REVISED MARCH 2017

ENVIRONMENTAL MANAGEMENT STRATEGY (EMS)
SOIL, WATER and LEACHATE MANAGEMENT PLAN

Former QUARRY SITE AT OLD WALLGROVE ROAD EASTERN CREEK
MATERIALS PROCESSING CENTRE (MPC)
WASTE TRANSFER FACILITY associated with an adjacent
SOLID WASTE LANDFILL
Document Control

Reference Documents.

Report on Soil, Water and Leachate Management Plan – Douglas Partners July 2010- Consultant J Russell (**SWLMP**).
Report on Specification for Leachate Management System – Douglas Partners July 2010 – Consultant J Russell (**LMS**)
Storm Consulting Site Surface Water Management Plan February 2008 Consultant Brad Farr (**Storm Consulting**)
IGGC Pty Ltd Groundwater and Salinity Assessment Consultant – Ian Grey (**IGGC**)
IGGC Detailed Hydrogeological Investigation Consultant – Ian Grey (**IGGC2**)
Martens Consulting Engineers Consolidated Stormwater Management Plan – June 2011 (**Martens**')
Report on Soil, Water and Leachate Management Plan – Douglas Partners December 2011 Consultant J Russell.
Specification for Leachate Management System – Douglas Partners April 2012.Consultant Ross McAlpine.
Water Balance Report Genesis Landfill and Recycling Facility – Consulting Earth Scientists November 2016. Consultant Darren Hanvey (**Water Balance Report**)

REVISION HISTORY

Version	Date	Reasons for Change	Prepared By	Authorised by
1	August 2010	Initial commission	Legal	Group General Counsel
2	August 2012	Review	Legal	Group General Counsel
3	August 20	Review	Legal	Group General Counsel
4	February 2014	Review	Legal	Group General Counsel
5	June 2015	Review	Legal	Group General Counsel
6	April 2016	Review	Legal	Group General Counsel
7	March 2017	Review	Legal	Group General Counsel

SOIL, WATER AND LEACHATE MANAGEMENT PLAN

PROJECT APPROVAL CONDITIONS

Condition 21 of Schedule 3 of the Project Approval requires preparation and implementation of a Soil, Water and Leachate Management Plan.

Condition 21 is as follows.

*The Proponent shall prepare and implement a **Soil, Water and Leachate Management Plan** for the site to the satisfaction of the Director-General. This plan must:*

a) Be submitted to the Director-General for approval prior to construction;
b) Be prepared by a suitably qualified and experienced expert;
c) Be prepared in consultation with the DECCW and Council; and
d) Include:
- *A site water balance;*
- *An erosion and sediment control plan;*
- *A stormwater management scheme;*
- *A surface water, groundwater and leachate monitoring program; and*
- *A surface water, groundwater and leachate response plan.*

The detailed requirement to compile the inclusions included in d) above are listed in Conditions 22, 23, 24, 27 and 28 of Schedule 3 of the Project Approval and are discussed in Sections 2, 3, 4, 5 and 7 of this report.

ACHIEVEMENT OF REQUIREMENTS

Table 1 lists the consent conditions for the preparation of a Soil, Water and Leachate Management Plan, provides a summary of the current compliance status

Table 1 Soil, Water and Leachate Management Plan Compliance Review (Condition 21 of Schedule 3).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
a) Be submitted to the Director-General for approval prior to construction;	Complies Plan completed and submitted prior to construction.
b) Be prepared by a suitably qualified and experienced expert;	Complies Plan prepared by Douglas Partners Pty Ltd and Consulting Earth Scientists with reference to previous works by Storm Consulting Pty Ltd, IGGC Pty Ltd and Hyder Consulting.
c) Be prepared in consultation with the NSW EPA and Council; and	Complies

CONSENT REQUIREMENTS	COMPLIANCE STATUS
	Further hydrogeological investigations carried out by IGGC Pty Ltd in consultation with NSW EPA pursuant to NSW EPA specification in the Project approval following public exhibition of EAR. Report submitted to NSW EPA and DoP Peer Review of Report and Data by Red Earth Geosciences dated 24 March 2010
e) Include: • *A site water balance;* • *An erosion and sediment control plan;* • *A stormwater management scheme;* • *A surface water, groundwater and leachate monitoring program; and* • *A surface water, groundwater and leachate response plan.*	Complies Site water balance included at: • Section 2 of this Management Plan • Section 3 of SWLMP • ECS, 2016. *Water Balance Report* Erosion and sediment control plan included at: • Section 3 of this Management Plan • Section 4 of SWLMP Stormwater management scheme included at: • Section 4 of this Management Plan • Section 5 of SWLMP Surface water, groundwater and leachate monitoring program included at: • Section 5 of this Management Plan • Section 6 of SWLMP Surface water, groundwater and leachate response plan included at: • Section 7 and 11 of this Management Plan • Section 7 of SWLMP

Table 2 reviews whether the preparation of a Soil, Water and Leachate Management Plan, has been consistent with the requirements of Condition 2 of Schedule 5 of the Project Approval.

Table 2. Soil, Water and Leachate Management Plan Preparation Compliance Review (Condition 2 of Schedule 5).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
prepared in accordance with any relevant guidelines.	Complies The report was prepared with reference to the following guidelines (refer page 2 of SWLMP): • EPA, 2016. *Environmental Guidelines: Solid Waste Landfills* • Landcom, 2004. *Managing Urban Stormwater: Soils and Construction* ("Blue Book") Fourth Edition • DEC, 2006. *Managing Urban Stormwater: Harvesting and Reuse*
a) Detailed baseline data;	Complies Data is in the appended source documents in the following locations: Storm Consulting: • Site Catchment – p6 Storm • Quarry pit basin information – p12 Storm • RAFTS modelling criteria for on-site detention determination – p14 Storm • Results for onsite detention basin modelling – p14 Storm • Rainfall areas – p17 Storm • Rain harvestable areas – p17 Storm • Modelled water demands – p18 Storm • Potential runoff generation – p18 Storm • % Water demand met by quarry basin runoff – p21 Storm • Pollutant retention criteria – p22 Storm Site Water Balance • Site Catchment – Part 3 Water Balance Report • Landfill Geometry – Part 3.3 Water Balance Report • Rainfall areas – Part 4.2 Water Balance Report • Rain harvestable areas – Part 4.2 Water Balance Report • Water generated by rainfall – Part 4.2.1.1 Water Balance Report • Water generated by irrigation – Part 4.2.1.2 Water Balance Report • Climatic data – Part 4.1 Water Balance Report • Potential runoff generation – Part 4.2.1 Water Balance Report • % Water demand met by quarry basin runoff – Part 4.2.1 Water Balance Report
b) A description of; • *The relevant statutory requirements (including any relevant approval, licence or lease conditions);* • *Any relevant limits or performance measures/criteria;* • *The specific performance indicators that are proposed to be used to judge the performance of,*	Complies: Refer: Section 5 of this Management Report; and pp 19, 20, 23, 25, 26, 28, 31, 32, 33, 34, 37, 38, 39, 40, 41, 43, 44, 45, 46 & 47 of SWLMP

CONSENT REQUIREMENTS	COMPLIANCE STATUS
or guide the implementation of, the project or any management measures;	
c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Complies: Refer pp 19, 20, 23, 24, 25, 28, 31, 33, 34, 35, 37, 39, 40, 43, 45, 46 & 47 of SWLMP
d) A program to monitor and report any; • *Incidents;* • *Complaints;* • *Non-compliances with statutory requirements; and* • *Exceedances of the impact assessment criteria and/or performance criteria; and*	Complies Refer: Sections 5, 8 & 11 of this Management Plan; and Section 7 of SWLMP
e) A protocol for periodic review of the plan.	Complies Refer Section 9 of this Management Plan

2. SITE WATER BALANCE

2.1 PROJECT APPROVAL CONDITIONS

Condition 22 of Schedule 3 of the project Approval identifies the requirements for the Site Water Balance and is as follows.

The site water balance must:

a) Include details of all water extracted, transferred, used and/or discharged by the development;

b) Identify the source of all water collected or stored on the site, including rainfall, stormwater and groundwater;

c) Describe the measures that would be implemented to minimise water use on site.

2.2 ACHIEVEMENT OF REQUIREMENTS

The Site Water Balance has been prepared by Consulting Earth Scientists which is **Annexure A** to this EMS.

Table 3 lists the consent conditions for the preparation of a Site Water Balance, and provides a summary of the current compliance status

Table 3. Site Water Balance Compliance Review (Condition 22 of Schedule 3).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
a) Include details of all water extracted, transferred, used and/or discharged by the development;	Complies CES, 2016. Water Balance Report Table 4A of this Management Plan *A stormwater management scheme is referenced at Section 5 of* SWLMP
b) Identify the source of all water collected or stored on the site, including rainfall, stormwater and groundwater;	Complies CES, 2016. Site Water Balance Part 4.2 Table 4A of this Management Plan *A stormwater management scheme is referenced at Section 5 of* SWLMP
c) Describe the measures that would be implemented to minimise water use on site.	Complies Site Water Balance included at p 7 of Douglas Partners On-site water reuse concept included at p16 of Storm *A stormwater management scheme is referenced at Section 5 of* SWLMP

Table 4 reviews whether the preparation of a Site Water Balance, has been consistent with the requirements of Condition 2 of Schedule 5 of the Project Approval. It provides a summary of the current compliance status

Table 4. Site Water Balance Preparation Compliance Review (Condition 2 of Schedule 5).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
prepared in accordance with any relevant guidelines.	Complies The report was prepared with reference to the following guidelines (refer page 2 of SWLMP): • EPA, 2016. *Environmental Guidelines: Solid Waste Landfills* • Landcom, 2004. *Managing Urban Stormwater: Soils and Construction* ("Blue Book") Fourth Edition • DEC, 2006. *Managing Urban Stormwater: Harvesting and Reuse*
a) Detailed baseline data;	Complies Data is in the appended source documents in the following locations: • Site Catchment – Part 3 Water Balance Report • Landfill Geometry – Part 3.3 Water Balance Report • Rainfall areas – Part 4.2 Water Balance Report • Rain harvestable areas – Part 4.2 Water Balance Report • Water generated by rainfall – Part 4.2.1.1 Water Balance Report • Water generated by irrigation – Part 4.2.1.2 Water Balance Report • Climatic data – Part 4.1 Water Balance Report • Potential runoff generation – Part 4.2.1 Water Balance Report • % Water demand met by quarry basin runoff – Part 4.2.1 Water Balance Report
b) A description of; • *The relevant statutory requirements (including any relevant approval, licence or lease conditions);* • *Any relevant limits or performance measures/criteria;* • *The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;*	Complies: Refer pp 19 & 20 of SWLMP
c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Complies: Refer pp 19 & 20 of SWLMP

CONSENT REQUIREMENTS	COMPLIANCE STATUS
d) A program to monitor and report any; • *Incidents;* • *Complaints;* • *Non-compliances with statutory requirements; and* • *Exceedances of the impact assessment criteria and/or performance criteria; and*	Complies: Refer Section 8 of this Management Plan
e) A protocol for periodic review of the plan.	Complies Refer Section 9 of this Management Plan

2.3 SITE WATER BALANCE

Water extracted, transferred, used and/or discharged by the development is summarised in **Table 4A.**

Table 4A: Summary of Site Water Balance

Water	Usage/Storage	Anticipated Volume
Sector A – Processing Area		
Water demands	Toilets, irrigation, dust suppression, wheel wash	33,900kL per year^
Runoff	Runoff (mean rainfall year)	149,100kL per year^
Roof runoff	Stored in polytanks	Meets 75% of demands^
On-site detention basins (OSD)	Two basins to handle runoff: northern basin and southern basin	Northern 3,492.8m³ capacity; Southern 2,575.5m³ capacity**
Dust suppression	OSD water for dust suppression	Meets 87% of demand^
Section B – Landfill Area		
Groundwater ingress	Generated by groundwater inflow	<3m³ per day*
Leachate pumping rates	Leachate pumping rates are likely to vary throughout the life of the landfill	Estimated maximum required 500kL per day^^
Leachate storage tanks	Sequencing batch reactors (SBRs) for leachate treatment	500kL per day based on 7 to 9 hour treatment time^^

Sediment basin	Sediment basin for clean water in quarry pit	4,362kL capacity^
Leachate disposal	Five SBRs for leachate treatment prior to discharge to sewer	400kL decanting capacity^^
Leachate disposal	Tradewaste Water Consent	Max Discharge – 800kL/day^^

Source: ^Storm Consulting
*IGGC2
^^LMS
**Martens'

Calculation of a leachate water balance for a landfill site involves estimation of the various inputs and outputs to and from the waste mass, and allows the potential leachate production rate to be assessed. Water balances are commonly used in landfill site design, particularly in the sizing of cells to minimise leachate production.

The leachate water balance for the site for any given time period is described by the following equation:

Output (pumped leachate) = Input – Change in Storage

Inputs

The liquid inputs to the landfill site are as follows:

- Infiltration of rainfall directly into waste;
- Infiltration of rainfall through the landfill cap;
- Infiltration of stormwater runoff from offsite and onsite areas;
- Groundwater ingress;
- Liquid waste inputs; and
- Miscellaneous other sources.

Liquid waste inputs are assumed to be negligible for the site given that no liquid waste will be received.

Miscellaneous other sources of liquid and moisture in the waste stream are also assumed to be negligible. This includes water from dust suppression.

Stormwater inflows into the landfill site from offsite sources are also expected to be minor.

The site wheel wash will be a sealed, recirculating design, and does not contribute any water to the landfill area.

Outputs

Losses of water from the waste are as follows:

- Direct evaporation from waste surfaces;
- Direct evaporation from hard-surfaced areas;
- Runoff and discharge to stormwater from hard-surfaced areas;
- Evapo-transpiration from capped areas;
- Absorption by received waste; and
- Leachate disposal to treatment plant and sewer.

Leakage into underlying strata is negligible because of the inward hydraulic gradient in the perched and fractured rock aquifers.

Absorptive capacity of the waste received is estimated at 50L/m³, approximately 2/3 of that typical for compacted domestic waste. The waste input rate is approximately 30,000 tonnes per month, equivalent to 450,000m³ per year (excluding daily cover material).

Summary of Storage Volumes

The following storage volumes are recommended by Storm Consulting based on the water balance analysis:

- Each building has its own rainwater tank with a minimum of 10kL volume, to harvest roof water runoff for reuse including toilet flushing and wheel wash top up;
- The OSD storage capacity exceeds the minimum 370m³/ha to contain the 1 in 2 year storm event and 1 in 100 year storm event, and by additional use to act as storage for reuse on site; and
- The sediment basin in the quarry has been sized using the Blue Book (approx. 165m³/ha) and can be drawn down following storm events for dust suppression in water carts.

Building designs adopted incorporate an additional 1.5 million litre water storage capacity, above the minimum requirements recommended by Storm Consulting.

2.4 LEACHATE WATER BALANCE

It is anticipated that the 'best case' infilling rate of the landfill is approximately 400,000 tonnes per year (estimated to be 235,000m³ per year), however, under 'worst case' conditions the infilling rate is likely to approximate 1,000,000 tonnes per year (estimated to be 588,000m³ per year). Table 4B represents the results for a 'best case' landfill filling rate. These results were found not to change significantly under worst case conditions.

Table 4B: Surface Water and Leachate Generation Estimates

	Surface Water Inflow (m³ per day)	**Leachate Generation (m³ per day)**	**Total inflow (m³ per day)**
Minimum	209	45	254
10th Percentile	238	119	357
Average	385	241	626
90th Percentile	507	374	881
Maximum	1,003	872	1,875

The leachate storage for the tipping area provides sufficient storage capacity to deal with a 1 in 20 year ARI 24-hour storm. The potential volume of leachate generated during such an event is given in Table 4C. Leachate generation of 890m³ during a 1 in 20 year 24-hour storm event, with a flow rate of 10.3L/s is estimated. The leachate collection system has been designed with a capacity of 890m³.

Table 4C: Peak Leachate Generation,

	1:20 year ARI (m³/day)	**1:20 year ARI (L/s)**
Rainfall intensity	9.27 mm/hour	9.27 mm/hour
Volume generated (active tipping face, 4,000m²)	890	10.3
Volume generated (greenwaste area)	22	0.26

3 EROSION AND SEDIMENT CONTROL PLAN

3.1 PROJECT APPROVAL CONDITIONS

An Erosion and Sediment Control Plan has to be prepared and included in the Soil, Water and Leachate Management Plan. Condition 23 of Schedule 3 of the Project Approval identifies the requirements for the Erosion and Sediment Control Plan and is as follows.

The erosion and sediment control plan must:

a) Be consistent with the requirements in the latest version of Managing Urban Stormwater: Soils and Construction (Landcom);

b) Identify the activities on site that could cause soil erosion and generate sediment; and

c) Describe what measures would be implemented to:

- *Minimise soil erosion and the transport of sediment to downstream waters, including the location, function and capacity of any erosion and sediment control structures; and*
- *Maintain these structures over time.*

3.2 ACHIEVEMENT OF REQUIREMENTS

Table 5 lists the consent conditions for the preparation of an Erosion and Sediment Control Plan, and provides a summary of the current compliance status

Table 5 Sediment Control Plan Compliance Review (Condition 23 of Schedule 3).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
a) Be consistent with the requirements in the latest version of Managing Urban Stormwater: Soils and Construction (Landcom);	Complies Refer pp 23 & 25 of SWLMP
b) Identify the activities on site that could cause soil erosion and generate sediment; and	Complies Refer: p23 of SWLMP; and p8 and Appendix A of Storm
c) Describe what measures would be implemented to: • *Minimise soil erosion and the transport of sediment to downstream waters, including the location, function and capacity of any erosion and sediment control structures; and*	Complies Refer Section 3 of this Management Plan and pp 23 & 24 of SWLMP

CONSENT REQUIREMENTS	COMPLIANCE STATUS
• *Maintain these structures over time.*	Refer Section 3 of this Management Plan and pp 24 & 25 of SWLMP

Table 6 reviews whether the preparation of a Sediment Control Plan, has been consistent with the requirements of Condition 2 of Schedule 5 of the Project Approval. It provides a summary of the current compliance status

Table 6 Sediment Control Plan Preparation Compliance Review (Condition 2 of Schedule 5).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
prepared in accordance with any relevant guidelines.	Complies The report was prepared with reference to the following guidelines (refer page 2 of SWLMP): • EPA, 2016. *Environmental Guidelines: Solid Waste Landfills* • Landcom, 2004. *Managing Urban Stormwater: Soils and Construction* ("Blue Book") Fourth Edition • DEC, 2006. *Managing Urban Stormwater: Harvesting and Reuse*
a) Detailed baseline data;	Complies Data is in the appended source documents in the following locations: • Potential runoff generation – p18 Storm • Pollutant retention criteria – p22 Storm
b) A description of; • *The relevant statutory requirements (including any relevant approval, licence or lease conditions);* • *Any relevant limits or performance measures/criteria;* • *The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;*	Complies Refer pp 23 & 25 of SWLMP
c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Complies Refer pp 23, 24 & 25 of SWLMP
d) A program to monitor and report any; • *Incidents;* • *Complaints;* • *Non-compliances with statutory requirements; and* • *Exceedances of the impact assessment criteria and/or performance criteria; and*	Complies Refer: Sections 5 & 8 of this Management Plan; and Section 7 of SWLMP

CONSENT REQUIREMENTS	COMPLIANCE STATUS
e) A protocol for periodic review of the plan.	Complies Refer Section 9 of this Management Plan

3.3 EROSION AND SEDIMENT CONTROL

CRITERIA

The relevant criteria are set out in conditions 21-25 and 27-28 of Development Consent MP 06_0239 dated 22 November 2009 and the relevant provisions of the Protection of the Environment and Operations Act.

RISKS TO SURFACE WATER QUALITY

At present risk to surface water quality are minimal as the site is a net receiver of inflow. Some runoff potential may occur in stockpile area for timber materials and green waste storage at the MPC but these areas are served by a series of collection sumps which are designed to collect leachate generated from green waste stockpiles within the MPC for the purpose of treatment and disposal to sewer.

MANAGEMENT AND MITIGATION MEASURES

Surface Water drainage Flow Paths are shown on the Blacktown Council diagram indicating pre-development flows. Surface Water drainage paths, OSDs were constructed as outlined in this EMS consistent with the diagram.

The Report entitled Eastern Creek Business Park Bulk Earthworks Drawings DA001-DA002-DAOO3-DA004-DA005-DA006 -DA016- DAAO17 DA021 - Hyder Consulting Pty Ltd identifies the location and quantity of fill materials on site. During the Operations phase the operator shall:

- Undertake regular waste clearing and wetting down of exposed areas to limit sediment erosion and waste contamination of areas including but not limited to embankment and excavation areas, stockpile areas, site facility and storage areas and temporary work areas.
- Rehabilitate or revegetate areas where work is required, on completion or where prompt revegetation cannot be completed, implement erosion control measures including siltation fencing until revegetation is completed.

- Install silt fences and hay bales or sand bags where required downstream of disturbed areas, base of embankments, existing drainage lines, earthworks stockpiles otherwise implement measures in accordance with best practice.

- Limit flow velocities in drainage systems by implementing sediment and waste collection barriers in order to minimise possible scouring and to encourage precipitation of particulates in run off.

- Maintain vegetation in and adjacent to drainage lines.

- Remove silt build-up regularly, especially following large storm events.

- Provide an access track where practicable, along the toe of embankments to allow access for maintenance.

- Keep sedimentation basin in a drawn-down state by preferential use of the water by tankers for dust suppression.

- Fuel and service all plant / equipment on a safe area away from any water course.

The small amount of 'inert' and general waste generated at the facility by employees, agents, invitees or contractors (not as part of the waste intake for the site) is stored temporarily and later separated and either directed for recycling or disposed of off-site as necessary.

CONTINGENCY MEASURES

- If the surface water monitoring program detects water pollution, the Site Project Manager ("SPM") will investigate surface water pollution and institute additional sediment control measures as outlined in the management and mitigation measures above.

- As a result of regular inspections of the site by the Site Project Manager, and immediately following major rain events, a 'site knowledge' will be established in respect to the potential for particular water quality impacts, including the likely location of control measures failing, This knowledge will allow a proactive approach to maintenance and implementation of additional measures before impacts are likely to occur- hence reducing impacts on water quality.

- Spare Hay bales or sand bags will be kept on site for immediate use.

- In the event of unexpectedly large overland water flows the SPM shall take steps to implement additional sediment protection barriers and ensure water flows so far as practicable are diverted to grassed overland areas where siltation cannot enter into streams or watercourses.
- The SPM shall monitor the site daily and report weekly to the operations manager on the following:
    - Effectiveness of the management measures in relation to Soil erosion and sediment Control.
    - Any recommendations of ways to improve the environmental performance of the works over time.

Material Processing Centre (MPC) OPERATIONS - EROSION AND SEDIMENT CONTROL

The MPC was constructed with paved areas that were designed in a manner (i.e compaction of unpaved surfaces) to reduce erosion and sedimentation.

Roadways and drainage pathways are inspected regularly and necessary maintenance is undertaken, if required, to reduce potential erosion and sedimentation. Overland surface flow is directed to a series of sedimentation ponds that clarify the water prior to disposal of excess water to stormwater.

Water sprays, operate on any above ground uncovered or unsheltered stockpiles to reduce wind erosion by up to 50%.

Dust erosion from stockpiles of fines (i.e. sands) is minimised by maintaining the height of the piles at less than protective bund heights, forming a domed surface.

In windy conditions, the stockpiles of fines will be damped down using a rain-gun (spray) or sprinkler system to prevent dust erosion.

Reducing the potential for dust erosion also reduces the potential for elevated concentrations of sediment in site drainage.

4 STORMWATER MANAGEMENT SCHEME

4.1 PROJECT APPROVAL CONDITIONS

A Stormwater Management Scheme has to be prepared and included in the Soil, Water and Leachate Management Plan.

Condition 24 of Schedule 3 of the Project Approval identifies the requirements for the Stormwater management Scheme and is as follows.

The stormwater management scheme must:

a) *Be consistent with the guidance in the latest version of Managing Urban Stormwater: Council Handbook (DEC); and*
b) *Include detailed plans for the proposed surface water management system.*

4.2 ACHIEVEMENT OF REQUIREMENTS

Table 7 lists the consent conditions for the preparation of a Stormwater Management Scheme, provides a summary of the current compliance status

Table 7 Stormwater Management Scheme Compliance Review (Condition 24 of Schedule 3).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
a) Be consistent with the guidance in the latest version of Managing Urban Stormwater: Council Handbook (DEC); and	Complies Refer p25 of SWLMP
b) Include detailed plans for the proposed surface water management system.	Complies Refer: Section 5 of SWLMP; and Section 3 and Appendix A of Storm

Table 8 reviews whether the preparation of a Stormwater Management Scheme, has been consistent with the requirements of Condition 2 of Schedule 5 of the Project Approval. It provides a summary of the current compliance status.

Table 8 Stormwater Management Scheme Compliance Review (Condition 2 of Schedule 5).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
prepared in accordance with any relevant guidelines.	Complies

CONSENT REQUIREMENTS	COMPLIANCE STATUS
	The report was prepared with reference to the following guidelines (refer page 2 of SWLMP): • EPA, 2016. *Environmental Guidelines: Solid Waste Landfills* • Landcom, 2004. *Managing Urban Stormwater: Soils and Construction* ("Blue Book") Fourth Edition • DEC, 2006. *Managing Urban Stormwater: Harvesting and Reuse*
a) Detailed baseline data;	Complies Data is in the appended source documents in the following locations: Storm Consulting: • Site Catchment – p6 Storm • Quarry pit basin information – p12 Storm • RAFTS modelling criteria for on-site detention determination – p14 Storm • Results for onsite detention basin modelling – p14 Storm • Rainfall areas – p17 Storm • Rain harvestable areas – p17 Storm • Modelled water demands – p18 Storm • Potential runoff generation – p18 Storm • % Water demand met by quarry basin runoff – p21 Storm • Pollutant retention criteria – p22 Storm Water Balance Report: • Site Catchment – Part 3 Water Balance Report • Landfill Geometry – Part 3.3 Water Balance Report • Rainfall areas – Part 4.2 Water Balance Report • Rain harvestable areas – Part 4.2 Water Balance Report • Water generated by rainfall – Part 4.2.1.1 Water Balance Report • Water generated by irrigation – Part 4.2.1.2 Water Balance Report • Climatic data – Part 4.1 Water Balance Report • Potential runoff generation – Part 4.2.1 Water Balance Report • % Water demand met by quarry basin runoff – Part 4.2.1 Water Balance Report
b) A description of; • *The relevant statutory requirements (including any relevant approval, licence or lease conditions);* • *Any relevant limits or performance measures/criteria;* • *The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;*	Complies Refer pp 25, 26, 28, 31, 32, 33, 34, 37, 38, 39 & 40 of SWLMP
c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Complies Refer pp 28, 31, 33, 34, 35, 37, 39 & 40 of SWLMP

CONSENT REQUIREMENTS	COMPLIANCE STATUS
d) A program to monitor and report any; • *Incidents;* • *Complaints;* • *Non-compliances with statutory requirements; and* • *Exceedances of the impact assessment criteria and/or performance criteria; and*	Complies Refer: Sections 5 & 8 of this Management Plan; and Section 7 of SWLMP
e) A protocol for periodic review of the plan.	Complies Refer Section 9 of this Management Plan

SURFACE WATER MANAGEMENT PLAN WATER MANAGEMENT

The minimum standards identified in the *Environmental Guidelines: Solid Waste Landfills* (EPA, 2016) provide guidance on surface water management and controls and the environmental objectives which are required to be addressed.

The EMS provides a detailed outline of the Surface Water Management Plan.

The relevant details of the plan are outlined below.

Proposed arrangements for surface water management include:

- Separation of areas between Clean run off and Leachate areas.
- Provision of storm-water collection ponds;
- Water Storage Tanks;
- Provision of contour drains and feeder drain on inter-berm areas and batters of the upper platform. These drains redirect overland flow to appropriate paths for sediment control; and
- Diversion of potential inflows along the lip of the former quarry and in the vicinity of the weighbridge area to sediment pits and then to storm drains.

STORMWATER DRAINAGE AND SEDIMENT CONTROL

Stormwater collection in the MPC area is as shown in the report by Storm Consulting Pty Ltd

5 SURFACE WATER, GROUNDWATER AND LEACHATE MONITORING PROGRAM

5.1 PROJECT APPROVAL CONDITIONS

A Surface Water, Groundwater and Leachate Monitoring Program has to be prepared and included in the Soil, Water and Leachate Management Plan.

Condition 27 of Schedule 3 of the Project Approval identifies the requirements for the Surface Water, Groundwater and Leachate Monitoring Program and is as follows.

The surface water, groundwater and leachate monitoring program must:

a) *Be generally consistent with the guidance in benchmark techniques 4, 5, 6, 7 and 8 of Appendix A of the DECCW's Environmental Guidelines for Solid Waste Landfills (1996, or the relevant sections of the latest version of the guideline); and*
b) *Include;*
    - *Baseline data;*
    - *Details of the proposed monitoring network; and*
    - *The parameters for testing and respective trigger levels for action under the surface water, groundwater and leachate response plan. (Refer Section 9 of this report).*

5.2 ACHIEVEMENT OF REQUIREMENTS

Table 9 lists the consent conditions for the preparation of a Surface Water, Groundwater and Leachate Monitoring Program, and provides a summary of the current compliance status

Table 9 Surface Water, Groundwater and Leachate Monitoring Program Compliance Review (Condition 24 of Schedule 3).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
a) Be generally consistent with the guidance in benchmark techniques 4, 5, 6, 7 and 8 of Appendix A of the DECCW's NSW EPA's Environmental Guidelines for Solid Waste Landfills (1996, or the relevant sections of the latest version of the guideline); and	EPA, 2016. *Environmental Guidelines: Solid Waste Landfills* replaced benchmark techniques with minimum standards for landfills. Complies Refer: s7 of this Management Report; and p41 of SWLMP
b) Include; • *Baseline data;* • *Details of the proposed monitoring network; and* • *The parameters for testing and respective trigger levels for action under the surface water, groundwater and leachate response plan*	Complies Refer: Section 6 of this Management Report; p45 of SWLMP; pp 16, 18, 19 & 21 of IGGC; and IGGC2 Refer: Section 6 of this Management Report; and Section 6 of SWLMP Refer: Section 7 of this Management Plan; and pp 42, 44 & 47 of SWLMP

Table 10 reviews whether the preparation of a Surface Water, Groundwater and Leachate Monitoring Program, has been consistent with the requirements of Condition 2 of Schedule 5 of the Project Approval. It provides a summary of the current compliance status

Table 10 Surface Water, Groundwater and Leachate Monitoring Program Compliance Review (Condition 2 of Schedule 5).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
prepared in accordance with any relevant guidelines.	Complies The report was prepared with reference to the following guidelines (refer page 2 of SWLMP): • EPA, 2016. *Environmental Guidelines: Solid Waste Landfills* • Landcom, 2004. *Managing Urban Stormwater: Soils and Construction* ("Blue Book") Fourth Edition • DEC, 2006. *Managing Urban Stormwater: Council Handbook*

CONSENT REQUIREMENTS	COMPLIANCE STATUS
a) Detailed baseline data;	Data is in the appended source documents in the following locations: Storm Consulting: • Site Catchment – p6 Storm • Quarry pit basin information – p12 Storm • RAFTS modelling criteria for on-site detention determination – p14 Storm • Results for onsite detention basin modelling – p14 Storm • Rainfall areas – p17 Storm • Rain harvestable areas – p17 Storm • Modelled water demands – p18 Storm • Potential runoff generation – p18 Storm • % Water demand met by quarry basin runoff – p21 Storm Pollutant retention criteria – p22 Storm Water Balance Report: • Site Catchment – Part 3 Water Balance Report • Landfill Geometry – Part 3.3 Water Balance Report • Rainfall areas – Part 4.2 Water Balance Report • Rain harvestable areas – Part 4.2 Water Balance Report • Water generated by rainfall – Part 4.2.1.1 Water Balance Report • Water generated by irrigation – Part 4.2.1.2 Water Balance Report • Climatic data – Part 4.1 Water Balance Report • Potential runoff generation – Part 4.2.1 Water Balance Report • % Water demand met by quarry basin runoff – Part 4.2.1 Water Balance Report
b) A description of; • *The relevant statutory requirements (including any relevant approval, licence or lease conditions);* • *Any relevant limits or performance measures/criteria;* • *The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;*	Complies Refer: Section 5 of this Management Report; and pp 41, 43, 44, 45, 46 & 47 of SWLMP
c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Complies Refer: pp 43, 45, 46 & 47 of SWLMP
d) A program to monitor and report any; • *Incidents;* • *Complaints;* • *Non-compliances with statutory requirements; and* • *Exceedances of the impact assessment*	Complies Refer: Sections 5, 8 & 11 of this Management Plan; and Section 7 of SWLMP

CONSENT REQUIREMENTS	COMPLIANCE STATUS
criteria and/or performance criteria; and	
e) A protocol for periodic review of the plan.	Complies Refer section 9 of this Management Plan

STORMWATER QUALITY MONITORING AND DISCHARGE CRITERIA

Stormwater from the MPC site and the surrounding area discharges into the stormwater system and via GPT (Gross Pollution Traps) and thence via overland swales to Onsite Detention basins where it is collected for re-use on site.

Water quality objectives for the catchment are based on the ANZECC (2000) criteria for protection of aquatic ecosystems and visual amenity.

MONITORING AND COMPLIANCE REPORTING

- The surface water monitoring program must be able to demonstrate that surface water is not polluted by the Site.
- Surface Water Monitoring points are established at each of the OSD discharge points.
- Water at these locations are monitored quarterly by an Independent appropriately qualified expert to test compliance with Blacktown City Council's Stormwater Quality Control Policy (2005), Pollutant Retention Criteria and the Environmental Protection License.
- The Site Project Manager is responsible for the following:
    - The maintenance of the proposed stormwater controls including regular visual inspection of the stormwater treatment measures on a monthly basis and after major rain events.
    - Conduct regular inspections of all water management safeguards and complete checklist.
    - Monitor and test water quality, as required.
- The quality of any water released (if any) should be in accordance with the site Environment Protection Licence.

- In respect to Sediment and Soil Erosion, the Site Project Manager is responsible for the following:
    - Inspection of silt fences regularly to confirm that they are not partially buried and still in good condition.

Conduct a detailed inspection after any significant rain event to check status of safeguards and confirm that siltation barriers are functional and that the sedimentation basins are working effectively and are not compromised.

6 LEACHATE MANAGEMENT SYSTEM REPORT

6.1 PROJECT APPROVAL CONDITIONS

A Leachate Management System Report is required to be prepared and implemented in accordance with Condition 10 of Schedule 3 of the Project Approval. Condition 10 is as follows.

Prior to the commencement of construction of the leachate management system, the Proponent must submit a report to the Secretary for approval that is prepared in consultation with EPA and Sydney Water, providing design details of the proposed leachate collection, conveyance, extraction, storage, treatment and disposal systems for all aspects of the proposal's operations (landfill and materials processing centre/resource recovery facility), including but not limited to:

a) A construction quality assurance (CQA) plan for the collection, conveyance and storage measures of leachate including details of the leachate barrier system proposed for any surface areas used for direct impoundment of leachate;
b) Details of the proposed leachate pre-treatment system, including its capacity;
c) A program for the installation and commissioning of the systems; and
d) Details of the Proponent's proposed trade waste agreement with Sydney Water Corporation.

GROUNDWATER and SURFACE WATER

A groundwater and salinity assessment has been undertaken and the results are found in IGGC and IGGC2.

RISKS TO GROUNDWATER QUALITY

No apparent risks to groundwater quality have been identified.

The potential for off-site impacts on down-gradient beneficial uses is therefore minimal. Similarly the risk of significant harm to human health or the environment is considered to be low.

GROUNDWATER MONITORING PROGRAMME

The MPC operations have had no effect or impact on groundwater and, consequently, groundwater monitoring has not been required by DADI for the MPC.

Groundwater monitoring is a licence requirement for the adjacent Landfill site.

Details of the groundwater monitoring regime, remediation programme and associated *Action Plans* as presented in the EMS are provided Below:

The minimum standards in Part 4.4 of the *Environmental Guidelines: Solid Waste Landfills* (EPA, 2016) outline the requirements for a groundwater monitoring network and monitoring programme. The groundwater monitoring programme should effectively monitor and report groundwater character, and ensure early detection and reporting of possible pollution of groundwater.

A comprehensive hydrological investigation of the site and the surrounding groundwater regime has been conducted by Consulting Earth Scientists and formerly IGGC, Douglas Partners has also noted the findings of the peer review of the IGGC hydrogeological reports by Dr Boyd Dent of Red Earth Geosciences (Red Earth Geosciences, 2009; 2010).

Quarterly monitoring utilises the existing monitoring well network comprising nested piezometers presented on Figure 5.2 of the IGGC report. A suitably qualified environmental consultant must complete all groundwater monitoring and reporting.

Groundwater levels are recorded in the piezometers surrounding the quarry using an electronic dip meter or whistle. The groundwater monitoring consultant should give consideration to the piezometer depths and analytes (e.g. oxygen sensitive analaytes) when selecting the groundwater sampling method. The sampling method should be consistent for successive monitoring events to maximise data comparability.

EROSION AND SEDIMENT CONTROLS WITHIN THE LANDFILL

Erosion and sediment controls at non-active parts of the Site shall be undertaken in the form of the following:

- placement of compacted on site VENM in accordance with the Extraction and Rehabilitation Plan prepared by Hyder Consulting lodged with the Development Application.
- the construction of adequate surface falls, drainage channels and/or contour drains to direct surface runoff away from the leachate producing areas of the MPC; and
- the construction of detention basins/sumps; and
- the establishment of grass cover where required by hydro-seeding on areas including the upper quarry platforms and flanking areas.

LEACHATE QUALITY

CRITERIA

The relevant criteria is set out by Sydney Water for the purposes of entering into a Trade Waste agreement.

Untreated Leachate quality is monitored on a quarterly basis (and some parameters on an annual basis). Results of periodical monitoring are presented in the annual report to NSW EPA in tabular form and indicators are also graphed showing trends in leachate quality. The report isprepared by suitably qualified external consultants on behalf of DADI as required by the license conditions.

Noting the absence of a formal engineered leachate barrier (landfill liner) the data on leachate quality trends will assist in determining potential impacts on groundwater quality and help in correlating reductions in groundwater quality (if any) with leachate chemistry.
The leachate monitoring programme will involve three components:

- Monitoring of the leachate level in the primary (basal) sump;
- Monitoring leachate quality prior to discharge to sewer; and
- Monitoring leachate generation volumes to calibrate the leachate water balance.

Leachate level monitoring in the basal sump is done on a weekly basis.

Leachate disposal for the treated leachate is as trade waste. DADI need to meet the conditions of Sydney Water trade waste criteria.

Monitoring of leachate water quality for discharge to sewer is done in accordance with the requirements of the Trade Waste Agreement with Sydney Water.

Monitoring of pumped leachate volumes is done using flow meters. The monitoring data is used to further refine the water balance based on actual generation rates.

LEACHATE BARRIER SYSTEMS

The NSW EPA indicates the relevant environmental goals associated with the barrier and collections system as follows:-

- preventing pollution of water by leachate;
- detecting water pollution;
- remediating water pollution;
- preventing landfill gas emission;
- assuring quality of design, construction and operation; and
- remediating landfill after closure; and preventing degradation of local amenity.

The Guideline suggests that leachate can be discharged (during non-storm events) in the following ways:-

- discharge to sewer - this option has not been approved for the site
- spraying or land application over the grasslands adjoining the landfill, or injection back into the landfill in accordance with the landfill license conditions; or
- treatment to an acceptable quality and discharge (as effluent) in accordance with the conditions of the Trade Waste Agreement with Sydney Water (Current methodology).

Leachate treatment is performed via sequencing batch reactors (SBR) or sequential batch reactors. SBRs are industrial processing tanks for the treatment of wastewater. Tanks placed at the site are four 110 kL tanks with decanting capacity of approximately 50 kL.

LEACHATE MANAGEMENT

Due to the nature of the landfill and the extraction methods for removal of biodegradable wastes from the waste stream prior to landfilling the leachate expected to be generated does not have high concentrations of organic and inorganic materials characteristic of putrescible waste landfills.

All leachate in excess of the field capacity of the waste is collected in leachate collection system and prevented from escaping into ground and surface water.

Leachate is collected by gravity drainage and directed by a series of drains to the leachate sump. Detailed specifications are to be found in the Construction Quality Assurance Design and Program provided by Douglas Partners appended to the SWLMP and in the LMS.

LEACHATE COLLECTION

CRITERIA

The relevant criteria is set out in Schedule 3, Conditions 21, 22, 23, 24 of Development Consent 06_0139 (as modified) dated 22 November 2009.

A basal layer leachate collection system similar to that outlined in the *Environmental Guidelines: Solid Waste Landfills* (2016) was installed. Minimum standards 1.4 and 1.5 in the 'Guidelines' indicate that a granular layer with drains should be installed and the leachate should drain to a central collection point.

Details of the Leachate Collection system are outlined in Section 8 of Douglas Partners (2010).

The leachate collection system consists of a herringbone system at the base of the quarry directing leachate from the wastes towards a sump.

A temporary surface dam (which will be moved as necessary) is used for stormwater collection down slope of the current operational area and only collects surface water runoff.

A delineation system involving the use of trenches, slopes and bunds directs stormwater to the collection pond avoiding the potentially contaminated surface water from the active tipping area.

Leachate in this system will make its way through gravity flow along the herringbone piping system towards a sump located in the lower part of the site (located at about -57 m AHD). A layout diagram of the leachate collection system is shown in Figure 4.1 in IGGC .

The leachate collection system comprises a main leachate drain of 375 mm diameter RCP with feeder (herringbone) drains of 150 mm diameter slotted PVC construction. The system drains into a sump and is accessed by a manhole/riser of concrete ring construction.

Leachate is collected in the sump and then pumped out of the landfill via a sump-pump and first into a series of holding and treatment tanks located to the east of the void at surface. Ref; Figure 4.1 in IGGC.

Erosion and Sediment Control

Erosion and spalling of shaley material is to a lesser extent also possible on the southern and western cut slope batters in natural materials.

Regular inspection and maintenance is required to reduce potential erosion and sedimentation. Sediment entrained in runoff will normally run into the site and accordingly will not impact the local environment

CAPPING AND SURFACE DRAINAGE

Capping layers are usually designed to perform the following pollution control functions:-

- As a surface barrier to prevent the outward migration of landfill gas;
- As a barrier to the infiltration of rainfall;
- As a drainage layer for infiltration;
- As a growing medium for re-vegetation; and
- As a landscape feature for restoration and rehabilitation or to provide a platform for additional waste disposal in order to form the final land-form which is expected to be domed.

The potential for methane gas generation is recognised.

Final capping will not be required on the site for many decades and it is not envisaged that final design details will be presented in this EMS. Notwithstanding issues related to final capping, land-form, future land-use and aftercare are discussed elsewhere in this EMS.

FILLING ARRANGEMENTS

Filling will progress in panels across the floor of the main tipping area which when completed will be reformed at the next level and the process repeated.

Filling surveys are completed on a six monthly basis and the leachate monitoring sump will be completed and then replaced vertically in the manner described in IGGC to ensure that leachate sampling and level measurement can continue in accordance with the site license conditions.

A schematic design for the leachate riser is shown in the IGGC report.

The riser will allow access for the pump and to enable leachate level monitoring and sampling according to the license conditions

6 SURFACE WATER, GROUNDWATER AND LEACHATE RESPONSE PLAN

6.1 PROJECT APPROVAL CONDITIONS

A Surface Water, Groundwater, and Leachate Response Plan has to be prepared and included in the Soil, Water and Leachate Management Plan. Condition 28 of Schedule 3 of the Project Approval identifies the requirements for the Surface Water, Groundwater and Leachate Response Plan and is as follows.

The surface water, groundwater and leachate response plan must:

a) *Include a protocol for the investigation, notification and mitigation of any exceedances of the respective trigger levels; and*
b) *Describe the array of measures that could be implemented to respond to any surface or groundwater contamination that may be caused by the development.*

6.2 ACHIEVEMENT OF REQUIREMENTS

Table 12 lists the consent conditions for the preparation of a Surface, Groundwater and Leachate Response Plan, provides a summary of the current compliance status

Table 12 Surface Water, Groundwater and Leachate Response Plan Compliance Review (Condition 28 of Schedule 3).

CONSENT REQUIREMENTS	COMPLIANCE STATUS
a) Include a protocol for the investigation, notification and mitigation of any exceedances of the respective trigger levels; and	Complies Refer: Section 6.3 and 6.4 of this Management Report; and pp 48 & 49 of SWLMP
b) Describe the array of measures that could be implemented to respond to any surface or groundwater contamination that may be caused by the development.	Complies Refer: Section 6.3 and 6.4 of this Management Report; and pp 48 & 49 of SWLMP

6.3 GROUNDWATER MONITORING PROGRAMME

CRITERIA

The primary objectives of the groundwater monitoring network are to detect, prevent and remediate water pollution.

Groundwater sampling on site is undertaken at seventeen locations on a quarterly basis using appropriate measures in compliance with the EPA's requirements.

However, advice will be sought from experienced hydrogeological experts on the frequency of such sampling during the operation of the landfill and should it be required that more frequent sampling and testing be undertaken, the procedures will be amended to comply with such requirements.

The bores are monitored for groundwater level and in situ parameters (dissolved oxygen, pH, conductivity & temperature) and samples are extracted on a quarterly basis and analysed for the parameters specified on condition M2.2 of the Environmental Protection Licence.

Results from the monitoring programme undertaken by the consultants are tabulated and indicators graphed against previous results to determine trends in groundwater quality. Reports are presented to the NSW EPA on an annual basis as required under the Site licence, or following

a reported incident as defined by exceedance of agreed water quality environmental trigger levels which will be determined by the monitors following 24 months of monitoring.

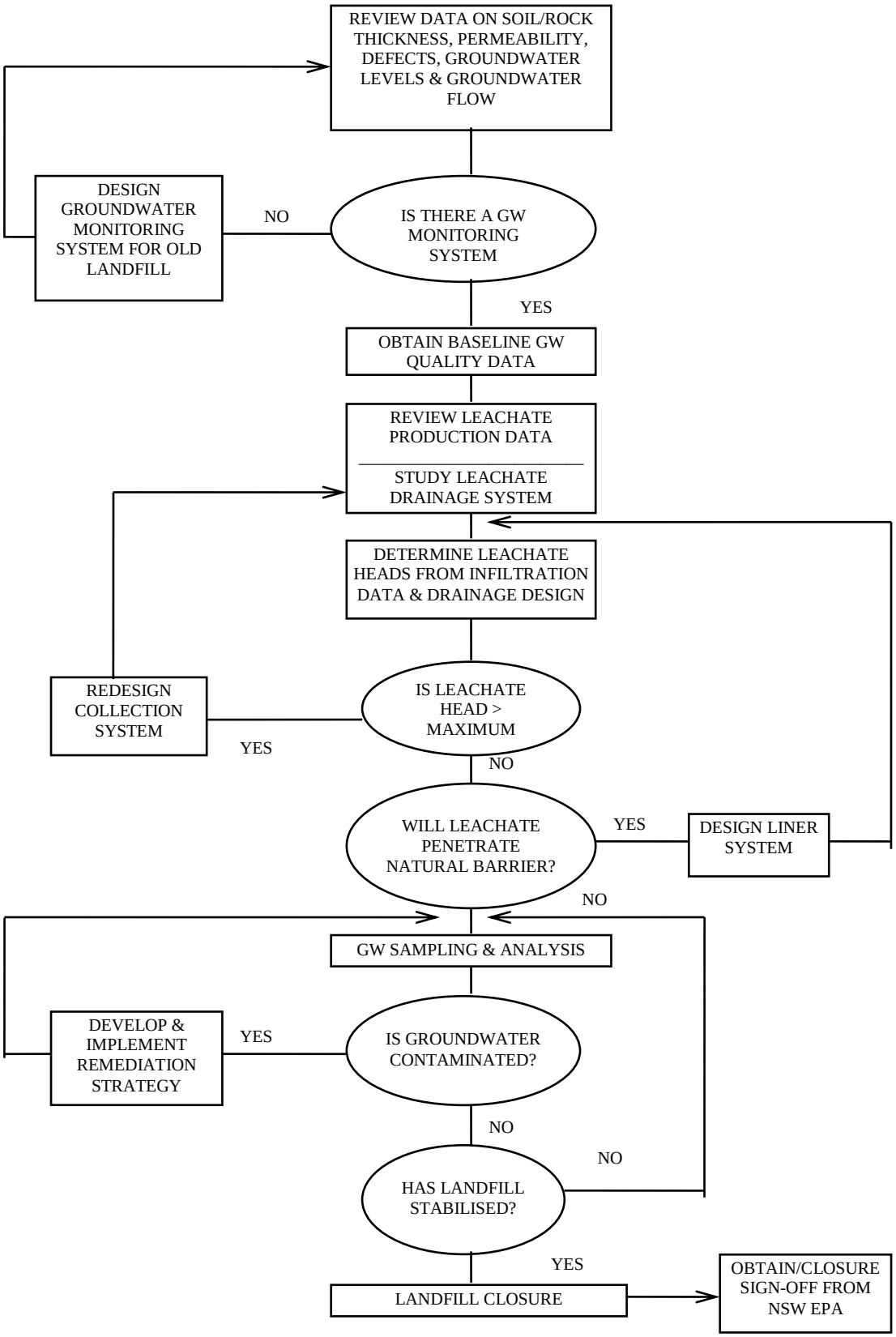
6.4 GROUNDWATER ACTION PLANS

In the event of an exceedance of environmental trigger levels for groundwater as determined by the monitoring consultant, a groundwater action plan or water contamination remediation plan as required under minimum standard 4 in the 'Guidelines' will be instigated.

The formulation of the action plan will depend on the nature and extent of the exceedance.

- The NSW EPA will be informed within 24 hours of the exceedance and within 14 days in writing and steps will be taken to re-sample from the locations which showed the exceedance of the established environmental trigger levels.
- Re-sampling results will determine if an adverse trend is developing, or whether the initial exceedances were isolated incidents or spurious readings.
- Once a trend has been established which indicates deteriorating groundwater quality or significant risk of harm then a suitable groundwater remediation action plan will be developed and notification of environmental harm made to the NSW EPA.
- Detailed plans cannot be provided until the nature of the problem has been identified, however, the general process involved is summarised in Figure 1.
- Proposals for voluntary groundwater remediation (i.e. the groundwater remediation action plan) will be forwarded to the NSW EPA for agreement under s 26 of the *Contaminated Land Management Act 1997*).
- Results of the monitoring programme, details of any required action plans and implementation of the remediation programme and its results will be provided in the annual report as specified in the site license

FIGURE 1 - GROUNDWATER ASPECTS OF LANDFILL ASSESSMENT



7 ENVIRONMENTAL MONITORING, CORRECTIVE ACTION AND AUDITS

ENVIRONMENTAL MONITORING

Environmental monitoring to determine conformance of the DADI Operations with the EMS will be managed by the Site Operations Manager.

Monitoring is undertaken in accordance with the Environmental Monitoring Program and individual Management plans and programs prepared in accordance with the Development Consent Conditions.

A schedule of environmental monitoring undertaken is also contained within the EMS along with an environmental monitoring site location plan.

The purpose of this monitoring is to provide a measure of the performance of the operation, which can be compared against the objectives, targets and performance criteria specified in the Environment Protection Licences, Consent Conditions and EMS.

All monitoring is undertaken using standard monitoring techniques and calibrated equipment operated by trained personnel.

Analysis of samples is to be undertaken in accordance with the Development Consent and NSW EPA licence conditions.

All monitoring results are to be filed by the Site Operations Manager for DADI and maintained on site for at least four years.

Monitoring results are to be compared against development consent, licence and permit conditions and any non-conformance recorded against the monitoring result.

In the event of a non-conformance the Site Operations Manager and the General Manager are to investigate the cause of the non-conformance and recommend corrective and/or preventative action.

The effectiveness of the corrective and/or preventative action is to be assessed by analysis of the next available monitoring results and during the next monthly site inspection.

Any changes to work procedures as a result of the corrective or preventative action are to be documented and communicated as per the sites change management procedure.

Calibration records are kept of the monitoring equipment used.

Calibration will be undertaken in accordance with the equipment manufacturer's recommendations. Where monitoring is outsourced, the consulting body is responsible for maintaining calibration and supplying the relevant documentation.

8 INSPECTIONS

Regular environmental inspections of the Genesis Waste Facility Site operations are conducted.

These inspections are to determine, in conjunction with the environmental monitoring and incident/complaint reporting procedures, on-site compliance with the EMSs.

Site inspections are to be conducted by the Site Operations Manager or his/her delegate and the inspection results recorded on the inspection form.

Any non-conformances are to be recorded on the inspection form and the cause of the non-conformance investigated by the Site Operations Manager.

Corrective and/or preventative action is to be recommended by the person undertaking the inspection and the effectiveness of the corrective and/or preventative action assessed at the next monthly site inspection.

The Site Operations Manager will report any significant non-conformances arising from site inspections to the Operations Manager and General Manager.

9 INTERNAL AUDITS

Internal EMS audits will be undertaken annually to assess whether the EMS has been properly implemented and maintained and conforms to the environmental policy, objectives and targets of DADI Executive Management Committee.

The results are communicated to senior management and employees in accordance with the EMS Communication Procedures.

Actions and recommendations from internal audits undertaken on site will also be entered into the site's reporting database.

Internal auditors are to be selected on the basis of their understanding of environmental management principles of Waste Processing and landfill operations.

Internal auditors shall be suitably qualified and experienced and be capable of impartially and objectively auditing the EMSs.

A schedule of Environmental Audits will be maintained within the EMS.

10 EXTERNAL AUDITS

Independent environmental audits of the operation are to be conducted within six months of commencement of Operations in accordance with Condition 7 of the Schedule 5 of the Development Consent.

Thereafter external audits shall be conducted every 2 years unless the Director General of Planning NSW directs otherwise.

External auditors are to be selected on the basis of their understanding of environmental management principles waste processing and landfill operations.

The selection of external auditors will be the responsibility of the DADI Executive Management and the appointment duties and tasks of the auditors must satisfy the criteria and requirements set out in Condition 7 of Schedule 5 of the Development Consent.

Actions and recommendations from external audits will be communicated to senior management and employees in accordance with relevant EMS communication procedures.

In accordance with Condition 8 of Schedule 5 of the Development Consent within 6 weeks of the completion of the independent environmental audit, the Proponent shall submit a copy of the audit

report to the Director General, together with its response to any recommendations contained in the audit report.

11 NON CONFORMITY, CORRECTIVE ACTION AND PREVENTATIVE ACTION

On receipt of an incident/complaint reporting form, site inspection form, hazard report or monitoring result that indicates a potential or actual non-conformance of the Genesis Waste Facility with the relevant EMSs, the General Manager or Site Operations Manager is to undertake an investigation and recommend corrective or preventative action.

Details of the required action(s) are to be communicated to the relevant supervisor of the specific operations area and a copy of the communications kept with the investigation report.

The effectiveness of the requested action is to be assessed within one month of the non-conformance.

Corrective and preventative actions relating to environmental aspects specifically identified within the Development Consents are addressed within the dedicated Environmental Management Plans and Programs as required by the Consents.

12 MS RECORDS AND INFORMATION MANAGEMENT

A master copy of the EMSs including the Strategy, plans, procedures and supporting information is held in the office of the Managing Director and/Group General Counsel.

All EMS records are to be maintained in the appropriate location, as detailed throughout this document, in a legible form for a minimum period of four years.

The EMS is to be reviewed at least every two years and updated, as required.

13 REVIEW AND IMPROVEMENT

13.1 MANAGEMENT REVIEW

The review and revision of the EMS are to be undertaken by senior management not less than every two years.

The EMS review will include:

- updated policy and guidelines when applicable;
- review of audit findings;
- results of monitoring programs;
- achievement of objectives and targets;
- relevance of the Policy, objectives and targets to current and future conditions; and
- information and concerns of stakeholders.

13.2 STRATEGIC REVIEW

In accordance with Condition 7 of the Schedule 5 of the Development Consent following the completion of an Independent Environmental Audit the EMS will be reviewed and revised as necessary.

Updated policy and guidelines	EPA, 2016. *Environmental Guidelines: Solid Waste Landfills* replaced EPA, 1996. *Environmental Guidelines: Solid Waste Landfills* DEC, 2006. *Managing Urban Stormwater: Harvesting and Reuse* replaced DEC, 1997. *Managing Urban Stormwater: Harvesting and Reuse*
Review of audit findings	The most recent independent environmental audit was initiated on or around April 2015 and undertaken by Cardno. The findings and recommendations are contained in a report dated 21 August 2015 and an addendum dated 12 April 2016. Cardno identified that it is not clear if a groundwater monitoring report has been prepared since the monitoring was initiated. In

	response, the Proponent engaged EnvironConsulting Services to prepare a groundwater monitoring report for submission to the EPA. If any significant changes are made to the Strategy as part of one of these reviews, the revised Strategy will be provided to the DoP for approval.
Results of monitoring programs	<u>Storm water Quality</u> Water quality monitoring of the two storm water retention dams on site (EPA monitoring points 2 & 3) was conducted quarterly by EnvironConsulting Services in 2016. A review of the monitoring results found that: • Ammonia levels have increased slightly during the third quarter of 2016, however on the last monitoring round conducted in November 2016 the concentrations of ammonia have returned to their background levels from previous years. • pH levels slightly increased from below 8.5 in previous years, to above 8.5 in 2016. • Total suspended solids results greatly improved to below 10mg/L in 2016. • Heavy metal concentrations have remained with low concentrations in 2016. <u>Groundwater monitoring</u> Groundwater quality monitoring was conducted quarterly by EnvironConsulting

	Services in 2016 at EPA monitoring points 7-25. Groundwater quality has been maintained in 2016, when comparing monitoring results to previous years. <u>Leachate collection</u> Leachate quality monitoring was conducted quarterly at EPA monitoring point 26. Leachate levels were also monitored at Monitoring Point 27. Chemicals monitored as part of the leachate quality monitoring program, have reported concentrations similar to those found on previous years with the exception of ammonia, which has increased its concentrations levels. The concentrations of ammonia are expected to continue increasing as the landfill ages and the degradation process takes part within the waste mass. The leachate treatment plant has successfully managed the increased concentrations of ammonia during the year 2016 to levels below the trade waste agreement criteria that the licensee currently holds with Sydney Water.
Achievement of objectives and targets	The main objectives of the SWLMP is to detect, prevent and remediate water pollution. Detect: Groundwater sampling on site is undertaken at seventeen locations on a quarterly basis using appropriate measures in compliance with the EPA's requirements.

	The bores are monitored for groundwater level and in situ parameters (dissolved oxygen, pH, conductivity & temperature) and samples are extracted on a quarterly basis and analysed for the parameters specified on condition M2.2 of the Environmental Protection Licence. Results from the monitoring programme undertaken by the consultants are tabulated and indicators graphed against previous results to determine trends in groundwater quality. Reports are presented to the NSW EPA on an annual basis as required under the Site licence, or following a reported incident as defined by exceedance of agreed water quality environmental trigger levels which will be determined by the monitors following 24 months of monitoring. Prevent
relevance of the Policy, objectives and targets to current and future conditions	Continuation of all existing monitoring systems to meet policy objectives.
information and concerns of stakeholders	N/A