundwater monitoring including levels (refer condition 305-375);

1.3. a summary of the results, an interpretation and actions arising from Landfill gas monitoring (refer condition 305-376);

1.4. Summary of the results, and interpretation and actions arising from stormwater and surface water monitoring (refer condition 305-105)

1.5. Summary of all Waste Soil received, stored and/or disposed in accordance with Condition 67-45;

1.6. Progress towards final height (mAHD in each cell and stage) and any updates to stage or cell planning;

1.7. Summary of all incidents, fires and emergencies;

1.8. Summary of results and interpretation and actions arising from leachate monitoring and management including chemical analysis, leachate levels and pumping records; and

1.9. An updated plan of premises that shows the locations of:

1.9.1. operational cells, proposed future cells, and closed cells,

1.9.2. Landfill Gas monitoring and/or extraction bore network,

1.9.3. Groundwater monitoring bores, leachate sumps, pipework and ponds, stormwater ponds and diversion networks,

1.9.4 materials storage areas, buildings access roads, Premises boundary, fencelines and nearest sensitive receptors.

1.10 Any conclusions and recommendations arising from the summary of the results.

41. (320-44) The Licensees right of renewal of this Licence under section 43(5) of the Act is subject to the Licensee complying with conditions 67-504, 67-505, 67-824, 67-507, 67-509, 67-511, 305-375, 305-105, 305-376, 320-13 and 315-367 of this licence.

General Administrative Condition(s)

42. (320-15) The Authority may during the term of this licence impose or vary conditions:

1. if, in the opinion of the Authority, the results of monitoring required by this licence or any other information or assessment indicates that new or varied conditions are necessary for the prevention or minimisation of environmental harm;
2. in relation to testing, monitoring and reporting referred to in section 52(1)(a) of the Act;
3. in relation to the types of waste the Licensee may receive at the Premises;
4. in relation to the manner in which the Licensee may store, treat or dispose of waste at the Premises;
5. that require the Licensee, in accordance with section 53 of the Act, to prepare a plan of action to be taken in the event of an emergency;
6. that relate to provision of information relating to the Licensee or any agent or contractor operating on behalf of the Licensee;
7. that relate to the provision of information relating to the activity subject to the licence including the level of inputs and outputs and the amounts of pollutants or waste generated by the activity;
8. in relation to definitions of Waste Fill, Intermediate Landfill Cover, Low Level and High Level Contaminated Soil; and
9. as a result of a variation to the Pathline LEMP, or any guidelines, bulletins or other attachments to this licence referred to by a condition thereof.

43. (320-13) 1. The Licensee must provide a financial assurance on or before 31 August each year that is equal to $0.25 for each tonne of waste received during the previous financial year;

2. The Licensee must lodge the financial assurance with the Authority in the form of a bond (supported by a guarantee, insurance policy, or other security approved by the Authority) or in the form of a pecuniary

sum discharge or repayment of which is conditional upon the Licensee complying with conditions 305-375, 305-105, 305-376 of this licence and undertaking when necessary emergency remediation of the Depot.

NOTE: The bond or sum shall be discharged in whole when the Authority is satisfied that these conditions of discharge have been complied with or are no longer necessary or in part when the accrued amount of the bond or sum exceeds the total costs, expenses, loss and damage that have been incurred or suffered or are likely to be incurred or suffered by any person (including the Authority) as a result of the Licensee's failure to satisfy these conditions of discharge.

44. (400-215) The Licensee must ensure that every employee, agent or contractor responsible for carrying out any task controlled by this licence is properly advised as to the requirements of this licence and the general environmental duty under section 25 of the Act that relate to that person's tasks and responsibilities as employee, agent or contractor.

45. (400-338) If the Licensee's name or postal address (or both) changes, then the Licensee must inform the Authority within 28 days of the change occurring.

46. (400-339) The Licensee must display a copy of this licence on a notice board at the Premises.

47. (400-347) CHANGE to PROCESS EMISSIONS or WASTE

The Licensee must not undertake any changes to operating processes at the Premises that:

1. has the potential to increase the emissions, or alter the nature, of pollutants or waste currently generated by or from the activity; or

2. has the potential to increase the risk of environmental harm; or

3. would relocate the point of discharge of pollution or waste at the Premises

unless the Licensee has:

3.1. made application to the Authority to enable an assessment of the likely environmental impacts of the proposed change; and

3.2. received written approval from the Authority enabling the proposed change to proceed.

Note: The Authority may during the term of this licence impose or vary the conditions of this authorisation upon approval of an application made in accordance with this condition.

48. (400-348) ALTERATIONS to PLANT and EQUIPMENT

The Licensee must not construct or alter a building or structure, or, install or alter any plant or equipment that:

1. has the potential to increase the emissions, or alter the nature, of pollutants or waste currently generated by or from the activity, or

2. has the potential to increase the risk of environmental harm, or

3. would relocate the point of discharge of pollution or waste at the Premises

unless the Licensee has:

3.1. made application to the Authority to enable an assessment of the likely environmental impacts of the proposed changes, and

3.2. paid the application fee, and

3.3. received written approval from the Authority allowing the proposed changes to proceed.

Note: The Authority may during the term of this licence impose or vary the conditions of this authorisation upon approval of an application made in accordance with this condition.

49. (400-78) The Licensee must:

1. Pay the annual authorisation fee by the authorisation fee payment date.

2. If this licence is for a term of 2 years or more, submit an annual return at least 90 days before the authorisation fee payment date.

50. (400-79) An application for renewal of this licence must be made at least 90 days before the expiry date of this licence.

Delegate Sanika Wagner

Environment Protection Authority

Date 30 July 2007

There are 1 attachments to this Licence

Table 1

Waste Soil - Physical Characteristics

WASTE FILL	INTERMEDIATE LANDFILL COVER
• Less than 100 mm in diameter, homogeneous, consisting of clay, concrete, rock, sand, soil or other inert mineralogical matter and not containing asbestos or bitumen (as specified in Part 4 of the Environment Protection (Fees and Levy) Regulations 1994. • Not containing significant organic material such as timber, vegetable matter or other waste materials.	• Less than 200 mm in diameter • Not containing significant organic material such as timber, vegetable matter or other waste materials.

Table 2

Waste Soil - Chemical Characteristics

	WASTE FILL	INTERMEDIATE LANDFILL COVER	
CHEMICAL SUBSTANCE	CONCENTRATION in mg/kg (dry weight)	CONCENTRATION in mg/kg (dry weight)	MAXIMUM LEACHATE CONCENTRATION in mg/L
			Method of Analysis AS 4439.3 - 1997
Aldrin + dieldrin (total)	2	<2	#
Arsenic	20	<200	5
Barium	300		
Benzene	1	<5	#
Benzo(a)pyrene	1	<2	#
Beryllium	20	<40	1
Cadmium	3	<30	0.5
Cobalt	170	<170	#
Chlordane	2	<2	#
Chromium (III)	400	<12%	#
Chromium (VI)	1	<200	5
Copper	60	<2000	10
Cyanides (Total)	500	<1000	10

Table 1 & 2 – Waste Soil

Table 2 (continued)			
DDT	2	<2	#
Ethylbenzene	3.1	<100	#
Heptachlor	2	<2	#
Lead	300	<1200	5
Manganese	500	<6000	50
Methyl mercury		<20	#
Mercury	1	<30	0.1
Nickel	60	<600	2
Total Petroleum Hydrocarbons (TPH) C_6-C_9	65	<100	#
TPH > C_9	1000	<1000	#
Phenolic compounds (total)	0.5	<17000	#
Polychorinated biphenyls	2	<2	#
Polycyclic Aromatic Hydrocarbons (PAH) (Total)	5	<40	#
Toluene	1.4	<50	#
Xylene (total)	14	<180	#
Zinc	200	<14000	250

1. The assessment of the chemical analysis carried out on samples of the waste soil in accordance with this condition may include scientifically valid statistical analysis to justify classification of the waste soil in accordance with the values listed in this table.
2. '#' indicates that leachate testing for that chemical substance is not required provided that the concentration of that chemical substance in mg/kg (dry weight) does not exceed the value specified for that category of waste soil.
3. '<' = 'less than'

Appendix C

LEMP EMM 14

Transpacific Waste Management

Northward Fill

Landfill Environmental Management Plan

Principal Contacts
Paul Lightbody
Heath Sandland

August 2008
Ref No 20040614RA1 Rev F (draft containing only sections revised for LLCW)

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Transpacific Waste Management
Northward Fill
Landfill Environmental Management Plan (draft containing only sections revised for LLCW)

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1. Introduction

1.1 Background

Transpacific Waste Management (TWM) is developing the Northward Fill (formerly Inkerman Landfill Depot) a landfill at Inkerman, 85 km north-west of Adelaide in a Primary Industry Zone. The Northward Fill lies within the area of the Wakefield Regional Council, which incorporates the previous District Council of Wakefield Plains.

This Landfill Environmental Management Plan (LEMP) has been developed for approval by the Environment Protection Authority (EPA) in accordance with Licence Conditions for the Northward Fill.

The Northward Fill landfill will provide a disposal facility for Adelaide's putrescible and inert waste for approximately 30 years (dependant on received volumes) with a waste capacity of approximately 12,000,000 m^3. The Northward Fill will receive and dispose of:

- Waste from the Adelaide Metropolitan Area that has gone through a Resource Recovery and Waste Transfer Facility;
- Waste from regional areas outside the Adelaide Metropolitan area that has undergone a three bin kerbside recycling system or through an authorised Resource Recovery and Waste Transfer Facility;
- Shredded Tyres with other approved waste, for a period of three years after which the proponent must apply for additional development approval;
- Non-friable asbestos subject to handling and disposal procedures for non-friable asbestos as provided in the specific EMM in the LEMP;
- Quarantine waste subject to approval from AQIS to receive and dispose of quarantine waste as provided in the specific EMM in the LEMP;
- Foundry sands as provided in the specific EMM in the LEMP; and
- Low level contaminated wastes (or LLCW) into specially designed and constructed cells.

The Northward Fill development will be designed and constructed in accordance with Best Available Control Technology (BACT) and incorporate Best Practice landfill operation in accordance with the approved LEMP.

BACT, as defined in the EPA Guidelines for Major Landfills (dated October 1998), is the Best Available Control Technology for any specific source, and the currently available technology producing the greatest reduction of pollutant emissions to the environment, taking into account energy, environmental, economic and other costs.

Best Practice is not a fixed set of standards that applies everywhere in all circumstances. It evolves to suit particular ecosystems and community expectations. Ongoing monitoring and performance review at the Northward Fill will lead to improvements in landfill operations, and to the definition and adoption of Best Practice, offering Adelaide a long term and stable waste disposal facility.

The Northward Fill has been subject to the following approval process:

- The Environmental Impact Statement (EIS) for the Northward Fill was published in October 1995 by Path Line Australia Pty Ltd;
- Following a statutory period for public comment, a Supplement to the EIS was published in June 1996;
- Thirty submissions were received by the then Department of Housing and Urban Development (DHUD), now the Department of Environment, Heritage and Aboriginal Affairs (DEHAA). The Supplement to the EIS responded to public submissions and government comments on the EIS;
- DHUD published an Assessment Report in April 1997, which had a number of detailed comments on the proposal. This report recommended that further investigation, design and development of operational procedures were needed to warrant approval;
- Path Line Australia Pty Ltd addressed these comments in the Final EIS document dated June 1998;
- As a result of information contained in that document the Governor of South Australia granted development approval for the Northward Fill on 21 January 1999. A transcript of the Governor's Decision provided is in of this LEMP;
- Since development approval was granted several gazettal notices (presented in Appendix A) have been issued for the following reasons;
  - revised base liner profile (South Australian Government Gazette (14 October 2004)),
  - Trailer Transfer Area (South Australian Government Gazette (17 June 2004)),
  - Change in leachate collection system and operating hours (South Australian Government Gazette (13 April 2006)), and
  - Additional Waste which may be received (Non-Friable Asbestos Waste, Quarantine Waste, Used Foundry Sand, Shredded Tyres, Wastes from non-metropolitan areas) and revised leachate transfer pipework location, (South Australian Government Gazette (20 September 2007)).

The actions associated with the development of the landfill that have been implemented to date include:

- LEMP first issued to the EPA in July 1999;
- EPA Licence 14463 issued in accordance with the statutory requirements, in particular the Environment Protection Act (1993). A copy of the licence is presented in ;
- Detailed engineering design for various stages of the landfill and the Trailer Transfer Area (TTA) had been developed, documented and approved by the EPA for the implementation of the proposed operation;
- Construction of the landfill commenced in July 2003; and
- Landfill activities commenced following EPA approval for the As Construct Report for Stage 1 and then onto subsequent stages.

1.2 Site Details

1.2.1 Land Owner

The owner and Licensee of the Northward Fill Landfill is Waste Management Pacific (SA) Pty Ltd (WMP). WMP is a wholly owned subsidiary of Transpacific Industries Pty Ltd (TPI). Operating the site is an operating division of TPI - Transpacific Waste Management (TWM).

1.2.2 Locality

The Northward Fill site is located approximately 85 km north-west of Adelaide at Inkerman. The landfill itself is 1.2 km east of Port Wakefield Road. It is opposite the Army Proof and Experimental Establishment Range.

1.2.3 Zoning

The Northward Fill is located on land currently zoned as Primary Industry by the Wakefield Regional Council (development plans consolidated 27 July 2006).

1.2.4 Surrounding Land Use

The predominant surrounding land uses are livestock grazing and cereal cropping, with some intensive animal keeping. The agricultural production of the surrounding land contributes significantly to the local economy. Climate, soil and landform characteristics of the area favour agricultural production and the grazing of livestock therefore these activities will continue to surround the landfill site.

1.3 Physical Environment

1.3.1 Existing Local Hydrology

The site is located in an area with an average annual rainfall of 331 mm and pan evaporation of 1,820 mm, measured at the Port Wakefield Post Office and Price (Ocean Salt) respectively. Most rainfall occurs in the winter months.

The site does not function as a typical catchment. There are no defined flow paths discharging to receiving waters. The nearest river, River Wakefield, lies 15 km to the north of the site. Rainfall infiltrates into the sandy surface soils with no runoff. The landform is generated by wind erosion rather than water erosion. There are many entrapped low spots between the dunes, and in some the underlying Hindmarsh Clay is exposed as a claypan. These shallow claypans occasionally contain shallow water due to direct precipitation and some seepage from the adjacent dunes.

1.3.2 Geology and Hydrogeology

The Adelaide 1:250,000 geological map sheet indicates that the geology of the site consists of aeolian Fulham Sand and possibly Molineaux Sand (dunefield sands) underlain by (possibly) aeolian calcareous sand of the Woorinen Formation and Bakara Soil/Ripon Calcrete. Beneath these surficial deposits is a substantial thickness of Hindmarsh Clay, described as grey and red-brown mottled sandy clay (MESA, 1969). These sediments plus the underlying Tertiary age units are known as the St Vincent Basin.

The uppermost Tertiary unit in the St Vincent Basin in this area is the Port Willunga Formation (MESA, 1995), which consists of fossiliferous sandy limestones, sands and sandstones. It is underlain by siltstones and limestones of the Blanche Point Formation (MESA, 1983), which in turn is underlain by sands, clays and coal seams of the South Maslin Sands, Clinton Formation, and North Maslin Sands (MESA, 1969).

Aquifers within these sediments include thin sand or gravel beds within the Hindmarsh Clay, the uppermost Tertiary aquifer within the North Maslin Sands and South Maslin Sands. In the Inkerman area, the salinity of groundwater is generally well in excess of 6000 mg/L in both Tertiary and Quaternary aquifers and is therefore not used for irrigation.

1.3.3 Local Topography and Use

The current visual appearance of the site is one of undulating land broken by sand dunes, which rise to RL 20, i.e. 20 m above Sea Level, or approximately 10 m above the natural ground level adjacent to Port Wakefield Road. Further to the east of the site, these dunes present themselves to a height of RL 25, providing an irregular raised profile. The dunes are not cultivated but are vegetated with scattered native trees and some native grassing. The surrounding fields, where planted, exhibit as cereal crop farmland, and vary in appearance as the seasons prevail and range from the mid winter green crops to yellow summer stubble to bare earth. The area adjacent to the Port Wakefield Road, abutting the western boundary of the site, has significant native vegetation and tree and shrub plantings in place which acts as a visual and noise buffer from the traffic.

1.3.4 Wind

Winds are predominantly from the south and south-west during summer and the north and north-east during winter.

1.4 Environmental Management Approach

There is the potential for a number of environmental impacts to be generated by the landfill development. Careful management and appropriate control measures will be adopted to ameliorate potential impacts which could be generated by the landfill. TWM will undertake to minimise all foreseeable impacts by implementing landfill environmental management measures for the design, construction, operation and post-closure of the facility. These management measures will ensure that acceptable limits defined by relevant legislation are achieved.

Major issues concerning the landfill are:

- site management and operations, including monitoring of the characteristics of incoming waste, regular topographic surveys, cover material;
- stormwater and erosion management;
- leachate management;
- landfill gas management;
- nuisance avoidance, including noise, air emissions, dust and odour, visual amenity, litter control, pest control and fire control;
- aboriginal heritage protection; and
- post-closure management.

To control and manage the above issues, TWM has developed issue specific Environmental Management Measures (EMMs) which are detailed in Sections **Error! Reference source not found.** to 16 of this LEMP.

1.5 Objectives of the Landfill Environmental Management Plan

This LEMP details actions and procedures to be carried out during the construction, operation and post-closure phases of the Northward Fill in order to mitigate adverse impacts on the environment.

These actions and procedures are generally as set out in:

- Additional Investigation, Design and Documentation, Northward Fill – Final EIS Report - dated June 1998; and
- The Decision by the Governor and associated Conditions for Development Approval dated 21 January 1999.

The LEMP has been modified (where not in conflict with the Governor's approval) to meet the EPA's "Guidelines for Major Solid Waste Landfill Depots" and "Guidelines for the Development of a Groundwater Monitoring Program for Waste Disposal Depots" February 1999 (updated 23 April 1999), both available from the EPA. Additional modifications have been incorporated into the LEMP as per discussions with the EPA.

The purpose of the environmental management process is to:

- produce a framework for control of design, construction, operational and post-closure impacts, including practicable and achievable performance requirements and a system of monitoring, reporting and implementing corrective action;
- minimise adverse affects to the environment;
- provide information for the EPA Licence;
- provide evidence of compliance with relevant legislation, standards, policies and guidelines; and
- provide the community with assurance that management of the project will be conducted in an environmentally acceptable manner.

This is to be achieved by pro-active environmental management planning, prior to carrying out performance monitoring, and implementation of corrective action if required.

1.6 Structure of the Landfill Environmental Management Plan

The following structure of the LEMP was selected to demonstrate TWM's commitment to sound environmental management:

- Section 1 – Introduction;
- Sections 2 – Provides operational details of the project and those aspects where there are potential environmental risks to be considered in the construction and operation of the landfill;
- Section 3 – Describes the infrastructure to be established at the site and initial landfill ("Stage 1") activities;

- Section 4 – Describes the proposed environmental management system including its structure and responsibilities, and establishes legislative, monitoring and reporting requirements;
- Sections 5 to 15 – Detail EMMs adopted to address potential impacts and risks;
- Section 16 describes a proposed Landfill Community Consultative Committee;
- Section 17 Describes measures applicable to disposal specific waste types at the landfill;
- Appendix A – Contains the decision by the Governor and associated conditions for development approval, plus gazettal notices for revised base liner and trailer transfer area;
- Appendix B – Contains a copy of the licence for the site issued by the EPA;
- Appendix C – Contains the monitoring templates;
- Appendix D – Contains relevant correspondence for LEMP;
- Appendix E – Contains the data used in the HELP Model;
- Appendix F – Contains the groundwater level monitoring data;
- Appendix G – Contains landfill gas data; and
- Appendix H – Contains an odour modelling report.

1.7 Documentation Supporting the LEMP

The information prepared for submission to the EPA is contained in three volumes as follows:

- Volume 1 – Landfill Environmental Management Plan;
- Volume 2 – Specification Guidelines and Technical Guidelines; and
- Volume 3 – Drawings.

2. Operation Details

2.1 Operating Hours

The landfill will be operated daily between the hours of 0600 and 1930 unless lower waste intake rates warrant less hours of operation.

Maintenance of vehicles and administration functions may occur outside of these hours.

If any emergency after-hours disposal of waste approved by the EPA occurs, it will be supervised and full details of procedures, types of waste and disposal locations will be provided to the EPA.

2.2 Waste Characteristics and Space Requirements

2.2.1 Waste Characteristics

The Northward Fill landfill will accept wastes in accordance with EPA Licence requirements. The following wastes will be received and disposed at the waste depot:

- domestic waste;
- municipal waste;
- commercial and industrial waste;
- construction and demolition waste;
- green waste;
- kerbside collected green waste;
- clean fill;
- intermediate landfill cover as defined in Table 2 of the Licence;
- non friable asbestos;
- quarantine waste;
- low level contaminated wastes (LLCW) into specially designed and constructed cells, and
- liquid treatment plant residues (where they satisfy EPA criteria for acceptance to the site as LLCW).

The following wastes will not be received and disposed at the depot:

- listed waste as set out in Schedule 1, Part B of the EP Act, 1993 (except for non friable asbestos and as varied by the approved wastes types as identified above);
- liquid wastes;

- soluble chemical waste;
- triple interceptor waste;
- grease trap waste;
- automotive batteries;
- whole automotive tyres and tyre pieces exceeding 250 mm in any dimension;
- motor vehicle bodies and chassis;
- high level contaminated soil;
- radioactive waste;
- wastes containing friable asbestos.

All waste will be processed at a Resource Recovery and Waste Transfer Facility licensed by the EPA, be residual material from a kerbside recycling and collection program or in the case of wastes subject to specific approvals, subject to that approval as detailed in a corresponding EMM and customer agreement. No building and demolition waste will be taken directly to the landfill.

The waste received may be in baled or pre-compacted form to optimise transport. Densification and homogenisation of waste will be accomplished at both the Waste Transfer Facility and the landfill itself; thereby ensuring minimum EPA waste density requirements for landfilled material are met.

The materials to be recycled and materials to be sent to landfill will be determined at EPA approved Resource Recovery and Waste Transfer Facilities or as part of a kerbside collection program, prior to waste being transported to the landfill. Resource recovery and recycling at these facilities will be the subject of a separate EPA licence. Increased costs associated with using landfills away from metropolitan Adelaide, due to rehandling and transport costs, will encourage both increased recycling and emerging technologies for sustainable waste management.

All drivers entering the landfill will be aware that the site does not accept listed and hazardous wastes. A sign will be located at the entrance area to identify the types of waste that will be accepted and not accepted at the landfill (refer Drawing Sheet 34, Volume 3). The sign will display the site name, the owner and operator, contact phone numbers in case of an emergency, the hours of operation and other relevant information. All on-site signs will be maintained to ensure that they are clear and legible at all times.

Scavenging will not be permitted at the landfill site.

2.2.2 Site Capacity

The total volume of the site from the base liner to the top of the final cap is 17 million m^3. Final air space available for waste disposal is 11.8 million m^3, with an expected input capacity of 14 million tonnes. Initial capping levels will be temporarily

raised above final levels to allow for settlement caused by biodegradation of deposited waste. Settlement of the landfill will be monitored to develop a predictive model suitable for calculating future settlements.

The site will be developed progressively. The expected lifespan of the proposed facility is dependent on annual waste inputs, however based on an annual input rate of 300,000 tonnes of waste commencing in January 2005, and making allowances for daily cover and compaction, it is estimated that the approved landfill volume will be fully utilised in 2035. Advanced resource recovery at the Resource Recovery and Waste Transfer Facilities together with EPA initiatives to 'promote and encourage a focus on waste avoidance and minimisation rather than landfilling' may extend this date.

In accordance with EPA Licence requirements, accurate volumetric surveys to determine consumed landfill space will be undertaken every 12 months and included in an annual report to the EPA.

2.3 Operations Plan

As the landfill and related facilities are constructed and activated, detailed Operations and Maintenance Manuals ("O&M Manuals") will be prepared. The manuals will incorporate pertinent information from the following sources:

- EPA Licence Conditions and LEMP;
- EIS documentation;
- final design documents;
- hands-on operating experience;
- equipment manufacturers; and
- other sources.

Separate O&M Manuals will be prepared for complex systems, such as leachate treatment, landfill gas control, stormwater and erosion control. Current O&M Manuals will be available to operating personnel and a copy held in the facility operating record. The manuals will be updated as necessary to reflect changes in site operations and equipment.

The O&M Manuals will be practical documents intended for day-to-day use by on-site operations personnel. The manuals will:

- include a detailed table of contents;
- include a site layout map;
- establish waste acceptance procedures;
- reflect the scope and content of field operations;
- provide clear and detailed direction of landfill operating procedures;
- address all topics identified in the LEMP and EPA Licence Conditions;
- contain contingency plans that include procedures for responding to scenarios including, but not limited to;
  - on-site personal injuries,
  - leachate releases,
  - surface water or groundwater contamination,
  - landfill gas migration and associated fire and explosion hazards,

  - liquid spills,
  - litter,
  - fire,
  - explosion, accident, and other emergencies,
  - detection of leachate in the groundwater monitoring system,
  - leachate storage facility at or above capacity,
  - storms and inclement weather;
- include an emergency notification list and procedures for;
  - emergency assessment,
  - communication,
  - identification of emergency response organisation,
  - identification of community contacts, civil authorities and regulatory personnel, and reporting;
- include definitions of all technical terminology;
- be assembled in loose-leaf binders to facilitate periodic revisions;
- outline notification requirements under relevant licences and Acts; and
- outline public notification procedures and responsibilities.

2.4 On-Site Personnel

Staffing at the Northward Fill will be based on appropriate qualifications, and clearly defined responsibilities, duties and lines of authority.

To ensure technical competence, operations staff will be trained as necessary in landfill development, construction and operation (refer Section 4.8).

The Northward Fill will have trained and technically competent staff and operators on site to supervise movement and deposition of waste. A qualified site manager will be appointed for the depot. The manager's responsibilities will include but not be limited to:

- environmental management as outlined in this LEMP and EPA Licence Conditions;
- construction and rehabilitation;
- control of the reception, inspection, handling, storage and recording of waste receival;
- maintenance of the landfill in a neat and tidy manner;
- maintenance of infrastructure and equipment;
- employee training to ensure that each employee has tiered and specified technical competencies to ensure compliance with the approved LEMP;
- control of persons entering the landfill;
- record keeping and notifications;
- licence requirements; and
- compliance with relevant Acts and Regulations.

2.5 On-Site Equipment

Equipment on-site for the landfill operations will be selected on the basis of physical and mechanical specifications. Equipment types will be consistent with facility design, construction and operation criteria. Equipment may include:

- a landfill compactor (25 tonnes or heavier);
- a bulldozer to be used to spread and cover the waste with daily cover within the disposal area and to assist in general earthmoving duties;
- a 30 tonne excavator to assist in excavating landfill areas and load cover material from stockpiles;
- a 6x6 articulated dump truck;
- a stand-by power generator;
- two litter tent systems with one spare net;
- a bobcat type multi-tool unit for clean-up;
- a grader for road maintenance, base liner construction and capping;
- scrapers as required for bulk excavation and stockpiling operations;
- specialised equipment as necessary to place and compact the base liner and capping;
- specialised equipment for direct seeding of vegetation as required;
- a 9kL water tank and a pump with a minimum flow rate of 40 L/min, for plant watering, dust suppression and fire fighting;
- other water tankers suitable for major earthworks as required;
- equipment required for site maintenance, such as pumps, slashers, 4-WD's, trailer etc; and
- a weighbridge.

Each item of plant or equipment will have a maintenance schedule. Records will be kept to show that the requirements of the schedules are being complied with. Machinery will be managed to ensure that the noise levels generated at the landfill comply with relevant Regulations and Acts.

Facility components that require periodic inspection, such as leachate, gas and stormwater collection systems, will have detailed inspection and maintenance procedures and a schedule for recording inspections and maintenance as set out in the relevant EMM's in this LEMP.

On-site plant will generally be diesel driven to minimise the likelihood of starting fires.

2.6 Incoming Waste Handling

2.6.1 General Description

Long haul vehicles transporting waste to the site from the Resource Recovery and Waste Transfer Facilities will proceed to the Trailer Transfer Area where A-double road train trailers will be split and individual trailers taken to the tip face for discharge at the tip face.

Resource Recovery and Waste Transfer Facilities (RRWTS), vehicles from other EPA approved resource recovery facilities and kerbside collection vehicles will use the site for the disposal of waste. These vehicles will proceed to the active landfill disposal area and deposit their load underneath the Somernet netting system (refer Section 12).

Prior to departing the site, vehicles will go through a wheel wash system to minimise the potential of transfer of mud and general waste from the site.

Wastes deposited at the disposal area will be spread and compacted using a landfill compactor inside the litter tent. The first layer of waste material deposited onto the leachate drainage system in a cell will be placed carefully in a one meter thick layer to prevent damage to the liner and drainage system by the landfill compactor.

Cover soil of 150 mm, from stockpiles of excavated material, will be progressively placed over the exposed surfaces of the waste. All waste will be covered within the operating hours of the waste depot in order to reduce the potential for vermin to access the waste and emission of odours. Exposed waste will be covered at all times by the litter tent.

Exposure or removal of previously deposited waste at the depot will not occur without prior approval by the EPA.

2.6.2 Site Access

Access to the site by long haul road vehicles will be restricted to the route from Port Wakefield Road via Primes Road and an internal site road. The site access road will be set back along Primes Road approximately 250 m from Port Wakefield Road. Any queuing of vehicles will occur on the south-western corner of Lot 392 rather than along the public road. The general public will not have access to the landfill, hence vehicle numbers will be small. The landfill will receive waste from EPA approved Waste Transfer Facilities transported in high capacity long haul vehicles as well as collection vehicles. High vehicle numbers and uncoordinated truck congestion normally associated with landfills will not occur.

The site access road from Primes Road to the Trailer Transfer Area will be bitumen sealed, as will be the section of Primes Road between Port Wakefield Road and the site entrance. As the vehicles enter the site the incoming waste will be recorded by weight and source. Trailers are then split for transport to the waste disposal area.

The perimeter roads from the Trailer Transfer Area to the tipping face shall be constructed from a base of compacted rubble suitable for all weather conditions. Road construction details are contained in Volume 2, Section 11.

Water and/or dust suppressants will be applied as necessary to roadways to mitigate dust resulting from traffic on the landfill site and from landfill construction and operation activities (refer Section 10).

2.6.3 Trailer Transfer Area

The Trailer Transfer Area will be the interchange between external and internal waste handling systems (refer to Drawing Sheet 16, Volume 3). Dedicated road vehicles will bring waste to the site with trailers then being split and site vehicles taking waste to the active disposal area. Stormwater from the road vehicle roadway will be drained into open areas. Roof runoff will be collected in rainwater tanks for general site use.

An Administration Building will provide accommodation for administrative, technical and management functions. Facilities for employees will be housed in a separate building with a dedicated septic tank system.

Information on the material received, including the weight and source will be recorded. All waste entering the Northward Fill waste depot will be weighed on the weighbridge located at the depot, and the levy paid accordingly.

A Maintenance Workshop Building will be used for the repair and maintenance of site plant and long haul vehicles.

A washdown slab has been provided adjacent to the workshop building to enable site equipment to be cleaned prior to being serviced. Washdown water generated from washing down activities will pass through an initial screen and triple interceptor pit prior to discharge to the leachate evaporation ponds.

2.6.4 Landfill Operations

Landfill areas will be excavated and prepared in a progressive manner. Topsoil and subsoil will be stripped and stockpiled for later use as cover material. Dune sand will be excavated and stockpiled for use in the final cap. Calcrete will be ripped and used for the Trailer Transfer Area pavement, perimeter roads, access tracks and in the final cover growing layer. Hindmarsh clay will be excavated and the base of the excavation shaped and rolled in preparation for the placement of the liner and drainage layer in the waste disposal areas. The base of the liner will be located a minimum of 2 m above the groundwater. Disposal of waste into groundwater will not occur.

Ongoing geotechnical assessments will be carried out to confirm the suitability of liner materials for the waste receival areas. The clay liner will be a minimum of 1 m thick and placed in compacted layers, in accordance with traditional methods or an EPA approved alternative clay placement method (as outlined in the Technical Specification). The clay liner will have a maximum hydraulic conductivity of $1x10^{-9}$ m/s. The leachate drainage layer will be a minimum 300 mm thick and constructed of coarse stone to form a layer with a hydraulic conductivity of at least $1x\ 10^{-3}$ m/s (refer Volume 2, Section 3.7 of the Specification Guidelines and Technical Guidelines, for a full specification). A filter geotextile will be used on top of the coarse stone to act as a sacrificial layer to control biofouling of the leachate drainage layer (refer Section 7.2.4.). The clay liner and the leachate drainage layer will be installed in accordance with technical specifications (refer Volume 2, Section 3) and carried out under Level 1 supervision (AS 3798 – 1996). Wastes will only be placed in areas provided with a liner and leachate collection system.

Potentially contaminated water and clean water will be kept separate around the landfill site and within the landfill areas. This will be done by confining leachate to within the operating area and diverting clean storm water around the operating area (refer Section 6). This will minimise the production of leachate and reduce the potential for contamination of the groundwater system.

Prime movers will be used to transfer waste to the tipping face. The trailers will be covered until the waste is emptied onto a relatively narrow controlled tipping face within the litter tent. The size of the tipping face will be much smaller than a traditional landfill because of the small number of vehicles bringing waste to the landfill face. The litter tent will prevent escape of litter from the face and prevent birds from gaining access to the face (refer Section 12). Once emptied, trailers will be returned to the trailer transfer area for reconnection.

A bulldozer and/or landfill compactor will spread deposited waste at the tipping face. The bulldozer will spread daily cover.

Waste will be spread and compacted immediately to achieve a final density of at least 700 kg/m^3 as required by EPA guidelines.

Final waste cover (150 mm of topsoil and 850mm of growing medium over 1 m of compacted clay) will be placed after an area reaches its design level. An intermediate cover of 300 mm of compacted soil will be placed over the waste prior to the installation of the final waste cover. This will assist in compaction of the clay cap to required specifications. Slopes of the final cover will be contoured (refer Drawing Sheet 12 (Volume 3) and Section 7.2.2). Revegetation of completed areas will commence once favourable weather conditions prevail, i.e. during late autumn and winter.

A landfill gas collection system will be progressively installed as areas are completed and a monitoring program is implemented. An extraction, collection and flaring system will be established (refer Section 8). Landfill gas will be utilised if economically feasible.

2.7 Security

Security measures shall be established to prevent unauthorised entry, unauthorised waste disposal, and to prevent scavenging practices. These security measures may incorporate fencing, lighting, alarms and surveillance by electronic equipment and patrols as required.

Potential hazards at the site will be identified on relevant site maps and drawings. Potential hazards will be clearly signposted and separately fenced where reasonable and practicable.

2.8 Weed and Pest Control

Weed and pest control has commenced (and will be continued) to assist in the establishment of final vegetation (refer Section 13.2.4).

The use of the Somernet system will minimise the attraction of wildlife such as birds (refer Section 13.2.4).

2.9 Monitoring and Reporting

Detailed monitoring programs have been developed as part of the LEMP for the Northward Fill. Annual Reports will be submitted to the EPA in August of each year (refer Section 5).

2.10 Staging and Progressive Cell Construction

Landfilling will be carried out in sequence of stages, trending north, as shown in Volume 3 Drawing Sheet 4. The progressive construction will be used for planning for the provision of infrastructure such as stormwater and leachate ponds and landfill gas flares. Regular environmental performance monitoring will be undertaken to upgrade the detailed design for, and environmental performance of, subsequent areas.

A layout of Stage 1 and landfill facilities that have been constructed as part of the first phase of landfill works are shown on Drawing Sheet 22, Volume 3.

Before commencing waste filling operations for each cell, construction will be undertaken as follows:

- the provision of an access track to the waste filling area;
- the construction of open surface water drains, temporary bunds and stormwater ponds;
- construction of silt control dams and bunds;
- excavation of the landfill base;
- stockpiling of excavated material for later use as cover material or other on-site construction activities;
- the construction of a compacted clay liner and a leachate collection system; and
- construction of leachate evaporation ponds.

2.11 General Site Rehabilitation

2.11.1 Capping

Following the completion of waste filling, landfill areas will be capped to minimise rainwater infiltration. To ensure effective compaction of the 1 m thick clay liner to the required specifications, a 300 mm thick foundation layer/interim cover of compacted soil will be provided over the compacted waste. This compacted soil layer will act as a temporary cap and will be graded to the underside of the final clay liner level. Ponding of water on the temporary cap will not be permitted.

To ensure that adequate topsoil is available when required, suitable material will be stockpiled as it becomes available. Balance of material calculations indicate that there will be sufficient volume of materials excavated from the landfill basin and existing sand dunes to supply the soil needs of the landfill.

The final capping layer will constitute 1 m of clay, placed in layers of 200 mm compacted thickness (installed in accordance with Level 1 supervision (AS 3798 – 1996)); 850 mm of growing medium; and 150 mm of topsoil. The total thickness of the final cover layer will be 2 m (refer Section 7.2.2).

Completed areas will be seeded in late autumn or winter to make best use of wet and cool winter conditions. In addition, advice will be sought from local farm advisors on seed germination and grass growth issues. Areas not used for landfilling activities will continue to be farmed.

2.11.2 Screen Planting and Revegetation

A revegetation program will complement the completed landfill stages and be progressively implemented to achieve design criteria. The intention is to grow a pasture grass cover over the majority of the mound and revegetate with tree and shrub species in random groups. Once the pasture grass becomes established the mound will be planted with chenopod species to achieve continuous low growing vegetation cover similar to that which existed in the area prior to clearing.

The establishment of this vegetation cover will occur as the mound is created thereby reducing dust and providing additional aesthetic appeal from the surrounding areas. Where possible, native vegetation will be used for the revegetation of the site (refer Section 13).

Details of landscaping and planting are provided in Drawing Sheets 03 and 12, Volume 3. The perimeter areas of the site have been planted in first phase of works, prior to waste being received at the facility, to assist in forming a visual screen from Port Wakefield Road.

2.11.3 Final Landform

The proposed landform will be a reflection of the existing undulating landscape and sand dune formation that will blend the final landscaped form into the surrounding environment. The reproduction of the grade and slope which exist throughout this area will, from a distance, create a landscape which complements the surrounds and does not become an obvious alteration to the smooth, gentle lines of the background vista. The final landform and landscaping are shown on Drawing Sheet 12, Volume 3.

2.12 Closure and Post-Closure

Once the final landform has been completed, all improvements that are no longer required will be removed within 12 months of closure.

Prior to closure, a Closure Plan for the Northward Fill will be developed to include detailed design and post closure monitoring as required in the LEMP. The plan will comply with the rules and principles established in this LEMP and subsequent EPA Licence Conditions and include the following:

- a topographic plan showing the final contours of the landfill, and surface water diversion and drainage controls;
- a design of the final cover including the thickness and hydraulic conductivity of barrier and drainage layers, and information on topsoil, vegetative cover and erosion prevention controls;
- rodent and nuisance wildlife control procedures, and proposed end uses of the property after closure;

- a plan for monitoring groundwater, surface water, leachate and landfill gas, erosion and settlement for a minimum post-closure period of 25 years;
- a plan and accompanying design for the collection, storage and treatment/use of landfill gas for a minimum of 25 years;
- a plan for operating any required pollution abatement engineering works such as leachate collection and treatment systems, for a minimum post-closure period of 25 years;
- an estimated cost, updated annually, to carry out closure and post-closure activities including site maintenance to ensure the integrity of the end use is retained for a minimum period of 25 years (refer Section 4.4); and
- procedures for notifying the community about the closure.

The Closure Plan will replace the LEMP.

2.13 Future Use

As filling continues, the landfill site will be incrementally restored, using pasture grasses, tube stocks and seeds. The site will be redeveloped for non-intensive agricultural uses. Progressive capping of the site will enable early restoration of completed sections of the landfill. It is anticipated that the "Buffer Zone" between the landfill and Port Wakefield Road will continue to be farmed.

Investigations will be carried out to determine the viability of establishing industries in the area that will utilise by-products of the landfilling process, such as landfill gas. The construction of buildings and other structures on the landfill itself will not be permitted.

18. EMM 14 – Operation of Cells to Receive LLCW

18.1 Variation to Measure Applicable to LLCW Cell

Specific measures are detailed in this section covering the requirements for the LLCW Cell

Where there is any conflict with other management provisions within the LEMP, the specific measures take precedence.

The following measures are specifically varied for the operation of the LLCW Cell:

EMM 03 – Leachate Management and Groundwater Protection
EMM 04 – Landfill Gas Management
EMM 08 – Litter Management.

18.2 Acceptance and Disposal of LLCW

18.2.1 General

The proposed management and handling procedures for LLCW are detailed in this section.

LLCW material will only be disposed in designated LLCW cells, constructed in accordance with the provisions of EMM14, specifically:

- 18.3 - Variation of EMM 03 – Leachate Management and Groundwater Protection,
- 18.4 Variation of EMM 04 – Landfill Gas Management; and
- 18.5 Variation of EMM 08 – Litter Management..

LLCW cell development is limited to areas within the approved landfill footprint.

The designated LLCW area shown on Drawing 20080323 Sheet 01 has a capacity of approximately 1.2 million cubic metres of airspace. The design of the LLCW cells proposed is also applicable to the edge cells of future stages, allowing for development of additional LLCW cells as required.

18.2.2 Receival of LLCW

18.2.2.1 General

LLCW will only be received on site by prior arrangement.

A Customer Agreement Form will be established by TWM to specify site requirements for LLCW material to be received and disposed of at the site. This will include, as a minimum:

- A statement that LLCW is accepted subject to conformance of the waste to the LLCW classification using classification procedures acceptable to EPA;
- The source and a detailed description of the waste;
- The waste Transport certificate (including details of the chain of custody of the load from its source to the site); and
- Project specific procedures or requirements for the waste (if any).

The Customer Agreement Form will state that LLCW material will only be received by prior arrangement.

If prior notice is not provided, or classification acceptable to TWM is not provided, the load will be held at the gate until appropriate resolution of the classification or procedures can be implemented and landfill is able to receive and dispose of the material.

18.2.3 Procedure for Site Preparation for LLCW

On receipt of notification that LLCW material is to be disposed at the site, the Site Supervisor will be responsible for:

- Checking adequate plant is on-site for operation and disposal to the LLCW Cell;
- Checking adequate personnel are on-site for the disposal and that all site personnel have access to appropriate PPE;
- Instructing staff to prepare an area for disposal;
- Instructing staff to create appropriate stockpile of material for immediate cover where this is required due to the nature of the load (malodorous material); and
- Any project specific procedures as identified for the effective handling of specific materials.

Procedure for Gatehouse Receival of LLCW

Having received notification of the disposal and implemented the procedures for site preparation, the material will be processed to the disposal point as follows:

- Site entry procedures for all waste loads, including LLCW material, are that vehicles will stop at the Gatehouse for the purposes of:
    1. Weighing and inspecting the load;
    2. Completing documentation, as appropriate; and
    3. Directing to disposal area and advising of site protocols.

Staff will be advised that the LLCW load is entering the site (using 2-way radio, as required).

18.2.4 Disposal of LLCW

18.2.4.1 Procedure for Disposal Preparation for LLCW

Following suitable instruction, staff will prepare an area to receive the LLCW material, which shall be located either

- forming a contiguous cellular filling sequence within the LLCW cell, or
- If subject to project specific procedures or requirement requiring use of the staging area, within the staging area.

LLCW located within the staging area shall be transferred to the LLCW cell following completion of any project specific requirements within the staging area.

18.2.4.2 Procedure for Handling Materials within the Staging Area

Project specific handling procedures can apply where these are required for the effective handling and disposal of specific materials. This may include the requirements of an approved projects environmental management plan. Application of project specific handling procedures is subject to EPA approval.

It is a minimum requirement of this procedure that odorous or dusty materials shall not be left uncovered.

18.2.4.3 Procedure for Disposal of LLCW

Having been advised that the procedures for receival at the Gatehouse are completed, the staff will be advised that the material is on-route to the disposal point. The operators will ensure the LLCW is disposed in accordance with the following procedure:

- Remain within cab of vehicle with windows closed at all times during disposal.
- Wear respiratory protection equipment if for any reason leaving the vehicle cab within the vicinity of the active disposal area during unloading.
- Provide additional direction to the vehicle, as required, to ensure disposal in prepared area.

- Following disposal and any subsequent filling on the same day above the burial location, a minimum 150 mm layer of daily cover material will be placed by the close of business on the day that the material is received at the site.

18.2.4.4 LLCW Staging Area

A level area will be provided within the LLCW cell footprint for staging of disposal to the LLCW cell.

The LLCW staging area will be clearly marked, and located such that runoff from this area does not escape the LLCW cell.

18.2.4.5 LLCW Disposal Area

LLCW Cells shall be developed in accordance with the measures outlined in EMM13 which vary the requirements of EMM03 and EMM 04, specifically:

- 18.3 - Variation of EMM 03 – Leachate Management and Groundwater Protection,
- 18.4 Variation of EMM 04 – Landfill Gas Management; and
- 18.5 Variation of EMM 08 – Litter Management.

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The LLCW disposal areas will be clearly marked with star-droppers and warnings signs to identify LLCW disposal. The disposal areas will not be accessible to the public.

At suitable locations, during the development of the site, appropriate warning signs will be erected indicating the disposal of LLCW, to provide warning to any person excavating that area at a future date.

18.2.4.6 Non-Complying LLCW Loads

In the event of a non-complying load being brought to the site for disposal, the load will be rejected and the incident will be recorded in accordance with requirements detailed in the LEMP, with the EPA advised as appropriate.

In the event of load of LLCW being brought to the site for disposal without a Waste Transfer Certificate, the load will be held at the Gatehouse until appropriate certification can be provided and ultimately, rejected if a Waste Transfer Certificate is not provided with the load.

18.2.5 Training and Education

18.2.5.1 Staff Training

As detailed in the site LEMP, training in environmental awareness and in environmentally sound work practices has been undertaken and will regularly be updated by TWM staff and contractors.

TWM will coordinate staff training in accordance with the company training procedures and environmental training will be conducted on the site by experienced personnel.
The training may be split into the following categories:

- Environmental Induction
  An introduction to the environmental impacts of the site, the regulatory requirements for environmental control and the broad system of environmental monitoring, records and reporting for the site.
- Basic Work Practices Aimed at Minimising Environmental Impact
  Work practices for site personnel, such as daily cover over waste, litter control, dust control, restriction of working hours, and the environmental basis for these practices.
- Targeted Environmental Awareness Training
  Aspects to be considered will be regulatory requirements, environmental monitoring programs and results, and community awareness, aimed at senior site personnel and key staff involved with the site.

The procedures for receival and disposal of LLCW material will be incorporated in the training programs outlined above.

18.2.5.2 Customer Education

The Customer Agreement Form, together with advising of receival and disposal procedures, will be the basis of customer education.

18.2.6 Site Records

This LEMP details that the following site records will be held at the site:

- copy of conditions of planning consent and authorisation under the Environment Protection Act, 1993;
- records of inspections conducted by staff;
- records of complaints received;
- records of inspections by EPA;
- records of situations where licence conditions have been breached and how the breaches were rectified;
- copy of LEMP;
- plans of waste storage locations;

- emergency response (contingency) plan and notification procedures;
- closure and post closure management plans (when developed); and
- copy of Annual Reports, including details of waste types and quantities based on weighbridge records.

It is the responsibility of the Landfill Manager to ensure that the above records are kept up to date, and are made accessible to the EPA.

18.2.7 Environmental Controls

Existing environmental control measures, which form part of the ongoing operations of the site and are detailed in this LEMP, include:

- Groundwater management – groundwater monitoring;
- Leachate management – leachate collection, treatment and monitoring;
- Surface water management – surface water monitoring;
- Soil erosion management – erosion control and monitoring;
- Air quality and noise management – including dust and mud/slurry control, litter control noise and odour; and
- Bird, vermin, pest and weed management.

These programs readily accommodate the proposed operations.
Plans for the site detailing the groundwater monitoring wells, surface water management and landfill gas monitoring wells are included in the site LEMP.

18.3 Variation of EMM 03 – Leachate Management and Groundwater Protection

18.3.1 General

The barrier system and leachate monitoring system are specifically varied for the LLCW cells to provide a higher level of performance.

18.3.2 Base Liner and Leachate Collection System

In accordance with EPA requirements, the landfill base will be lined to achieve equivalent performance to a composite liner comprising a layer of 2.0mm (nominal) HDPE overlying 1.2m of low permeability compacted clay liner (CCL), with a geogrid drainage geo-composite layer located at the midpoint of the CCL.

Drawing 20080323 Sheet 02 and Sheet 03 shows details of the proposed implementation of this system in Stage 4 Cell 1 (LLCW).

The CCL forming part of the composite liner will be constructed from the same site clays used to construct the site 1m CCL.

A minimum distance of 2 m between the design base of the clay liner and the upper groundwater system is to be achieved within LLCW cells.

Construction of the composite lining system shall be in accordance with plans and specifications approved by the EPA.

18.3.3 LLCW Cell Perimeter Leachate Sumps

LLCW cells will only be established in perimeter cells with perimeter sumps.

LLCW cell perimeter sumps are of a double composite lined type as shown on Drawing 20080323 Sheet 02 and Sheet 03. A drainage collection point is provided at each perimeter sump to monitor and collect fluid present below the primary liner.

Existing approved monitoring and pumping systems will similarly be required in the LLCW cell to ensure leachate levels are maintained at (or below) allowable levels.

18.3.4 LLCW Cell Isolation

The perimeter of LLCW Cells shall coincide with ridges in the lining system. Each LLCW Cell shall drain to its own sump.

LLCW Cells shall be isolated from non-LLCW cells by a compacted sandy clay soil layer or bund. This layer shall be a minimum of 1m thick. The isolation layer shall be constructed progressively as detailed on Drawing 20080323 Sheet 04 and be continuous from the top of the liner to the underside of the cap.

18.3.5 Leachate Treatment

Leachate from LLCW Cells shall be pumped to dedicated LLCW Cell leachate collection ponds located as shown on Drawing 20080323 Sheet 01.

LLCW Leachate pond sizing will be based upon the approach described in EMM 03.

18.3.6 Groundwater Monitoring

The groundwater monitoring program shall be varied for wells located down gradient of LLCW cells to include analysis of Volatiles as a trigger parameter.

18.3.7 Leachate Monitoring

The leachate monitoring program shall be varied to include analysis of Volatiles as a trigger parameter.

18.4 Variation of EMM 04 – Landfill Gas Management

18.4.1 Infrastructure Requirements

Due to the different composition of LLCW from other wastes received on-site, the landfill gas extraction system for the LLCW cell shall include the following features:

- Sampling ports in the gas infrastructure upstream of interconnection with infrastructure receiving LFG from other portions of the landfill; and
- Be capable of being isolated from the LFG system servicing the remainder of the site, and operated independently if required.

18.4.2 LFG Treatment

It is common practice for the LFG system servicing LLCW cells to be combined with the whole of site LFG system.

Where based upon monitoring of the performance of the LFG system it is determined that combined operation is resulting in unsatisfactory performance, a separate gas treatment system shall be established.

18.4.3 LLCW Cell Isolation

LLCW Cells shall be isolated from non-LLCW cells by a compacted sandy clay soil layer or bund. This layer shall be a minimum of 1m thick. The isolation layer shall be constructed progressively as detailed on Drawing 20080323 Sheet 04, and be continuous from the top of the liner to the underside of the cap.

18.5 Variation of EMM 08 – Litter Management

18.5.1 Litter Control Measures

The since the LLCW material is not likely to produce appreciable quantities of litter, a litter net system is not proposed to be used in the LLCW cells.