Environmental Management Plan

Foxglove Oval, Mount Colah

Hornsby Shire Council

28 May 2025

The Power of Commitment

Foxglove Oval Environmental Management Plan – Quick Start Guide

28 May 2025

NOTE: This Quick Start (QS) Guide is subject to, and must be read in conjunction with, the assumptions and limitations contained in the Environmental Management Plan (EMP) and the key terms and definition provided in Attachment 1 of this QS Guide.

The site

Hornsby Shire Council (Council) owns Foxglove Oval in Mount Colah, NSW (the site). The site is a former landfill that received putrescible and non-putrescible municipal wastes between 1970 and 1980. It was rehabilitated to publicly accessible sports fields in 1984 and has been used for that purpose since. A plan of the site is provided as Figure QS.1 (refer Attachment 2). Landfilled waste remains in place at the site. The landfilled waste and its associated contaminants present certain hazards to the environment and users of the site that must be managed. Council is managing those hazards via a comprehensive EMP.

The EMP and how it affects your activities

The management measures in the EMP must be implemented to minimise adverse impacts from landfilled waste and/or its associated contaminants. Site workers and licensed users (for example, sporting clubs) must complete their agreed activities in accordance with the requirements of the EMP.

To help site workers and licensed users comply with the EMP, Council has developed this QS Guide (which forms part of the EMP). The QS guide includes management procedures for certain activities at the site that site workers and/or licensed users may undertake (refer Attachment 3). Council expects site workers and licensed users to comply with those management procedures including their reporting requirements.

The issues you need to manage

Overview

Depending on the precise nature of the activities, site workers and licensed users will need to manage certain issues. Those issues will likely include:

– Work, health and safety matters
– Contamination related matters
– Known site infrastructure
– The potential presence of the general public

Further information on the issues identified above is provided in the following text.

Work, health and safety matters

Council expects that activity specific work, health and safety documentation will be developed and adhered to by site workers and/or licensed users as outlined in the management procedures (refer Attachment 3).

Contamination

The site has contamination related hazards that site workers need to be aware of and consider during the development of their activity specific safety documentation. A summary of the potential contamination related hazards and other relevant aspects is presented in Table 1 below.

Table 1 Summary of potential contamination related hazards

Contamination related hazard	Potential exposure pathways	Potential human health outcome	Examples of potential controls (Controls to be developed based on the specific activity and work location)
Contaminated soil, fill, and landfilled waste	Dermal (skin) contact Ingestion (eating, drinking etc.) Dust inhalation (breathing)	Health effects	– Personal protective equipment (PPE) like gloves, eye shield, long sleeves, long pants, boots, personal gas monitor (refer to image below for an example) and/or masks – Dust monitoring – Ground gas monitoring – Hot works procedures – Exclusion zone 
Landfill gases (for example, methane, carbon dioxide, carbon monoxide, hydrogen and hydrogen sulphide and trace gases)	Inhalation (breathing)	Fire/explosion Asphyxiation (suffocation)	– PPE like gloves, eye shield, long sleeves, long pants, boots, personal gas monitor and/or masks – Ground gas monitoring – Fire extinguisher – Exclusion zone
Leachate and leachate contaminated water	Dermal (skin) contact Ingestion (eating, drinking etc.)	Health effects	– PPE like gloves, eye shield, long sleeves, long pants, boots, personal gas monitor and/or masks – Ground gas monitoring – Exclusion zone

Known site infrastructure

The site has certain known above and below ground infrastructure that site workers and licensed users need to be consider during the development and implementation of their activities (including in the associated work, health and safety documentation). The location of known site infrastructure including subsurface services is shown on the figures provided in Attachment 2.

The potential presence of the general public

As the site is a publicly accessible park, it is noted that the general public may be present in the vicinity of activities being completed by site workers and/or site users. Council expects site workers and licensed users to minimise potentially adverse impacts upon the general public due to their activities.

Management procedures for your activities

The management procedures included in Attachment 3 provide details on steps to help reduce the likelihood of adverse impact from contamination upon the health and safety of site workers and licensed users while they are undertaking activities at the site.

The flow chart provided as Figure 1 directs site workers and licensed users to the management procedures specific to their proposed activities.

Council will assist site workers and licensed users to identify and select the management procedures relevant for the activities and potentially appropriate control measures.

The management procedures specify the records that must be provided by site workers to Council (refer Attachment 3).

A 20 x 20 metre grid is shown on the figures provided in Attachment 2. Council and site workers are required to use that grid as a reference for the location of their activities during instructions and records.

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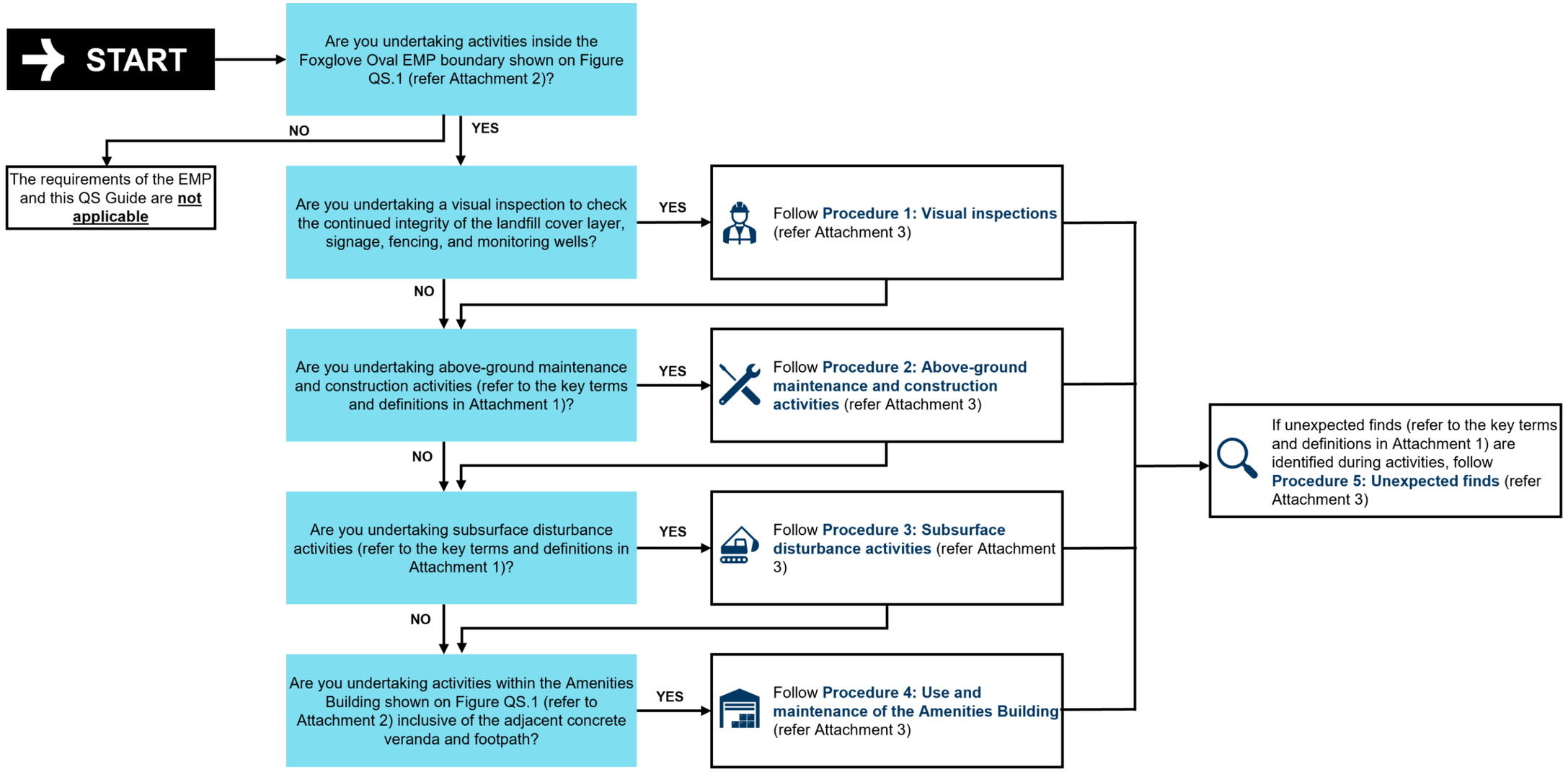

Figure 1 Management procedure identification flow chart

NOTE: Certain other management plans in addition to the EMP are in operation at the site (refer Section 4.4 of the EMP). Activities must also be undertaken in accordance with those management plans as relevant.

Council contact information

Key contacts in Council for contamination related matters at the site are provided below in Table 2 below.

Table 2 Key Council contacts

Role and contact	Contact details
Site Director **Hornsby Shire Council**	Hornsby Shire Council Customer Service Email: hsc@hornsby.nsw.gov.au Phone (24 hour): (02) 9847 6666 Address: PO Box 37, Hornsby NSW 1630 Steve Fedorow – Director, Community and Environment Email: SFedorow@hornsby.nsw.gov.au Phone: (02) 9847 6541 After hours: 0478 318 183
Legacy Site Manager **Hornsby Shire Council**	Amanda Walmsley – Legacy Site Project Manager Email: awalmsley@hornsby.nsw.gov.au Phone: (02) 9847 6069 After hours: 0457 519 387
Parks Manager **Hornsby Shire Council**	David Shiels – Branch Manager, Parks, Trees and Recreation Email: DSheils@hornsby.nsw.gov.au Phone: (02) 9847 6792 After hours: 0418 960 028
Council Supervisor (person in direct control of site works to be completed for Council) **Hornsby Shire Council**	To be confirmed with Council in advance of the works commencing

Attachments

Attachment 1

Key terms and definitions

The definitions of key terms used at the site in relation to the contamination hazards are provided in the table below.

Term	Definition
Above ground maintenance and construction activities	May include but are not limited to: – Vegetation and/or surface maintenance – Importing materials for gardens beds – Facilities maintenance – Line marking
Activity	Agreed activity undertaken at the site by either site workers or licensed users.
Contaminant	A chemical substance potentially derived from historical landfilling operations at the site that exceeds assessment criteria and may present a risk of harm to human health or the environment (i.e. something that is present and may require further assessment).
Contamination	The condition of land or water where any chemical substance potentially derived from historical landfilling operations at the site exceeds assessment criteria and may present a risk of harm to human health or the environment.
Fill of unknown origin	Imported material used across the site (including in the Chestnut Road Reserve, the Oval and the batters) for cover material. Localised areas of rubbish (typically non-putrescible waste that does not contain organic material) have been identified within the fill. An example of that is shown in the photograph below. More information is provided in Appendix E of the EMP. 
Landfill cover layer	The landfill cover layer is the clay-rich material that has been placed over the landfilled waste. It is the layer between the ground surface (for example, vegetation or handstand) and the landfilled waste. The depth of the landfill cover layer is variable and is not precisely known in many areas of the site. Investigations of the landfill cover layer to date have identified waste starting between 0.15 and 2.5 metres below ground level. More information is provided in Appendix E of the EMP.
Landfill gas	Potentially hazardous (for example, combustible, asphyxiant) ground gases produced by the degradation of landfilled waste (for example, methane, carbon dioxide, carbon monoxide, hydrogen and hydrogen sulphide and trace gases) and may be present anywhere across the site.
Landfilled waste	Putrescible and non-putrescible municipal waste materials placed at the site during landfilling operations. Examples of this are shown in the photographs below. More information is provided in Appendix E of the EMP. Landfilled waste is present across the majority of the site beneath the landfill cover layer.

Term	Definition
	 
Leachate	Contaminated water that has been produced inside the landfill, typically found in the waste, the leachate sump, the treatment plant and various dedicated leachate utilities. Leachate may be encountered during subsurface disturbance activities anywhere across the site. Rarely it may also be encountered sometimes at ground surface at the site.
Licensed user	Users (for example, sporting clubs) that have entered into an agreement with the Council to use the site's facilities (for example, Amenities Building and/or the Oval).
Maintenance of buildings	Repairs and improvements but not cleaning/cleansing works.
Rubbish	Loose material placed after landfilling operations ceased at the site (for example, windblown litter and other uncontrolled material)
Site worker	A Council employee or an external sub-contractor undertaking activities at the site.

Term	Definition
Subsurface disturbance activities	Works below the ground surface including all digging and excavation works at the site and penetration of hardstand surfaces (for example, the access road, carpark, concrete pathways, slab inside the Amenities Building).
Unexpected find	An unexpected find at the site may entail: – Contamination that is unexpected at the site based on existing information. Unexpected finds in that regard would include underground storage tanks, acid sulphate soils, no landfill cover layer (i.e. exposed landfilled waste at the site surface), large-scale ACM across the site surface) and/or – Contamination that is external to the known areas of contamination at the site based on existing information. Unexpected finds in that regard would include the identification of landfilled waste in the bushland areas to the north and/or west of the site

Attachment 2

Figures

- Figure QS.1 All known infrastructure – Overview
- Figure QS.1A All known infrastructure – Northern Region
- Figure QS.1B All known infrastructure – Eastern Region
- Figure QS.1C All known infrastructure – Southern Region
- Figure QS.1D All known infrastructure – Western Region
- Figure QS.1E All known infrastructure – Oval Region

Treated Leachate Tank

Leachate Treatment Area

Landfill Gas Venting System

Low Flow Inlet into Leachate Trench

Leachate Sump

Leachate Trench

Irrigation Header Tank

QS.1A Northern Region

QS.1D Western Region

QS.1E Oval Region

QS.1B Eastern region

Southern Region QS.1C

[Western Paddock]

[Northern Batter]

[Western Batter]

[Southern Batter]

[Carpark]

Chestnut Road Reserve

DIANELLA WAY

BANYULA TRAIL

EXCELSIOR ROAD

LANCELOT STREET

GLORIA CLOSE

SUE PLACE

OXLEY DRIVE

GLEESON CREEK

CARIBBEAN PLACE

FOXGLOVE ROAD

CAMELOT CLOSE

Legend

- Foxglove Oval EMP boundary
- EMP Grid (20 x 20 m)
- Leachate treatment infrastructure
- Building 1 (B1) - amenities building
- Sports field
- Playground
- Collection bore
- Vent
- Extent of landfill (approximate)
- 1975 disturbed land
- Leachate trench design
- [Surface Feature]
- Feeder pipe
- Drainage channel
- Former channel
- Watercourse

Monitoring locations

- GW - Shallow
- GW - Intermediate
- GW - Deep
- GW - Leachate
- Soil vapour
- Sub-slab pin
- Gas exchange vent

Sub-surface service pit and penetration GHD ID (approximate)

- Water line
- Potable water
- Electrical box
- Flood light pole
- Stormwater
- Leachate
- Sewer
- Unidentified
- Telstra
- Stormwater Pit

Legend

Utitilies (Approximate)

- W Water (Approx)
- D Stormwater (Approx)
- S Sewer (Approx)
- L Leachate (Approx)
- E Electrical (Approx)
- G Gas Pipe (Jemena)

The white grid lines are the subsurface sand slit drainage system installed in January 2011. The drains were installed to estimated depths of 75-100 mm. The current surface is grass for the playing field.

The EMP site boundary is defined as Lot 507 DP 752053, Lot 19 DP1002578, the Chestnut Road Reserve (Crown Land), the northern road verge on Foxglove Road, and the western road verge on Lancelot Street.

Paper Size ISO A3

0 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

All known infrastructure Overview

Project No. 12567731
Revision No. 0
Date 27/05/2025

FIGURE QS.1

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QS.1A
Northern Region

N

Leachate Treatment Area

Treated Leachate Tank

[Western Paddock]

[Northern Batter]

GLORIA CLOSE

LANCELOT STREET

The white grid lines are the subsurface sand slit drainage system installed in January 2011. The drains were installed to estimated depths of 75-100 mm. The current surface is grass for the playing field.

Legend

- Foxglove Oval EMP boundary
- Extent of landfill (approximate)
- Leachate treatment infrastructure
- Collection bore
- Vent
- EMP Grid (20 x 20 m)
- [Surface feature]
- Drainage channel
- Feeder pipe

Monitoring locations

- GW - Shallow
- GW - Intermediate
- GW - Deep
- GW - Leachate
- Soil vapour
- Sub-slab pin
- Gas exchange vent

Sub-surface service pit and penetration GHD ID (approximate)

- Flood light pole
- Stormwater
- Unidentified
- Stormwater Pit

Utilities (Approximate)

- W Water (Approx)
- D Stormwater (Approx)
- S Sewer (Approx)
- L Leachate (Approx)
- E Electrical (Approx)
- G Gas Pipe (Jemena)

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

All known infrastructure
Northern Region

Project No. 12567731
Revision No. 0
Date 28/05/2025

FIGURE QS.1A

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QS.1B
Eastern Region

[Carpark]

[Northern Batter]

Irrigation
Header Tank

Inlet

Outlet
Headwall

FOXGLOVE ROAD

LANCELOT STREET

The white grid lines are the subsurface sand slit drainage system installed in January 2011. The drains were installed to estimated depths of 75-100 mm. The current surface is grass for the playing field.

Legend

- Foxglove Oval EMP boundary
- Extent of landfill (approximate)
- 1975 disturbed land
- Leachate treatment infrastructure
- Building 1 (B1) - amenities building
- Playground
- Collection bore
- Vent
- EMP Grid (20 x 20 m)
- [Surface feature]
- Feeder pipe

Monitoring locations

- GW - Shallow
- GW - Intermediate
- GW - Deep
- GW - Leachate
- Soil vapour
- Gas exchange vent

Sub-surface service pit and penetration GHD ID (approximate)

- Water line
- Potable water
- Electrical box
- Flood light pole
- Stormwater
- Sewer
- Unidentified
- Telstra
- Stormwater Pit

Utilities (Approximate)

- D Stormwater (Approx)
- S Sewer (Approx)
- E Electrical (Approx)
- G Gas Pipe (Jemena)

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Paper Size ISO A3

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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

GHD

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

All known infrastructure
Eastern Region

Project No. 12567731
Revision No. 0
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FIGURE QS.1B

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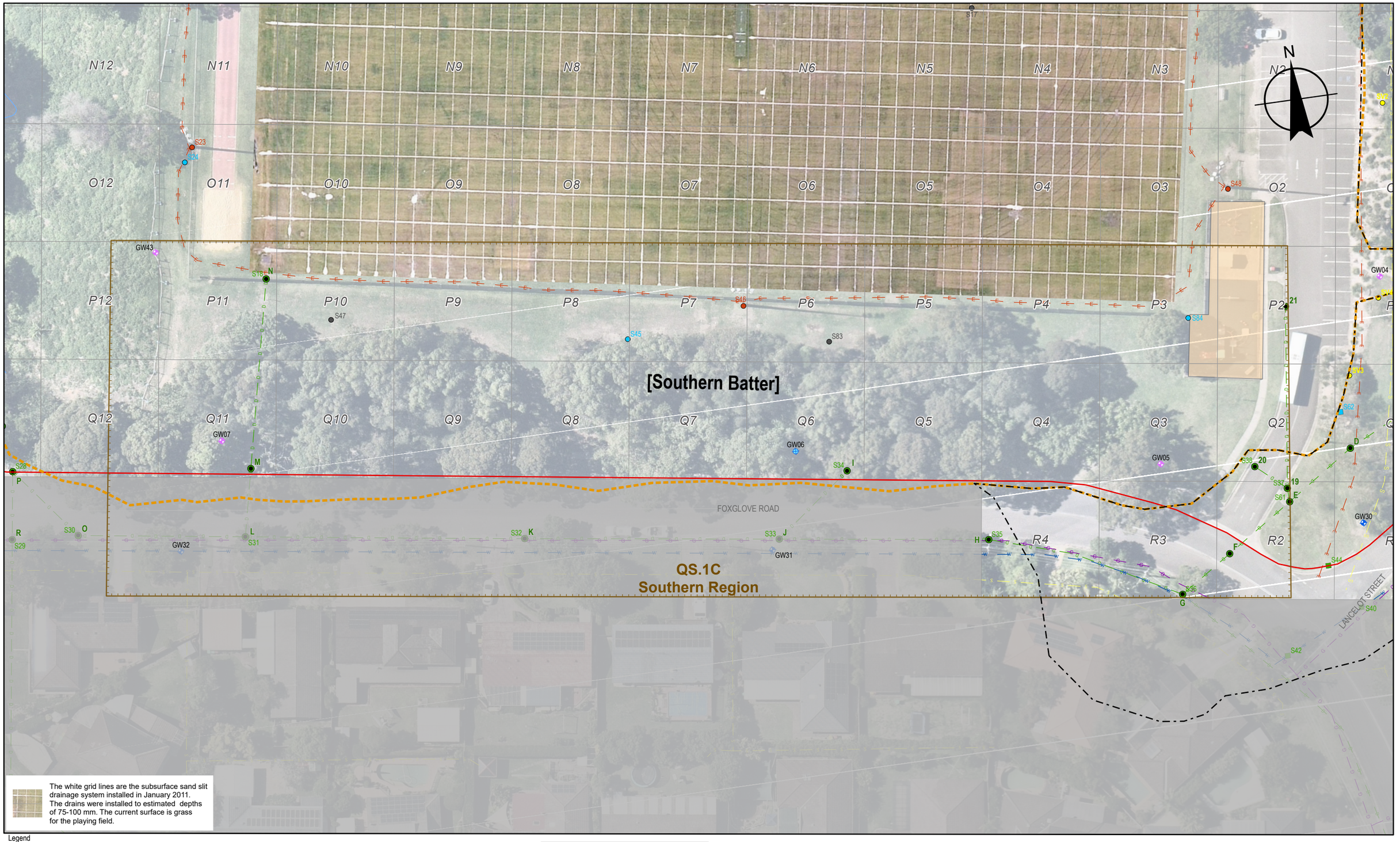

The white grid lines are the subsurface sand slit drainage system installed in January 2011. The drains were installed to estimated depths of 75-100 mm. The current surface is grass for the playing field.

Legend

- Foxglove Oval EMP boundary
- Extent of landfill (approximate)
- 1975 disturbed land
- Playground
- EMP Grid (20 x 20 m)
- [Surface feature]
- Watercourse

Monitoring locations

- GW - Intermediate
- GW - Deep
- GW - Leachate

Sub-surface service pit and penetration GHD ID (approximate)

- Water line
- Potable water
- Flood light pole
- Stormwater
- Sewer
- Unidentified
- Stormwater Pit

Utilities (Approximate)

- E Electrical (Approx)
- G Gas Pipe (Jemena)

The EMP site boundary is defined as Lot 507 DP 752053, Lot 19 DP1002578, the Chestnut Road Reserve (Crown Land), the northern road verge on Foxglove Road, and the western road verge on Lancelot Street.

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

GHD

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

All known infrastructure
Southern Region

Project No. 12567731
Revision No. 0
Date 27/05/2025

FIGURE QS.1C

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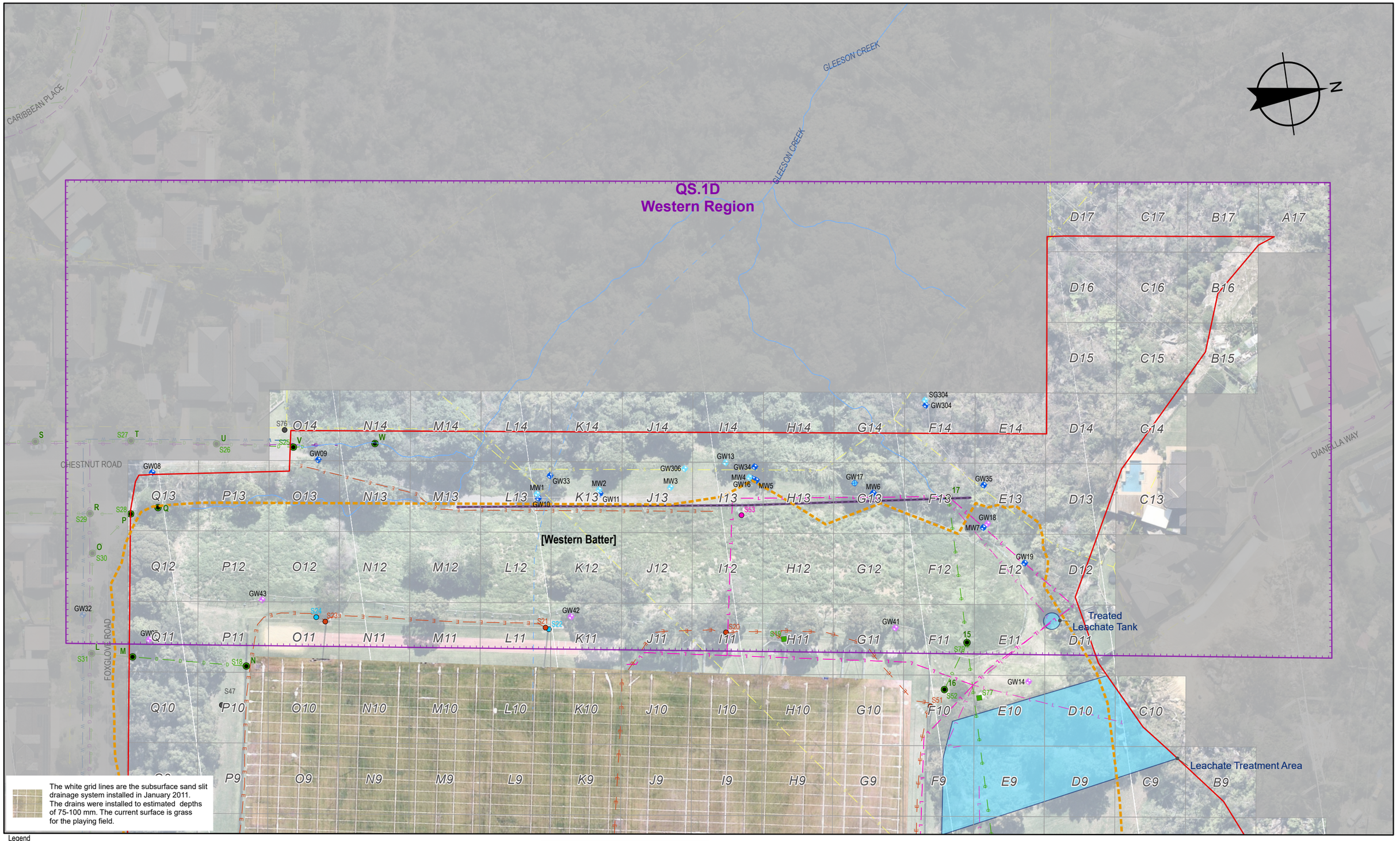
QS.1D
Western Region



The white grid lines are the subsurface sand slit drainage system installed in January 2011. The drains were installed to estimated depths of 75-100 mm. The current surface is grass for the playing field.

Legend

- Foxglove Oval EMP boundary
- Extent of landfill (approximate)
- Leachate treatment infrastructure
- EMP Grid (20 x 20 m)
- [Surface feature]
- Watercourse
- Former channel
- Leachate trench design

Monitoring locations

- GW - Shallow
- GW - Intermediate
- GW - Deep
- GW - Leachate

Sub-surface service pit and penetration GHD ID (approximate)

- Potable water
- Flood light pole
- Stormwater
- Leachate
- Unidentified
- Stormwater Pit

Utilities (Approximate)

- L Leachate (Approx)
- E Electrical (Approx)
- G Gas Pipe (Jemena)

The EMP site boundary is defined as Lot 507 DP 752053, Lot 19 DP1002578, the Chestnut Road Reserve (Crown Land), the northern road verge on Foxglove Road, and the western road verge on Lancelot Street.

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

All known infrastructure
Western Region

Project No. **12567731**
Revision No. **0**
Date **27/05/2025**

FIGURE QS.1D

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Legend

- Foxglove Oval EMP boundary
- Extent of landfill (approximate)
- 1975 disturbed land
- Leachate treatment infrastructure
- Building 1 (B1) - amenities building
- Playground
- Collection bore
- Vent
- EMP Grid (20 x 20 m)
- [Surface feature]

- Watercourse
- Former channel
- Leachate trench design
- Feeder pipe

Monitoring locations

- GW - Shallow
- GW - Intermediate
- GW - Deep
- GW - Leachate
- Soil vapour
- Gas exchange vent

Sub-surface service pit and penetration GHD ID (approximate)

- Water line
- Potable water
- Electrical box
- Flood light pole
- Stormwater
- Leachate
- Sewer
- Unidentified
- Telstra
- Stormwater Pit

Utilities (Approximate)

- D Stormwater (Approx)
- S Sewer (Approx)
- L Leachate (Approx)
- E Electrical (Approx)
- G Gas Pipe (Jemena)

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Paper Size ISO A3

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Metres

Map Projection: Transverse Mercator
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GHD

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

All known infrastructure
Oval Region

Project No. **12567731**
Revision No. **0**
Date **27/05/2025**

FIGURE QS.1E

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Attachment 3

Management procedures

Management Procedures – Overview

In the management procedures following, stakeholders have been identified as being primary and/or secondary. Further information on the stakeholders of this EMP is provided in the table below.

Primary Stakeholders (those with direct responsibilities within the EMP)	Hornsby Shire Council, including: – Director, Community and Environment – Branch Manager, Parks, Trees, and Recreation – Legacy Sites Project team, Environment Branch – Council Supervisor
Secondary Stakeholders (those who need to conduct activities in accordance with the EMP)	– Council workers – External workers engaged by Council (excluding Environmental Consultant) – External workers not engaged by Council (for example, public utility workers) – Licensed users (for example, sporting clubs) – Environmental Consultant – Site Auditor

Procedure 1: Visual inspections

Applicable Area	The land inside the 'Foxglove Oval EMP boundary' as shown on Figure QS.1 (refer Attachment 2).
Responsible parties	Council (Legacy Site Manager) or a delegate considered appropriate by Council
Objectives	The objective of the visual inspections is to check the continued integrity of the landfill cover layer, signage, fencing, and monitoring wells and to identify any matters requiring management action. The objective of the associated reporting is to document the visual inspections completed in a clear and concise format and to compare the findings from the inspections to the relevant requirements in the EMP.
Procedure	The following procedure will be implemented to address the objectives above. The inspections should be completed by the Legacy Site Manager or a delegate considered appropriate by Council. The following procedure shall be applied during visual inspections. **Visual inspection of the landfill cover layer:** – Walkover the area of the site that is covered by landfill cover at a maximum 25 metre spacing in a grid format. Visually assess the consistency of ground levels and cover, the material coverage should be a minimum of 80% vegetation or hardstand cover – Inspect any areas of apparent disturbance or damage to the landfill cover layer **Visual inspection of signage and fencing:** Visually inspect all signage and fencing in place at the site. Assess the suitability and condition of fencing and appropriateness of signage in relation to contamination present at the site and identify areas where signage may need amendment, repair and or installation. **Visual inspection of monitoring wells:** Visually inspect all monitoring wells at the site. Assess the suitability and condition of monitoring wells and identify areas where they may need amendment, repair and or installation. Inspections of the monitoring wells are undertaken during regular monitoring (refer Section 4.5 of the EMP) by the Environmental Consultant and reported to Council. Monitoring wells that are not regularly monitored should be visually inspected every two years. **Visual inspection after wet weather:** Visually inspect the site after wet weather. Assess the impact of surface water runoff, drainage, and presence of leachate seepage when rainfall at the on-site weather station exceeds 25 mm within a 24-hour period. If the on-site weather station is unavailable, the closest Bureau of Meteorology Station (Terrey Hills AWS 066059) should be used. Depending on the findings of the visual inspection, if leachate seepages and/or other issues (for example sedimentation and/or erosion) are identified, Council will identify and undertake appropriate actions within internally agreed timeframes. Such actions could include: – Fencing off certain areas to prevent access – Signage to warn of potential hazards – Closure of certain areas to public access – Remedial measures such as improving cover and/or stabilising areas **Reporting:** An appropriate checklist summarising each visual inspection event completed under the EMP must be prepared by the person undertaking the inspection. Example checklists for the four types of inspections required are provided in Appendix D of the EMP. **Review of checklists:** The Legacy Site Manager must review the completed checklists with consideration of EMP requirements and arrange for appropriate actions (for example, additional monitoring, rectification works) to be undertaken and documented as necessary.
Frequency	**Visual inspections:** – 6-monthly for landfill cover layer, signage and fencing and active (i.e. in use) monitoring wells – Every 2 years for monitoring wells that are not in active use – Inspections of the site following a wet weather event (i.e. 25 mm of rain in 24 hours as per the GWMP (GHD, 2024)) should be undertaken at least once a year – As required if Council is notified of a breach or potential issue or identifies issues when on site **Reporting**: Within four weeks of a visual inspection event
Records	Copies of all completed visual inspection checklists will be retained by Council.

Procedure 2: Above-ground maintenance and construction activities

Applicable Area	The land inside the 'Foxglove Oval EMP boundary' as shown on Figure QS.1 (refer Attachment 2).
Responsible parties	Secondary Stakeholders as relevant to the activity with support from Council.
Key terms	**Above-ground maintenance and construction activities** may include but are not limited to: – Vegetation and/or surface maintenance – Importing materials for gardens beds – Facilities maintenance – Line marking
Objective	To help prevent contamination related hazards impacting upon the health and safety of persons undertaking above-ground maintenance and construction activities at the site.
Procedure	The following procedure will be implemented to address the objective above: – Workers at the site will undertake an induction endorsed and arranged by the Legacy Site Manager. The induction must consider the guidance notes provided below – Workers shall prepare a works specific safe work method statement (SWMS) for the proposed works and provide it to Council Supervisor for review prior to commencing the works – Once the above steps are addressed and Council has reviewed the SWMS, works can proceed in accordance with the SWMS – If works are being undertaken at the Amenities Building (Building 1) shown on Figure QS.1 (refer Attachment 2) inclusive of the adjacent concrete veranda and footpath, **Procedure 4: Use and maintenance of the Amenities Building** must be followed – If maintenance works require subsurface disturbance activities (i.e. works below the ground surface including excavation and penetration of hardstand surfaces (for example, access road, carpark, concrete pathways, slab inside the Amenities Building), refer to **Procedure 3: Subsurface disturbance** – Should unexpected finds be encountered during the works, **Procedure 5: Unexpected finds** must be followed – A log of the works undertaken must be prepared and kept by Council **Induction guidance notes:** – Items in the induction may include: • An overview of the site and its contamination related matters, the contamination control measures, the EMPs stakeholders and their key responsibilities, and the general need of the EMP and key requirements • An outline of the maintenance or works approval and record keeping processes outlined in Procedures 1 to 5 and any other Council record keeping processes • Minimum PPE requirements for the site • The recorded locations of the EMP (refer Section 2.3 of the EMP) – A register for inducted workers to sign will be created and maintained by the Legacy Site Manager to confirm that they have read and understood the EMP and relevant procedures before undertaking works at the site. Workers will need to re-sign every time the EMP is updated in advance of new works proceeding
Frequency	**Inductions:** Prior to commencing each activity or as otherwise agreed with the Legacy Site Manager **Above-ground maintenance and construction activities:** As required
Records	**Inductions:** Records of inductions must be kept by Council for a minimum of 2 years. **Above-ground maintenance and construction activities:** A log of above-ground maintenance and construction activities will be prepared and retained by Council. That log will be accessible to the Legacy Site Manager who will review it annually to confirm its ongoing appropriateness. The log shall include such information as date, time, activity completed, party undertaking the activity and location at the site.

Procedure 3: Subsurface disturbance activities

Applicable Area	The land inside the 'Foxglove Oval EMP boundary' as shown on Figure QS.1 (refer Attachment 2).
Responsible parties	Secondary Stakeholders as relevant to the activity with support from Council.
Key terms	– **Landfill cover layer:** The depth of the landfill cover layer is variable and is not precisely known in many areas of the site. Investigations of the landfill cover layer to date have identified waste starting between 0.15 and 2.5 metres below ground level. The landfill cover layer is formed of earthen materials. More information on the landfill cover layer is provided in Appendix E of the EMP – **Fill of unknown origin:** Imported material used across the site (including in the Chestnut Road Reserve, the Oval and the batters) for cover material. Localised areas of rubbish (typically non-putrescible waste that does not contain organic material) have been identified within the fill – **Landfilled waste:** Waste materials including putrescible and non-putrescible wastes that were landfilled at the site – **Subsurface disturbance activities:** Works below the ground surface including all digging and excavation works at the site and penetration of hardstand surfaces (for example, the access road, carpark, concrete pathways, slab inside the Amenities Building)
Objective	To help prevent contamination related hazards impacting upon the health and safety of persons undertaking subsurface disturbance activities at the site and also site users and neighbouring residents.
Procedure	Subsurface disturbance activities (i.e. below the ground surface at the site) shall only be undertaken when absolutely necessary and all measures should be undertaken to maintain the integrity of the surface layer (for example, vegetation or hardstand), landfill cover layer and subsurface drainage layer/system (if present). All excavations/trenches should be considered confined spaces based on the potential for entry of landfill gas into the trench. The *Code of practice: Confined spaces* (SafeWork NSW, 2022) provides guidance on how to manage risks associated with confined spaces. The relevant parts of the following procedure will be implemented to address the objective above: – Workers at the site will undertake an induction endorsed and arranged by the Legacy Site Manager. The induction must consider the guidance notes provided below – Workers shall prepare a works specific safe work method statement (SWMS) for the proposed works and provide it to Council Supervisor for review prior to commencing the works. The SWMS should consider the Guidance notes provided below – If there is the potential to exhume landfilled waste during subsurface works, an application for the exhumation of waste needs to be submitted by Council to the NSW EPA and approved by the NSW EPA prior to any subsurface works proceeding (this is a legal requirement) – In some scenarios, a Remediation Action Plan (RAP), design works and/or validation works may be required. For such works (for example, for new structures to be built), workers shall prepare a works specific Construction Environmental Management Plan (CEMP) and provide it to the Council Supervisor for review by the Legacy Site Manager (or an appropriate delegate) prior to the works commencing – Once the above steps are addressed and Council has reviewed the SWMS (and CEMP if required), works can proceed in accordance with the SWMS (and CEMP as relevant) – If maintenance works are being undertaken in the Amenities Building (inclusive of the adjacent concrete veranda and footpath), **Procedure 4: Use and maintenance of the Amenities Building** must be followed – Should unexpected finds be encountered during the works, **Procedure 5: Unexpected finds** must be followed – Records of all works undertaken must be kept by Council (refer to reporting requirements below for details of the type of information that should be recorded) **Reporting:** Council must ensure that a report (for example, a summary of the works or validation report) documenting each subsurface disturbance activity completed under the EMP is prepared by the person/party completing the activity. Each report shall contain details of the following (as relevant): • Type and date of subsurface works undertaken • Name and organisation of person that undertook the subsurface works • Observations made during the subsurface works • As-constructed plans, surveys, and/or photographs of the works • Notes of activities undertaken during the subsurface works • Any relevant recommendations for future monitoring or implementation of the EMP **Guidance notes:** **Inductions:** – Items in the induction may include: • An overview of the site and its contamination related matters, the contamination control measures, the EMPs stakeholders and their key responsibilities, and the general need of the EMP and key requirements • An outline of the maintenance or works approval and record keeping processes outlined in Procedures 1 to 5 and any other Council record keeping processes • Minimum PPE requirements for the site • The recorded locations of the EMP (refer Section 2.3 of the EMP) – A register for inducted workers to sign will be created and maintained by the Legacy Site Manager to confirm that they have read and understood the EMP and relevant procedures before undertaking works at the site. Workers will need to re-sign every time the EMP is updated in advance of new works proceeding **Soil and water management:** When undertaking subsurface disturbance, several distinct layers may require excavation including: – Surface layer (for example, vegetation or handstand) – Landfill cover layer – Underlying fill of unknown origin – Subsurface drainage layer/system – Landfilled waste

	The materials should be kept segregated during all stages of the works. Where materials become mixed at any stage, then the mixed materials shall be regarded as contaminated soils until tested and classified (as per relevant NSW EPA requirements) for disposal to an appropriate licenced facility (will require NSW EPA approval) or reused on site. Lining should be placed under the areas used for the stockpiling materials to prevent potentially mixing with non-impacted soils, and impacted material is covered with plastic lining to prevent potential exposure. Stockpiles should be appropriately bunded and sediment controls installed around them to prevent erosion/contaminated run-off from the stockpiled materials. Where per- and polyfluoroalkyl substances (PFAS) is considered a potential contaminant, consideration should be given to the requirements for stockpiling outlined in the *PFAS National Environmental Management Plan, Version 3.0* (HEPA, 2025). **New structures:** No structures (for example, new buildings) are to be erected on the site without an assessment of contamination and landfill gas related risks and information outlining how the structure's design will address those risks. Approval documentation and a CEMP will also be required. **Reinstatement and repair of surface and subsurface layers:** – As possible, the landfill cover layer, vegetation and subsurface sand slit drainage system (if encountered) should be reinstated immediately at the cessation of any subsurface works – Any breaches in the landfill cover layer should be repaired within one day of identification by Council or notification to Council by its representative. Reinstatement shall be to a similar standard as existed prior to the subsurface works and may require earth compaction equipment. The landfill cover layer should be inspected by the Legacy Site Manager (or an appropriate delegate) (refer **Procedure 1: Visual inspections and associated reporting**) to ensure that it has been reinstated to its previous state – Where the landfill cover layer cannot be repaired within the timeframe identified above, the area of the breach shall be fenced and signage installed until reinstatement works are undertaken – Should landfilled waste be encountered, Council must be notified immediately and appropriate arrangements for managing that waste be identified within one day – Erosion and sediment controls, if necessary, during and at completion of works should be assessed for each work location – Suitability of any imported materials to be assessed prior to importation to site and documented (appropriate material information to form part of the developed documents) – Any waste materials to be removed from site to be classified (in accordance with NSW EPA requirements) and documented prior to disposal off site **Potential or actual asbestos finds:** Refer to pages 27 and 28 of the *Hornsby Shire Council Asbestos Management Determination Plan POL00424* (Hornsby Shire Council, 2014). In summary, that document outlines the following: – Stop any excavating or digging activities that may disturb the asbestos – Notify your Supervisor – Secure area with barrier boards, tape, witches hats, etc. (as appropriate) to prevent persons gaining access to the area – Cover or enclose exposed asbestos if this is safe to do so – Inform stakeholders if the hazard has potential to impact them – Arrange for assessment of site where uncertain if actual asbestos – An Asbestos Work Permit must be obtained and authorised by the responsible supervisor prior to starting any in groundwork involving asbestos or once asbestos is discovered. If more than 10 m^2 of asbestos is identified, notification to SafeWork NSW must be conducted as part of Asbestos Work Permit – Only those employees, who have completed asbestos training and/or specific asbestos work procedure training, should engage in picking up asbestos – All disposal receipts are to be recorded. If disposing to the Thornleigh Community Recycling Centre stillage, the Legacy Site Manager must be notified to allow for tipping receipts to be organised through the Hornsby Shire Council Waste branch
Frequency	**Inductions:** Prior to commencing each activity or as otherwise agreed with the Legacy Site Manager **Subsurface disturbance activities:** As required **Reporting:** – Material importation: Prior to importation to site of associated materials – Wast classification: Prior to removal of associated waste from the site – Works activity: Within four weeks of subsurface disturbance works or other as deemed appropriate by the Legacy Site Manager dependent upon the nature of the works completed
Records	**Inductions:** Records of inductions must be kept by Council for a minimum of 2 years **Subsurface disturbance activities:** After the completion of any subsurface disturbance activities, documentation shall be provided to the Council Supervisor and Legacy Site Manager. That documentation must be retained by Council.

Procedure 4: Use and maintenance of the Amenities Building

Applicable Area	The Amenities Building (Building 1) shown on Figure QS.1 (refer Attachment 2) inclusive of the adjacent concrete veranda and footpath.
Responsible parties	Secondary Stakeholders as relevant to the activity with support from Council.
Key terms	**Licensed Users:** Users (for example, sporting clubs) that have entered into an agreement with the Council to use the site's facilities (for example, the Amenities Building and/or the Oval). **Maintenance of buildings:** Repairs and improvements but not cleaning/cleansing works.
Objective	The Amenities Building is used by site users, licensed users and by Council. The objective of this procedure is to help prevent contamination and landfill gas related hazards impacting upon the health and safety of persons using and maintaining the Amenities Building.
Procedure	The relevant parts of the following procedure will be implemented to address the objective above: **Use:** The Amenities Building must be used in accordance with the signage on the Amenities Building unless otherwise advised by Council. It is noted that: – Smoking and the use of naked flames is not allowed in or around the Amenities Building – BBQs can only be used in certain areas around the Amenities Building as agreed with Council via the licence agreement – Elevated methane concentrations around the perimeter of the Amenities Building have been detected on occasion. Council has been managing that matter via the escalation and de-escalation process outlined in Appendix C of the Gas and Water Monitoring Plan (GWMP) (GHD, 2024) – Senior level personnel from each licensed user will undertake an induction endorsed and arranged by the Legacy Site Manager **Maintenance:** – Maintenance works at and around the Amenities Building must only be undertaken by Primary or Secondary Stakeholders (excluding licensed users) as agreed with Council – Workers at the site will undertake an induction endorsed and arranged by the Legacy Site Manager. The induction must consider the guidance notes provided below – Workers shall prepare a works specific safe work method statement (SWMS) for the proposed works and provide it to Council Supervisor for review prior to commencing the works – Once the above steps are addressed and Council has reviewed the SWMS, works can proceed in accordance with the SWMS – If maintenance works require subsurface disturbance activities (i.e. works below the ground surface including excavation and penetration of hardstand surfaces (for example, access road, carpark, concrete pathways, slab inside the Amenities Building), refer to **Procedure 3: Subsurface disturbance** – Should unexpected finds be encountered during the works, **Procedure 5: Unexpected finds** must be followed – Records of all works undertaken must be kept by Council (refer to reporting requirements below for details of the type of information that must be recorded) **Reporting:** Council must ensure that maintenance works reports summarising each maintenance activity completed at the Amenities Building under the EMP are prepared by the person/party completing the activity. The following details must be documented (as relevant): • Type and date of maintenance works undertaken • Name and organisation of person that undertook the maintenance works • Observations made during the maintenance works • As-constructed plans, surveys, and/or photographs of the works • Notes of activities undertaken during the maintenance works • Any relevant recommendations for future monitoring or implementation of the EMP **Induction guidance notes:** – Items in the induction may include: • An overview of the site and its contamination related matters, the contamination control measures, the EMPs stakeholders and their key responsibilities, and the general need of the EMP and key requirements • An outline of the maintenance or works approval and record keeping processes outlined in **Procedures 1 to 5** and any other Council record keeping processes • Minimum PPE requirements for the site • The recorded locations of the EMP (refer Section 2.3 of the EMP) – A register for inducted workers to sign will be created and maintained by the Legacy Site Manager to confirm that they have read and understood the EMP and relevant procedures before undertaking works at the site. Workers will need to re-sign every time the EMP is updated in advance of new works proceeding
Frequency	**Inductions:** – Site workers: Prior to commencing each activity or as otherwise agreed with the Legacy Site Manager – Licensed users: Annually or as deemed appropriate by the Legacy Site Manager **Maintenance works:** As required **Reporting:** Within four weeks of maintenance works
Records	**Inductions:** Records of inductions must be kept by Council for a minimum of 2 years **Maintenance works:** After the completion of any maintenance works at the Amenities Building, a summary of the works shall be provided to Council Supervisor and Legacy Site Manager. That documentation must be retained by Council.

Procedure 5: Unexpected finds

Applicable Area	The land inside the 'Foxglove Oval EMP boundary' as shown on Figure QS.1 (refer Attachment 2).
Responsible parties	Secondary Stakeholders as relevant to the activity with support from Council.
Key terms	**Unexpected finds** may entail: – Contamination that is unexpected at the site based on existing information. Unexpected finds in that regard would include underground storage tanks, acid sulphate soils, no landfill cover layer (i.e. exposed landfilled waste at the site surface), large-scale ACM across the site surface) and/or – Contamination that is external to the known areas of contamination at the site based on existing information. Unexpected finds in that regard would include the identification of landfilled waste in the bushland areas to the north and/or west of the site
Objective	To help prevent contamination related hazards impacting upon the health and safety of persons undertaking activities at the site.
Procedure	The relevant parts of the following procedure will be implemented to address the objective above. **If unexpected finds are identified during activities at the site, the following procedure will be followed:** – If unexpected finds are identified, all activities should cease and an exclusion zone should be established around the unexpected find to temporarily secure the area – Council Supervisor and Legacy Site Manager should be notified of the find and shall approve the recommencement of activities only if appropriate controls are in place – The location, type, form, volume, physical and chemical characteristics of the unexpected find will be assessed by an appropriately qualified and experienced Environmental Consultant – The proposed strategy to deal with the characterised material should be undertaken by an appropriately qualified Environmental Consultant in accordance with the relevant guidance detailed in Section 1.7 of the EMP **Reporting:** Council must ensure that all unexpected finds are documented. The following details should be documented (as relevant): – Type and date of unexpected find – Name and organisation of person that found the unexpected find – Observations of the unexpected find – As-constructed plans, surveys, and/or photographs of the unexpected find – Notes of activities undertaken during the management of the unexpected find – Control measures taken to manage unexpected find – Any relevant recommendations for future monitoring, potential sampling, or for the ongoing implementation of the EMP
Frequency	**Unexpected finds:** Upon identification **Reporting:** Within four weeks of unexpected find
Records	Details of all unexpected finds must be documented and provided to Council Supervisor and Legacy Site Manager. That documentation must be retained by Council.

Project name		Foxglove Oval Updated VMP Works					
Document title		Environmental Management Plan | Foxglove Oval, Mount Colah					
Project number		12567731					
File name		Foxglove Oval_EMP_draft.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S4	0	J. Leeder	M. Welsh		M. Welsh		28/05/2025

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Acknowledgement of Country

GHD acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land, water and sky throughout Australia on which we do business. We recognise their strength, diversity, resilience and deep connections to Country. We pay our respects to Elders of the past, present and future, as they hold the memories, knowledges and spirit of Australia. GHD is committed to learning from Aboriginal and Torres Strait Islander peoples in the work we do.

Acronyms and glossary of terms

Term	Definition
% v/v	Percentage volume per volume
Activity	Agreed activity undertaken at the site by either Council or external workers or licensed users
BYDA	Before You Dig Australia
CEMP	Construction Environmental Management Plan
Council	Hornsby Shire Council
Contaminant	A chemical substance potentially derived from historical landfilling operations at the site that exceeds assessment criteria and may present a risk of harm to human health or the environment (i.e. something that is present and may require further assessment)
Contamination	The condition of land or water where any chemical substance potentially derived from historical landfilling operations at the site exceeds assessment criteria and may present a risk of harm to human health or the environment
CSM	Conceptual Site Model
CUN	Clean Up Notice
EMP	Environmental Management Plan
GWMP	Gas and Water Monitoring Plan
Key contaminant	A key contaminant is a contaminant that is a risk driver as it presents a potentially unacceptable risk to receptors without EMP controls, and it has the potential to migrate off site (i.e. something that is present is a key risk driver at the site)
LEL	Lower Explosive Limit
Landfilled waste	Putrescible and non-putrescible municipal waste materials placed at the site during landfilling operations
Licensed user	Users (for example, sporting clubs) that have entered into an agreement with Council to use the site's facilities (for example, the Amenities Building and/or the Oval)
mbgl	metres below ground level
NEPC	National Environmental Protection Council
NSW EPA	New South Wales Environmental Protection Authority
OMP	Operation and Maintenance Plan (for the landfill gas venting system on the site's Northern Batter)
Oval	The sports fields located at the site
PAH	Polycyclic aromatic hydrocarbons
PFAS	Per- and poly- fluoroalkyl substances
PFOS	Perfluorooctanesulfonic acid
PFHxS	Perfluorohexanesulfonic acid
Potential contaminant	A chemical substance potentially derived from historical landfilling operations that may be present at the site (i.e. something that may be present)
QS Guide	Quick Start Guide

Term	Definition
Rubbish	Loose material placed after the landfilling operations ceased at the site (for example, windblown litter and other uncontrolled material)
Site	Lot 507 DP752053, Lot 19 DP1002578, and the Chestnut Road Reserve (Crown Land)
SPR	Source-Pathway-Receptor
SWMS	Safe Work Method Statement
TRH	Total recoverable hydrocarbons
VMP	Voluntary Management Proposal

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1. Introduction

1.1 Overview

Hornsby Shire Council (Council) owns and manages Foxglove Oval in Mount Colah, NSW (the site). The site is a landfill that received both putrescible and non-putrescible municipal waste (landfilled waste) between 1970 and 1980. It was rehabilitated to sports fields in 1984 and has been used for that purpose since. The site is shown on Figure 1.1 following.

In relation to the historical landfilling operations at the site, this active[1] Environmental Management plan (EMP) documents the following:

– Background information including identification, background details, history, and uses of the site (Section 1.6 and 3.1)
– Management structure and communication (Section 2)
– Description of existing/residual contamination at the site (Section 3)
– Environmental management measures for the site (Section 4)

Council is responsible for the implementation and review of this EMP.

It is noted that throughout this document the term 'contamination' refers to the condition of land or water where any chemical substance potentially derived from historical landfilling operations at the site exceeds assessment criteria and presents a risk of harm to human health or the environment.

1.2 Purpose

The purpose of this EMP is to describe the management actions to be implemented at the site to reduce the likelihood of contamination at the site from adversely impacting upon human health or the environment.

1.3 Objective

The objective of this EMP is to document the:

– Current state of contamination
– Mitigation measures and monitoring requirements for the contamination and landfilled waste present on site

1.4 Scope of works

The scope of works completed by GHD during the development of this EMP was as follows:

– Development of a draft EMP outline and procedures
– Engagement with Council to discuss the draft EMP outline and procedures
– Preparation of this EMP including its associated 'Quick Start (QS) Guide' at the front of this EMP

1.5 Assumptions

A number of assumptions have been made during the development of this EMP including those outlined in its text and the following:

– That the site will be owned and managed by Council and will be primarily used for recreational purposes in its existing configuration

[1]This EMP is considered to be 'active' as per (NSW EPA, 2020) because of the presence and operation of the site's leachate collection and treatment system.

– That this EMP only needs to apply to the land inside the 'Foxglove Oval EMP Boundary' as shown on Figure 1.1 following
– That this EMP only needs to provide guidance for contamination relating to historical landfilling operations at the site (i.e. not other potential contamination sources of impact at the site such as overflows and/or leakages from local sewers and/or stormwater infrastructure (where present on the site)). This EMP does not cover management of those assets (whether owned by Council or a third party such as Sydney Water)
– That this EMP will operate alongside a number of other management plans (refer Section 4.4 following) and will be informed by them
– This EMP must be read in conjunction with the QS Guide at the front of this EMP

1.6 Background

A declaration (Declaration) of 'significantly contaminated land' by the New South Wales Environment Protection Agency (NSW EPA) was issued to Council on 18 February 2020 *(Declaration of significantly contaminated land, Declaration Number 20201102; Area Number 3453)* due to the potential for off-site migration of landfill gases including methane and carbon dioxide, and landfill leachate including ammonia, heavy metals, and organic contaminants. A copy of the Declaration is provided in Appendix F.

In response to that Declaration, Council entered into a Voluntary Management Proposal (VMP) *(Notice of Approved Voluntary Management Proposal Notice No. 20201708; Declaration No. 20201102; Area No. 3453)* agreement with the NSW EPA in April 2020. As part of the VMP works, a *Sampling, Analysis and Quality Plan* (GHD, 2020b) (SAQP) and an *Interim Environmental Management Plan* (GHD, 2020a) (IEMP) were developed. Those documents summarised the state of knowledge in relation to the site and actions required to further manage and/or understand the contamination mentioned in the Declaration at that time.

Since that time significant investigative works have been completed and are ongoing at the site to further manage and understand the contamination identified in the Declaration. Those works include:

– Soil investigation works including the site wide investigation documented in the *Foxglove Oval Landfill Support Works – Supplementary Contamination Investigation* (GHD, 2022) (SCI) and soil investigations completed in 2024 in the Northern Batter and the Western Batter as outlined in the draft *Northern Boundary Soil Assessment* (GHD, 2025b) and draft *Western Batter Soil Assessment* (GHD, 2025d) respectively
– Geology and hydrogeological investigations, hydraulic conductivity assessments and contaminant distribution assessments as documented in the *Targeted Site Investigation and 2023 Annual Report* (GHD, 2025c) (TSI)
– Additional environmental monitoring of ground gas and water (groundwater, surface water, leachate and seepage) (ongoing)
– Installation of additional monitoring wells (ongoing)
– Installation (completed) and validation of a landfill gas venting system on the site's Northern Batter (in progress)
– Investigation of the physical condition and operation of the leachate, stormwater and on-site sewer systems (ongoing)

Furthermore, a Clean-up Notice (CUN) (Clean-up Notice, Notice No. 3502130, Reference No. REG-2019, 14/04/2020), a variation of the CUN (Variation of Clean-up Notice, Notice No. 3511273, Reference No. VN-1531, 27/02/2025) and an updated VMP (Notice of Approved Voluntary Management Proposal, Notice No. 20221702; Declaration No. 20201102; Area No. 3453) have been issued by the NSW EPA to Council. The Variation of Clean-up Notice and updated VMP are provided in Appendix F.

1.7 Relevant guidelines

This EMP has been prepared with consideration of the requirements of the Declaration, current CUN, current VMP, and guidance relevant to the preparation of EMPs provided in the following documents:

– NSW EPA (2017) *Contaminated Land Management – Guidelines for the NSW Site Auditor Scheme*
– NSW EPA (2020) *Consultants reporting on contaminated land – Contaminated Land Guidelines*
– NSW EPA (2022) *Preparing environmental management plans for contaminated land: Practice note*

1.8 Legal enforceability

The site has been declared 'significantly contaminated land' by the NSW EPA and is currently being regulated by the NSW EPA under the VMP which includes reference to this EMP. As such, currently this EMP is enforceable under the VMP[2]. The Northern Batter (refer Figure 1.1 following) is subject to an additional enforcement mechanism in relation to landfill gas migration (the CUN).

1.9 Limitations

This report: has been prepared by GHD for Hornsby Shire Council and may only be used and relied on by Hornsby Shire Council for the purpose agreed between GHD and Hornsby Shire Council as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Hornsby Shire Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

GHD has prepared this report on the basis of information provided by Hornsby Shire Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

This report contains procedures for implementation at the site to manage potential exposure pathways from the identified contamination. The procedures should not be used for purposes other than those for which they are intended.

Except as otherwise expressly stated in this Report, GHD makes no warranty or representation as to the presence or otherwise of asbestos and/or asbestos containing materials ("ACM") on the site. If fill material has been imported on to the site at any time, or if any buildings have been demolished on the site or material from such buildings disposed of on the site (particularly if the buildings were constructed prior to 1990), the site may contain asbestos or ACM.

[2] It is noted that following removal of the VMP by NSW EPA, another legally enforceable mechanism for the EMP will need to be established by Council.

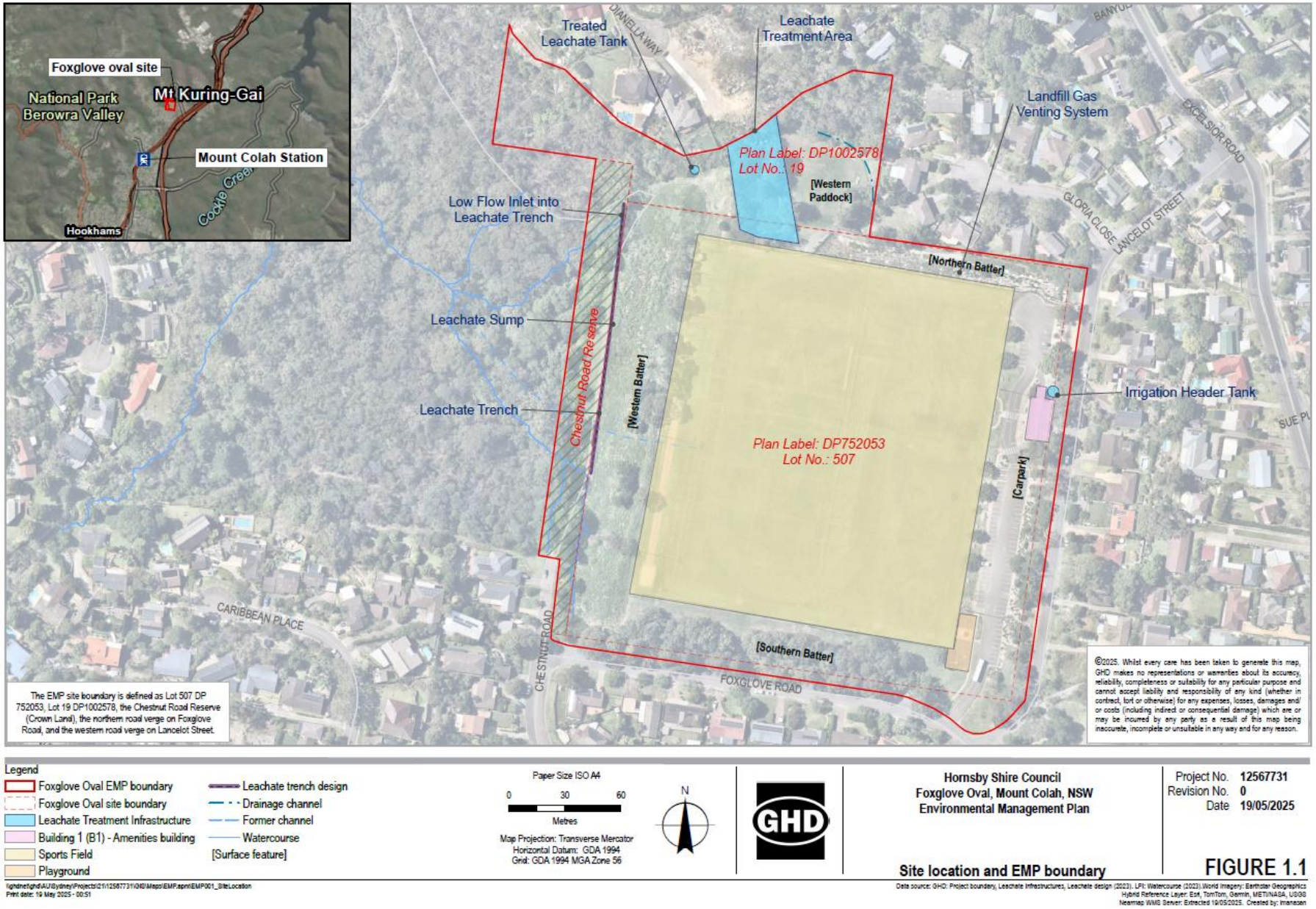

Figure 1.1 Site Location and EMP boundary

2. Management structure and communication

2.1 Stakeholders

In this EMP, stakeholders have been identified as being primary, secondary, or tertiary. Further information on the stakeholders of this EMP is provided in Table 2.1 below.

Table 2.1 Stakeholder identification

Primary Stakeholders (those with direct responsibilities within the EMP)	Hornsby Shire Council, including: – Director, Community and Environment – Branch Manager, Parks, Trees, and Recreation – Legacy Sites Project team, Environment Branch – Council Supervisor
Secondary Stakeholders (those who need to conduct activities in accordance with the EMP)	– External workers engaged by Council (excluding Environmental Consultant) – External workers not engaged by Council (for example, public utility workers) – Licensed users (for example, sporting clubs) – Environmental Consultant – Site Auditor
Tertiary Stakeholders (those who have an indirect association and/or have the potential to be impacted by activities undertaken in accordance with the EMP)	– Visitors, general public, and recreational users – NSW EPA

2.2 Roles and responsibilities

The implementation of this EMP is the responsibility of Council (specifically the Director, Community and Environment). Table 2.2 below presents the roles and responsibilities of the Primary and Secondary Stakeholders and the Site Auditor (a Tertiary Stakeholder) in relation to this EMP.

Table 2.2 Roles and responsibilities of Primary and Secondary Stakeholders and the Site Auditor (a Tertiary Stakeholder) in relation to this EMP

Role	Responsible Party	Responsibilities
Primary Stakeholders		
Site Director	**Hornsby Shire Council** Director, Community and Environment **Contact details:** Hornsby Shire Council Customer Service Email: hsc@hornsby.nsw.gov.au Phone (24 hour): (02) 9847 6666 Address: PO Box 37, Hornsby NSW 1630 Steve Fedorow – Director, Community and Environment: Email: SFedorow@hornsby.nsw.gov.au Phone: 02 9847 6541 After hours: 0478 318 183	The implementation of this EMP is the responsibility of Council. The Site Director is accountable for the implementation of the EMP and has delegated responsibility for the EMP's implementation to the Legacy Site Manager.
Parks Manager	**Hornsby Shire Council** Branch Manager, Parks, Trees, and Recreation **Contact details:** David Shiels – Branch Manager, Parks, Trees and Recreation Email: DSheils@hornsby.nsw.gov.au Phone: (02) 9847 6792 After hours: 0418 960 028	The Parks Manager is responsible for day to day running of the site.
Legacy Site Manager	**Hornsby Shire Council** Legacy Site Project Manager **Contact details:** Amanda Walmsley – Legacy Site Project Manager Email: awalmsley@hornsby.nsw.gov.au Phone: (02) 9847 6069 After hours: 0457 519 387	The Legacy Site Manager has responsibility for the implementation of this EMP as delegated by the Site Director. The Legacy Site Manager is responsible for: – Implementation and record keeping • Establishing and maintaining systems for the implementation of this EMP • Implementation of the following management measures outlined in Section 4: management procedures 1 to 5, signage and fencing, management plans, monitoring programs • Record keeping in relation to identified contamination and associated management measures taken • Co-ordinating reviews and/or updates of this EMP – Communication • Notifying stakeholders of the existence of this EMP • Informing and inducting Council staff and/or other relevant stakeholders in relation to this EMP and its requirements • Ensuring that relevant Primary and Secondary stakeholders are inducted or licenced • Ensuring persons undertaking works at the site are aware of and comply with the relevant requirements of this EMP • Ensuring only allowable activities identified in this EMP (or activities otherwise approved by the Site Director in writing) are undertaken at the site including within the vicinity of identified contamination • Regularly reporting on results of contamination and remediation studies to the relevant stakeholders • Informing the Site Director of any identified breaches of this EMP • Responding and documenting identified non-conformances of this EMP as per Section 2.6 – Coordination • Working with the Primary, Secondary and/or Tertiary Stakeholders (refer Section 2.1) as relevant to develop and implement management measures for the identified contamination • Investigating and documenting any identified breaches of this EMP • Coordinating corrective actions

Role	Responsible Party	Responsibilities
Council Supervisor	As deemed relevant at the time by Council	The Council officer in direct control of site works to be completed for Council is responsible for advising the Legacy Site Manager and Parks Manager of the proposed site works and for arranging appropriate Council review of the safe work method statement (SWMS) and/or Construction Environmental Management Plan (CEMP) prepared by the contractor engaged for the site works prior to works commencing in accordance with the relevant requirements of this EMP.
Secondary Stakeholders		
Council workers	As deemed relevant at the time	Undertake works at the site in accordance with the relevant requirements of this EMP. That includes adherence to management procedures 2 to 5 (provided in Attachment 3 of the QS Guide at the front of this EMP) as relevant to the activity.
External workers engaged by Council (excluding Environmental Consultant)	As engaged by Council	Workers engaged by Council must undertake activities at the site in accordance with the relevant requirements of this EMP. That includes adherence to management procedures 2 to 5 (provided in Attachment 3 of the QS Guide at the front of this EMP) as relevant to the activity.
External workers not engaged by Council (for example, public utility workers)	As relevant at the time	Workers not engaged by Council to undertake activities at the site must undertake works at the site in accordance with the relevant requirements of this EMP. That includes adherence to management procedures 2 to 5 (provided in Attachment 3 of the QS Guide at the front of this EMP) as relevant to the activity.
Licensed users (for example, sporting clubs)	As relevant at the time	Licensed users must undertake activities at the site in accordance with the licence agreement entered into with Council and the relevant requirements of this EMP. That includes adherence to management procedure 4 (provided in Attachment 3 of the QS Guide at the front of this EMP).
Environmental Consultant	As engaged by Council	An Environmental Consultant engaged by Council will undertake regular environmental monitoring and reporting at the site as part of this EMP. The scope of the monitoring and reporting is detailed in Section 4.5. Specific to this EMP, the Environmental Consultant's responsibilities include: – Identifying and reporting on any identified contamination – Informing the Legacy Site Manager of the results of routine monitoring programs, contamination and remediation studies at the site as soon as reasonably practicable – Working with the Site Director, Legacy Site Manager, Site Auditor and/or NSW EPA as relevant to develop and implement management measures for the identified contamination Informing the Legacy Site Manager of any identified breaches of this EMP noticed during monitoring works
Site Auditor	As engaged by Council	An independent NSW EPA accredited Site Auditor has been engaged by Council to undertake a statutory site audit with the purpose of confirming that the existing use of the site is acceptable from a human health and ecological risk perspective. The Site Auditor's responsibilities in relation to this EMP include reviews of relevant deliverables prepared as part of the EMP's implementation and reviews of any proposed amendments to this EMP.

2.3 Recorded locations

The existence of this EMP will be recorded in the following locations:

– In TRIM (Council's document management system) – 2025 Foxglove Oval Environmental Management Plan - Rev0, May, 2025 (Document reference D09070176)
– In property and contaminated land layers within 'Intramaps' (Council's GIS system)
– In 'Live pro' (Council's Customer Request Management System)
– On the Foxglove Oval webpage[3]
– With the NSW EPA
– With the Before You Dig Australia (BYDA) service

It is noted that Council does not currently have an existing Environmental Management System (EMS) to incorporate this EMP into.

2.4 Stakeholder notification

Stakeholders of this EMP (refer Section 2.1) will be notified of its existence as follows:

– Primary Stakeholders will be provided with a copy of this EMP by Council
– Secondary Stakeholders (Environmental Consultant and Workers engaged by Council): Will be provided with a copy of this EMP by Council upon engagement
– Secondary Stakeholders (Workers not engaged by Council) and Tertiary Stakeholders:
  - Will be advised by signage at the site that includes information on the location of the EMP in Council's record keeping systems.
  - Will be advised through the BYDA service (if undertaking subsurface works)

Primary Stakeholders, the Site Auditor and the NSW EPA will be contacted directly by email, letter, or phone call if any changes to the EMP are made or are likely to, occur. All other stakeholders will be updated if and when required.

2.5 Procedure for changing Site Director

The Site Director is the holder of the position Director, Community and Environment at Council. If there is a change in the Site Director, the following procedure shall be followed:

– The EMP shall be updated to identify the details of the new Site Director at the time of change
– The new EMP shall be provided to the relevant stakeholders and updated in the 'Recorded Locations' identified in Section 2.3

2.6 Departures

Where departures from the requirements of this EMP occur, the Legacy Site Manager (refer Table 2.2 preceding) must be informed and provided with details on the departure. The Legacy Site Manager must then:

– Review the reason for the departure
– Contact the Environmental Consultant and Site Auditor to discuss and agree required actions
– Advise relevant stakeholders (refer Table 2.1 preceding) of the required actions
– Arrange for the implementation of the required actions
– Document and record the departure, discussions and required actions taken

[3] **https://www.hornsby.nsw.gov.au/lifestyle/sports-and-recreation/facilities/foxgloveoval**

If the reason for the departure is found to be attributable to the EMP itself (rather than a non-compliance with the EMP), the Legacy Site Manager must:

– Arrange for a non-routine review of this EMP as per Section 5.1.2 following
– Notify the relevant stakeholders of the existence of the updated EMP as per Section 2.4 above once it is finalised

3. Site details and contamination status

3.1 Site details

Key details on the site are provided in Table 3.1 below. A site location plan is provided as Figure 1.1 preceding. A summary of the site history and environmental setting is provided in Appendix E.

Table 3.1 Site information

Information	Details
Site Name	Foxglove Oval
Address	24X Foxglove Road, Mount Colah, NSW 2079
Lot and Deposited Plan (DP)	The site comprises: – Lot 507 DP 752053 (Hornsby Shire Council) – Lot 19 DP 1002578 (Hornsby Shire Council) – Part of Chestnut Road Reserve to the west of the Oval (Crown Land)
Area	70,793 m^2 (7.08 hectares)
Local Government Area (LGA)	Hornsby Shire Council
Zoning	The site is located within two land zonings as classed by the Hornsby Local Environmental Plan (Hornsby Shire Council, 2013). – RE1 – Public Recreation across most of the site – R2 – Low density residential along the Chestnut Road Reserve, noting that this is the only lot zoned R2 that forms part of the site
Traditional owners	The Darug and Guringai peoples
Current land use	The site is currently used for public recreational purposes and includes the following key features: Amenities Building, Foxglove Oval sporting fields, car parking areas, playground, bushland areas and Chestnut Road Reserve.
Surrounding land use	The site is surrounded by residential properties and undeveloped bushland as detailed below: – North: Residential properties on Gloria Close, Excelsior Road and Dianella Way, undeveloped bushland, and low-density residential properties – East: Residential properties on Lancelot Street – South: Residential properties on Foxglove Road, Chestnut Road, and Caribbean Place – West: Residential properties on Chestnut Road, Oxley Drive and Hume Place. A property known as 23 Chestnut Road (currently an area of undeveloped bushland) is located to the immediate west of the site. Gleeson Creek runs through 23 Chestnut Road and is immediately downgradient of the site
Known infrastructure	Above and below ground infrastructure at the site includes subsurface services, a leachate collection and treatment system, a landfill gas venting system, a subsurface sand slit drainage system and monitoring wells. The location of known site infrastructure is shown on the figures provided in Attachment 2 of the QS Guide at the front of this EMP. Further information on subsurface services at the site is provided in Appendix E. It is further noted that overhead electricial lines run across part of the site.

3.2 Sources of contamination

Investigations at the site since March 2019 have identified several sources of potential impact including contamination derived from landfilled waste.

Sources of contamination (as defined in this EMP) at and around the site include:

– Primary sources:
  - Landfilled (buried) waste from historical landfill including putrescible and non-putrescible waste
  - Shallow buried rubbish from uncontrolled dumping after landfilling operations ceased
  - Imported fill material of unknown origin used in the Chestnut Road Reserve, the Oval and the batters for cover material
– Secondary sources:
  - Soil, ground gas, groundwater, leachate, and surface water contaminated by the above primary sources
  - Leachate leaking from:
    – The leachate treatment area north-west of the Oval at the top of the Western Paddock
    – The leachate trench west of the Oval and the bottom of the Western Batter

It is noted that other potential primary sources of impact on the site include overflows and/or leakages from local sewers and/or stormwater infrastructure (where present on site). This EMP does not cover management of those assets (whether owned by Council or a third party such as Sydney Water). Should Council identify and/or be made aware of impacts at the site from such potential sources, it will notify the relevant parties.

3.3 Description of contamination

The landfilled waste will remain in place at the site and be managed by this EMP. Figure B.1 in Appendix B shows the inferred extent of the landfilled waste at the site and locations where landfilled waste has been encountered during intrusive investigations. A detailed summary of waste extent and depth as encountered during intrusive investigations is provided in Appendix E.

The landfilled waste (which consists of putrescible and non-putrescible waste) may contain a variety of materials as per the definitions for those wastes presented in Step 3 of the NSW EPA (2014) *Waste Classification Guidelines – Part 1: Classifying waste*. Contaminants associated with that landfilled waste that have been identified as 'key contaminants' at the site are summarised in Table 3.2. There are other potential contaminants associated with that landfilled waste and with the secondary sources of ground gas and leachate associated with that landfilled waste (refer to Appendix A for additional information). The spatial distributions of contaminants by media (water, ground gas, and soil) as they were known at the time of preparation of this EMP are presented on Figure B.3, Figure B.4 and Figure B.5 in Appendix B. To date the primary focus of subsurface investigations at the site has related to perimeter conditions (i.e. whether ground gas and/or leachate impacts were present at the site's boundary) rather than the conditions within the landfilled waste. As such, Figure B.3, Figure B.4 and Figure B.5 primarily show contamination data at the site's perimeter (noting that those may change from time to time) rather than within the landfilled waste.

As stated on those figures, **landfill related contamination such as landfill gas, leachate, leachate impacted water and/or landfilled waste could be present anywhere within the inferred extent of the landfilled waste.**

Table 3.2 Summary of key contaminants

Key contaminant[1]	Description[2]	
Ground gas		
Methane	Methane has been consistently detected at concentrations above the assessment criteria in certain perimeter wells. Methane is a potential indicator of ground gas impacts from the landfill.	
Water (groundwater, surface water, leachate and seepage)		
Ammonia	Ammonia has consistently been detected at concentrations above the ecological assessment criteria in certain groundwater, surface water, leachate and seepage locations. Ammonia is a potential indicator of the presence of leachate.	
Dissolved methane	Dissolved methane has been detected at concentrations above the explosion assessment criteria in certain monitoring wells sampled for groundwater and certain leachate and seepage locations. Dissolved methane is a potential indicator of the presence of leachate.	
Nitrate	Nitrate has been detected at concentrations above the ecological assessment criteria in certain downgradient and isolated cross-gradient wells sampled for groundwater. Nitrate has also been detected above assessment criteria in surface water, leachate and seepage locations.	
PFAS	PFOS has been detected at concentrations above the ecological assessment criteria at certain groundwater, surface water, leachate and seepage locations across the site. Sum of PFHxS and PFOS has been detected at concentrations above the human health (recreational) assessment criterion in shallow groundwater off site to the south-west of the site.	
Notes: 1. Key contaminant = A contaminant that is a risk driver as it presents a potentially unacceptable risk to receptors without EMP controls, and has the potential to migrate off site (i.e. something that is present is a key risk driver at the site). 2. Further information on the approximate locations of identified exceedances is provided in Appendix A and in Figure B.3, Figure B.4 and Figure B.5 in Appendix B		

Further to Table 3.2 above it is noted that:

– *E. coli* has been regularly detected above the human health (recreational) assessment criterion in surface water on site and to the site's immediate west during routine monitoring works. However, it is not considered to be sourced from the landfilled waste

– Waste ceased to be landfilled at the site in 1980, and it has previously been estimated that the peak generation of landfill gases would have been around 1982. Now 40 years later, it is estimated that there has been a 95% reduction in the maximum rate of landfill gas generation and that the gas generation rate will continue to decrease moving forwards. Similarly, it has been estimated that leachate generation would have peaked around 1990 (i.e. 35 years ago) and that it will continue to decrease moving forwards. It has also been estimated that leachate impacted groundwater beneath the site would have reached the site boundaries by at least 1995 (i.e. 30 years ago)

3.4 Conceptual site model (CSM)

A summary of the source-pathway-receptor (SPR) linkages for the site and adjacent land (whether complete, potentially complete or incomplete) is provided in Appendix A. The SPR linkage assessment is based on the EMP being implemented. If the EMP and its controls are not appropriately implemented, then linkages assessed as incomplete could become potentially complete and/or complete.

4. Environmental management measures

4.1 Overview

Various environmental management measures need to be implemented at the site to manage the identified contamination associated with historical landfilling operations. Those measures are subdivided into the following:

– Management procedures to be followed (as relevant) at the site
– Signage and fencing
– Other management plans relating to:
  - The operation and maintenance of the landfill gas venting system
  - The operation and maintenance of the leachate collection and treatment system
– Monitoring programs relating to:
  - Routine environmental monitoring at the site
  - The landfill gas venting system
  - The leachate collection and treatment system

Figure 4.1 below summarises the measures outlined above.

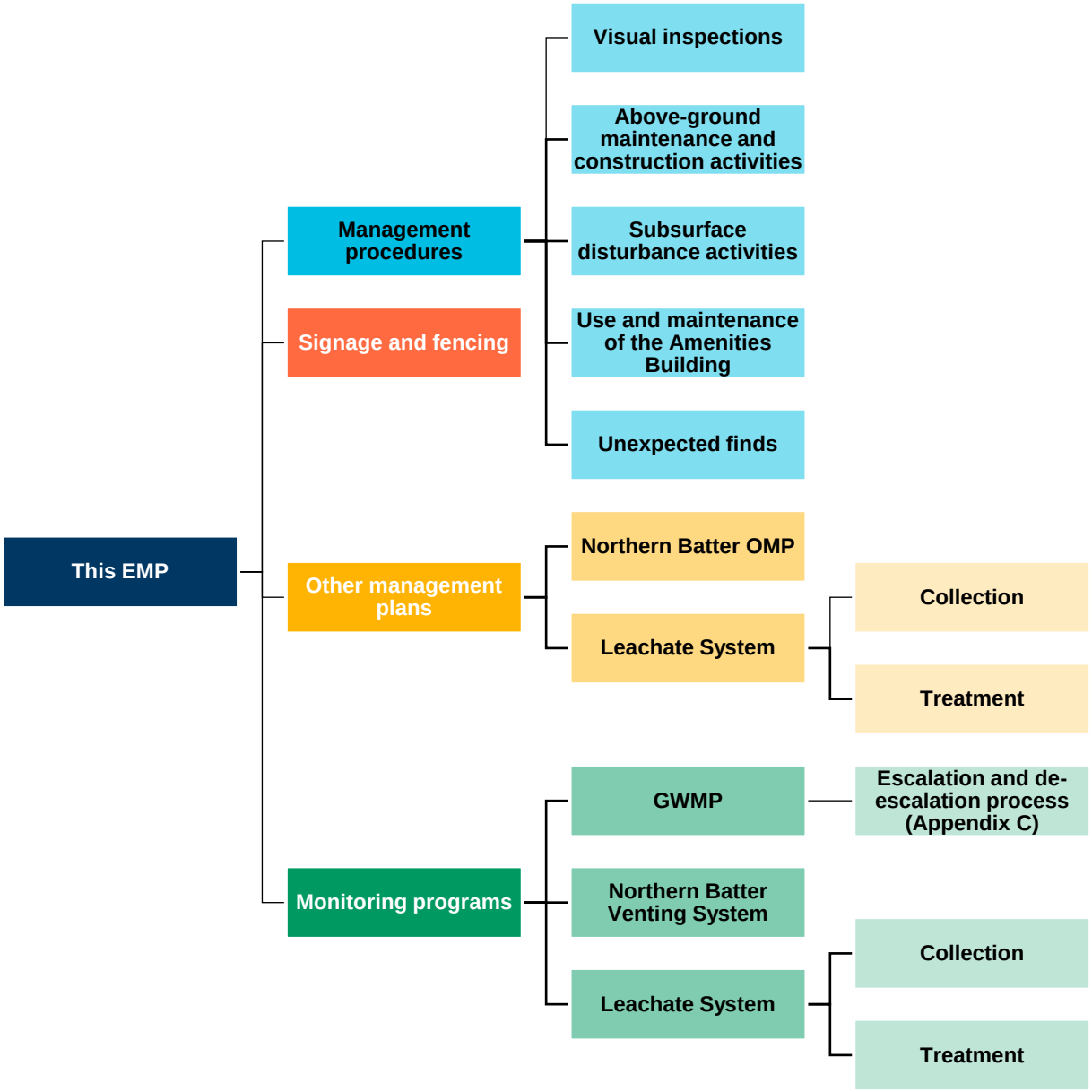

Figure 4.1 Overview of Environmental Management Measures in this EMP

4.2 Signage and fencing

Permanent signage and fencing are required to help prevent contamination related hazards impacting upon the health and safety of users of the site.

Permanent signage shall be installed and maintained by Council at the locations marked on Figure B.2 in Appendix B and/or other locations as determined by Council. Amongst other things, that signage shall outline the nature of the site (a closed landfill site), the potential for contamination at the site, potential contamination related hazards and the location of the EMP in Council's record keeping systems.

Permanent fencing shall be installed and maintained by Council at the locations marked on Figure B.2 in Appendix B and/or other locations as determined by Council. That fencing shall be sufficient in Council's opinion to prevent potential contamination related hazards adversely impacting upon the health and safety of users of the site.

Permanent signage and fencing shall be inspected and maintained in accordance with the relevant management procedure (refer Section 4.3).

Temporary signage and/or fencing may need to be installed and maintained by Council at locations not specifically identified on Figure B.2 from time to time. The need to undertake such actions would be guided by the escalation and de-escalation processes outlined in Appendix C of the GWMP.

4.3 Management procedures

Management procedures need to be implemented at the site (as relevant) to manage the identified contamination associated with historical landfilling operations. The procedures are as follows:

- **Procedure 1: Visual inspections**
- **Procedure 2: Above-ground maintenance and construction activities**
- **Procedure 3: Subsurface disturbance activities**
- **Procedure 4: Use and maintenance of the Amenities Building**
- **Procedure 5: Unexpected finds**

The procedures are provided in Attachment 3 of the QS Guide at the front of this EMP. The responsible parties identified in Table 2.2 need to familiarise themselves with the procedures and follow them as relevant when working at the site.

The flow chart provided as Figure 1 in the QS Guide at the front of this EMP provides guidance for workers and licensed users (for example, sporting clubs) on which management procedures need to be implemented depending on the proposed activities.

4.4 Other management plans

Certain other management plans in addition to this EMP are in operation at the site as outlined in Table 4.1 below. The management plans and relevant associated information (for example, findings from required inspections) shall be considered as relevant when undertaking works at the site.

Table 4.1 Other management plans in operation at the site

No.	Management Plan	Area	Details
1	**Northern Batter Operation and Maintenance Plan (OMP)** (GHD, 2023b)	Within the fenced area on the Northern Batter	Describes the landfill gas venting system and its associated monitoring, operation, and maintenance requirements/Includes inspection and maintenance requirements for certain associated infrastructure
2	**Stormwater Harvesting Management Plan - Foxglove Oval** (Storm Consulting, 2012)	Oval, Northern Batter, Western Paddock, Eastern Carpark Area	Describes the stormwater harvesting system (which is the same as and/or interfaces with the leachate collection and treatment system) and its associated operation and maintenance requirements
3	**Foxglove Oval Leachate Water Re-use System-Operations Manual** (Watermatic Irrigation, 2010)	Oval, Northern Batter, Western Paddock, Eastern Carpark Area	Describes certain parts of the stormwater harvesting system (which is the same as and/or interfaces with the leachate collection and treatment system) and its associated operation and maintenance requirements. Is an appendix to Storm Consulting (2012) mentioned above.

A holistic management plan for the leachate collection and treatment system is currently in development and will supersede management plans 2 and 3 identified in Table 4.1 above. That new management plan will be referenced in an updated version of this EMP following its completion.

4.5 Monitoring programs

Certain environmental monitoring programs are in operation at the site as outlined in Table 4.2 below. The monitoring programs and relevant associated information (for example, monitoring results) shall be considered as relevant when undertaking works at the site.

Table 4.2 Monitoring programs in operation at the site

Monitoring program	VMP Area	Media	Type of monitoring
Gas and Water Monitoring Plan (GWMP) (GHD, 2024)	Entire site and surrounds	Gas	Subsurface well monitoring
			Building accumulation monitoring
			Subsurface service pit/penetration monitoring
			Surface emission monitoring
		Water	Groundwater
			Surface Water
			Leachate and seepage
Northern Batter OMP – Section 5: Environmental Monitoring (GHD, 2023b)	Within the fenced area on the Northern Batter	Gas	Vents
			Valve pits
			Gas extraction pits
			Collection bores
		Leachate	

A holistic management plan for the leachate collection and treatment system is currently in development and will be included in an updated version of this EMP upon its completion. That plan will include the relevant monitoring requirements for the system.

5. Review and cessation of EMP

5.1 Review of EMP

For certain reasons, this EMP may need to be reviewed and revised at certain times. Such reviews would be classified as routine and non-routine reviews.

5.1.1 Routine reviews

The need to revise this EMP will be routinely reviewed throughout its implementation to ensure that the EMP remains current and appropriate for the site. As a minimum, a routine review of this EMP will be undertaken and documented every two years for the first four years of its implementation. Following that initial period, reviews will be every four years. Revisions to the EMP will be made at those times as required.

Where a routine review identifies matters which require modification of the EMP, then an updated version of the EMP shall be prepared by the Environmental Consultant and reviewed and endorsed by Council and the Site Auditor[4] before its implementation. All formal EMP reviews and revisions shall be retained by Council. Relevant stakeholders (refer Table 2.1) shall be notified of the existence of the updated EMP as per Section 2.4 once it is finalised. Reviews of the EMP shall be guided by the *Preparing environmental management plans for contaminated land: Practice note* (NSW EPA, 2022) and the example checklist provided in Appendix C. The EMP shall continue to be routinely reviewed as outlined above until such a time as it is identified that it is no longer needed as outlined in Section 5.2.

5.1.2 Non-routine reviews

Certain things may trigger a non-routine review of this EMP including:

– A non-conformance with the EMP
– A change in Site Owner, Site Director and/or site conditions
– Significant changes in site conditions
– Changes in any assumptions that underlie the defined scope of the EMP
– Site modifications of construction activities

Where a non-routine review identifies matters which require modification of the EMP, then an updated version of the EMP shall be prepared by the Environmental Consultant and reviewed and endorsed by Council and the Site Auditor[5] before its implementation. All formal EMP reviews and revisions shall be retained by Council. Relevant stakeholders (refer Table 2.1) shall be notified of the existence of the updated EMP as per Section 2.4 once it is finalised. Reviews of the EMP shall be guided by the *Preparing environmental management plans for contaminated land: Practice note* (NSW EPA, 2022) and the example checklist provided in Appendix C. The EMP shall continue to be routinely reviewed as outlined above until such a time as it is identified that it is no longer needed as outlined in Section 5.2.

5.2 Cessation of EMP

This EMP shall cease when it has been agreed between Council, the NSW EPA and the Site Auditor (if relevant) that it is appropriate to do so. The decision to cease the EMP should include consideration of the requirements of the 'Certified Statement of Completion' as outlined in Section 10.2 of the *Environmental Guidelines Solid waste landfills* (NSW EPA, 2016).

[4] The review by the Site Auditor should only be undertaken during the period the site is regulated by the NSW EPA. Post Site Auditor engagement consistent with Section 1.2.4 of the *Preparing environmental management plans for contaminated land: Practice note* (NSW EPA, 2022), the EMP should be prepared by, or reviewed and approved by, a contaminated land consultant who is certified under a certification scheme recognised by the EPA or as otherwise agreed with Council.
[5] The review by the Site Auditor should only be undertaken during the period the site is regulated by the NSW EPA. Post Site Auditor engagement consistent with Section 1.2.4 of the *Preparing environmental management plans for contaminated land: Practice note* (NSW EPA, 2022), the EMP should be prepared by, or reviewed and approved by, a contaminated land consultant who is certified under a certification scheme recognised by the EPA or as otherwise agreed with Council.

6. Contingency plans

A contingency plan is a proactive strategy designed to address unexpected events or potential future risks that could disrupt operations, projects or activities. Such plans are typically implemented when a specific event occurs and outline a series of actions to be taken in response to mitigate the impacts of the event.

It is possible that certain contamination related events could occur at the site that may require management measures and/or actions beyond those outlined in this EMP. Contingency actions for conceivable scenarios are outlined in

Table 6.1 below. The actions outlined below are not definitive and should additional actions be identified as being appropriate, those additional actions should also be considered.

Table 6.1 Contingency scenarios and actions

Scenario	Contingency actions
Unexpected occurrence	
Matters that could present a risk to human health and/or the environment are identified that are: – Unexpected at the site based on existing information (for example, underground storage tanks, acid sulphate soils, no landfill cover layer (i.e. exposed landfilled waste at the site surface), widespread or significant ACM presence across the site surface) and/or – External to the known areas of contamination at the site (for example, landfilled waste in the bushland areas to the north and/or west of the site)	Follow the unexpected finds management procedure (Procedure 5) provided in Attachment 3 of the QS Guide at the front of this EMP.
Possible occurrence	
Off-site migration of methane	In the event that methane is detected at and/or beyond the site boundary, the actins outlined in Appendix C of the GWMP should be followed. Subsequent actions for consideration include: – Develop and implement monitoring and management plans similar to those previously developed for the site (for example, the Residential Area Monitoring Plan (RAMP) and the Reoccupation Environmental Management Plans (REMPs) for the residential properties previously evacuated) – Identify if relocation and /or remediation is needed – Remediate and validate if required
New surface leachate spillage or outbreaks (i.e. spillages or outbreaks not known at the time of preparation of this EMP)	In the event that any new surface leachate spillage or outbreaks (i.e. spillages or outbreaks not known at the time of preparation of this EMP) are identified, the following actions should be considered for implementation: – Implement any immediate actions that are considered appropriate to break any SPR linkages or potential SPR linkages (for example, confirmation of source, signage, fencing, notification of relevant stakeholders) – Sample the leachate as soon as practicable – Keep records including estimates of the volume of leachate discharged and notify NSW EPA – Contain the spill or outbreak – Remediate and validate any affected land, water or sediments if required – Investigate the cause of the leachate spill or outbreak – Undertake measures to prevent the spill or outbreak recurring as required

Scenario	Contingency actions
Worsening groundwater and/or surface water conditions downgradient of the site	In the event that worsening groundwater or surface water conditions down gradient of the site are detected, the following actions should be considered for implementation: – Implement any immediate actions that are considered appropriate to break any SPR linkages or potential SPR linkages (for example, signage, fencing, notification of relevant stakeholders) – Review the operation and condition of the leachate management system and/or surface water management systems – Re-assess frequency and locations of monitoring, with a view to increasing as appropriate – Once cause identified, remediate and validate if required

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Appendices

Appendix A

Source-Pathway-Receptor linkage assessment and Conceptual Site Model

A-1 Summary Source-Pathway-Receptor linkage assessment

Table A.1 Summary of SPR linkage assessment for the site

Contamination sources	Potential contaminants and key contaminants[1, 2, 3]	Exposure Pathway	Receptors[4]	EMP management measures	Linkage classification – With implementation of EMP[5] *[Linkage without EMP]*
Primary source					
Cover material which may include the following: soil, fill, or rubbish	Site walkovers and extensive intrusive investigations have <u>not</u> identified gross asbestos contamination but there is the potential for asbestos fragments to be present in cover material. *[**Note**: During remediation works in the Northern Batter and Western Paddock discrete pieces of bonded asbestos were identified after rainfall events in surface cover material. The bonded asbestos was removed and the areas validated*]. No key contaminants based on historical monitoring data	Direct contact	Ecological receptors	– Management procedure 1	– Incomplete
		Direct contact, incidental ingestion, and inhalation	Maintenance workers, intrusive maintenance workers, and recreational users of the site	– Fencing (Northern Batter only) – Management procedure 1 and 2	– Incomplete [*Potentially Complete*]
Landfilled waste	Range of potential contaminants including asbestos fragments as the landfilled waste has not been fully characterised	Direct contact, incidental ingestion, and inhalation	Intrusive maintenance workers	– Management procedures 1, 3, 4 and 5	– Incomplete [*Potentially Complete]*
Secondary sources (derived from primary source and could be located within, or external to the inferred extent of the landfilled waste)					
Ground gas	Potential contaminants may include various ground gases (for example, carbon dioxide, carbon monoxide, hydrogen, hydrogen sulphide) and trace gases The key contaminant for ground gas based on the historical monitoring data is methane	Inhalation	Ecological receptors	– Fencing (Northern Batter only) – Management procedure 1 – Other management plans (Northern Batter OMP) – Monitoring programs (GWMP and Northern Batter OMP)	– Incomplete
		Inhalation and gas emissions	Maintenance workers, intrusive maintenance workers, licensed users and recreational users of the site	– Signage and fencing (Northern Batter only) – Management procedures 1 to 5 – Other management plans (Northern Batter OMP) – Monitoring programs (GWMP and Northern Batter OMP)	– Incomplete [*Potentially Complete*]
Leachate and seepage	Range of potential contaminants as the landfilled waste has not been fully characterised Key contaminants based on the historical monitoring data are ammonia, dissolved methane, nitrate and PFAS	Direct contact	Ecological receptors including Gleeson Creek	– Signage and fencing – Management procedure 1 – Other management plans (Stormwater Harvesting Management Plan - Foxglove Oval and Foxglove Oval Leachate Water Re-use System- Operations Manual) – Monitoring programs (GWMP)	– Incomplete [*Potentially Complete for the Western Paddock and the Chestnut Road Reserve with its adjoining land to the west*]]
		Direct contact and incidental ingestion	Maintenance workers, intrusive maintenance workers and recreational users of the site including Gleeson Creek	– Signage and fencing – Management procedures 1, 2, 3 and 5 – Monitoring programs (GWMP)	– Incomplete [*Potentially Complete for the Western Paddock and the Chestnut Road Reserve with its adjoining land to the west*]
Contaminated surface water	Range of potential contaminants as the landfilled waste has not been fully characterised Key contaminants based on the historical monitoring data are ammonia, nitrate and PFAS	Direct contact	Ecological receptors including Gleeson Creek	– Signage – Management procedure 1 – Monitoring programs (GWMP)	– Incomplete [*Potentially Complete for PFAS and also ammonia and nitrate only for the Chestnut Road Reserve and its adjoining land to the west*]
		Direct contact and incidental ingestion	Maintenance workers, intrusive maintenance workers and recreational users of the site including Gleeson Creek	– Management procedure 1 – Monitoring programs (GWMP)	– Incomplete
Contaminated groundwater	Range of potential contaminants as the landfilled waste has not been fully characterised Key contaminants based on the historical monitoring data are ammonia, dissolved methane, nitrate and PFAS	Direct contact	Ecological receptors including Gleeson Creek	– Management procedure 1 – Monitoring programs (GWMP)	– Incomplete [*Potentially Complete for PFAS to the south-west of the site and for leachate impacted shallow groundwater in the Western Paddock and the Chestnut Road Reserve with its adjoining land to the west*]
		Direct contact and incidental ingestion	Intrusive maintenance workers on the site and recreational users of the site	– Management procedures 1, 3, 4 and 5 – Monitoring programs (GWMP)	– Incomplete [*Potentially Complete for PFAS to the south-west of the site]*

Notes:
1. Potential contaminant = A chemical substance potentially derived from historical landfilling operations that may be present at the site (i.e. something that may be present)
2. Contaminant = A chemical substance potentially derived from historical landfilling operations at the site that exceeds assessment criteria and may present a risk of harm to human health or the environment (i.e. something that is present and may require further assessment)
3. Key contaminant = A key contaminant is a contaminant that is a risk driver as it presents a potentially unacceptable risk to receptors without EMP controls, and it has the potential to migrate off site (i.e. something that is present is a key risk driver at the site).
4. Intrusive maintenance works typically include works down to 2 metres below ground (mbgl). Ecological receptors include terrestrial and/or aquatic ecosystems where they are present at the site
5. The SPR linkage assessment is based on the EMP being implemented. If the EMP and its management measures are not appropriately implemented, then linkages assessed as incomplete could become potentially complete and/or complete

Appendix B

Figures

Legend

- Waste observed during intrusive investigations
- No waste observed during intrusive investigations
- Foxglove Oval EMP boundary
- Extent of landfill (approximate)
- 1975 disturbed land
- Former channel
- Watercourse
- Oval Area
- North-western Boundary Area
- Northern Boundary Area
- Eastern Boundary Area
- Southern Boundary Area
- Western Boundary Area

Paper Size ISO A4

0 50 100

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

GHD

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

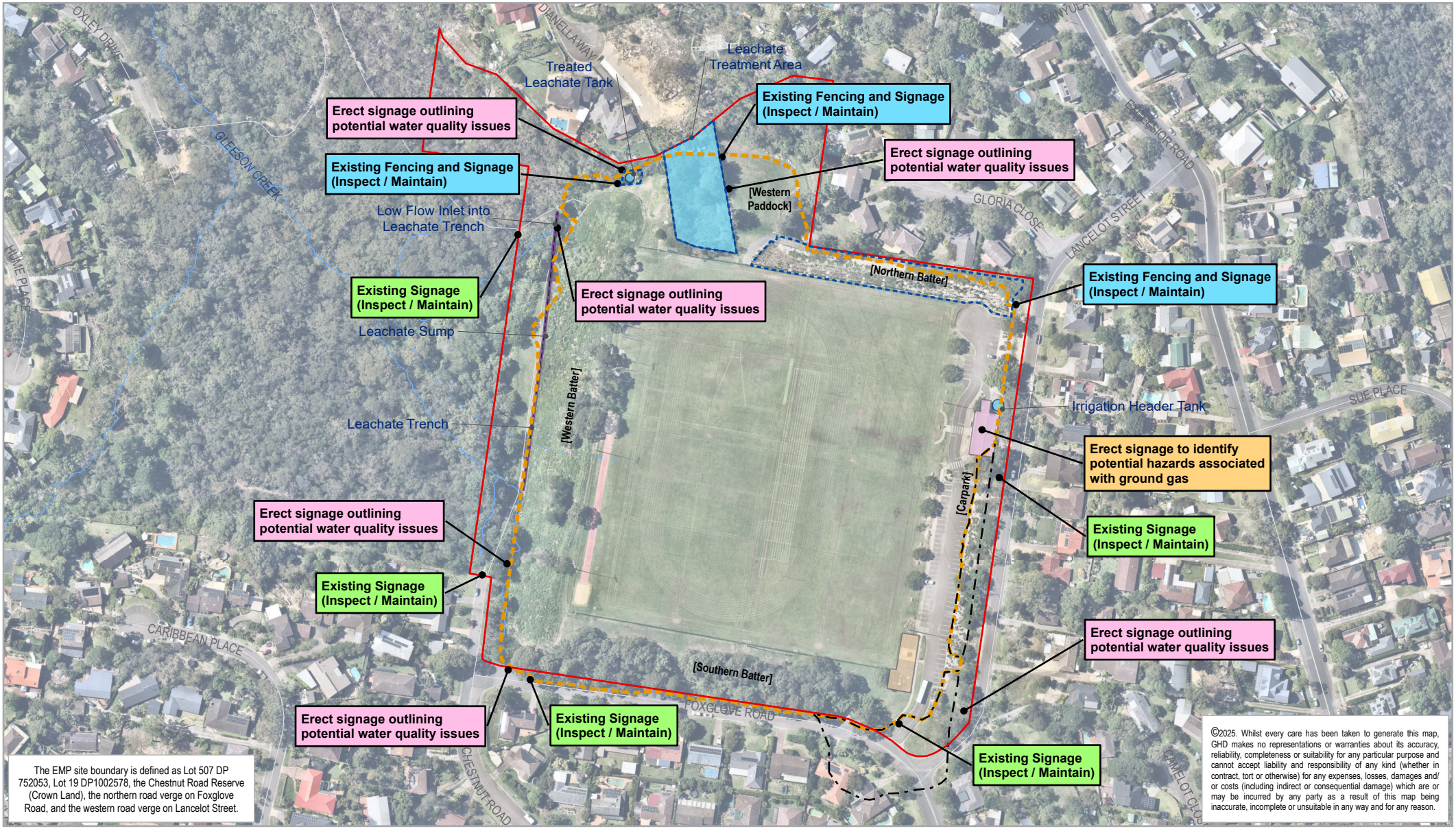
Project No. **12567731**
Revision No. **0**
Date **27/05/2025**

Foxglove Oval Inferred Landfill Waste Extent

FIGURE B.1

\\ghdnet\ghd\AU\Sydney\Projects\21\12567731\GIS\Maps\EMP.aprx\EMP009_LandfillWaste_Reference
Print date: 27 May 2025 - 18:50

Data source:Nearmap WMS Server: Extracted 27/05/2025. Created by: Imanasan



The EMP site boundary is defined as Lot 507 DP 752053, Lot 19 DP1002578, the Chestnut Road Reserve (Crown Land), the northern road verge on Foxglove Road, and the western road verge on Lancelot Street.

Legend

- Foxglove Oval EMP boundary
- Leachate treatment infrastructure
- Building 1 (B1) - amenities building
- Playground
- Permanent fencing
- Extent of landfill (approximate)
- 1975 disturbed land
- Leachate trench design
- Former channel
- Watercourse

Paper Size ISO A4

0 25 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

Council's Existing and Proposed Signage and Fencing Management Measures

Project No. **12567731**
Revision No. **0**
Date **27/05/2025**

FIGURE B.2

\\ghdnet\ghd\AU\Sydney\Projects\21\12567731\GIS\Maps\EMP.aprx\EMP012_ExistingProposedSiteSignage
Print date: 27 May 2025 - 18:50

Data source: sixmaps, LPI2015, Nearmap (Date Extracted: 28/12/2018, Imagery Date: 2018); Lot Boundaries: NSW Govt, LPI, 29/05/2020; Suburb Boundary: Australian Bureau of Statistics (ABS), 20/05/2020
Nearmap WMS Server: . Created by: lmanasan

The EMP site boundary is defined as Lot 507 DP 752053, Lot 19 DP1002578, the Chestnut Road Reserve (Crown Land), the northern road verge on Foxglove Road, and the western road verge on Lancelot Street.

Legend

- Surface Water Impacts > Criteria
- Groundwater Impacts > Criteria
- Foxglove Oval EMP boundary
- Extent of landfill (approximate)
- 1975 disturbed land
- Leachate treatment infrastructure
- Building 1 (B1) - amenities building
- Playground
- Drainage channel
- Leachate trench design
- Former channel
- Watercourse
- [Surface feature]

Paper Size ISO A4

0 50 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

Water contamination distribution between April 2023 and March 2024 (groundwater and surface water)

Project No. **12567731**
Revision No. **0**
Date **27/05/2025**

FIGURE B.3

\\ghdnet\ghd\AU\Sydney\Projects\21\12567731\GIS\Maps\EMP.aprx\EMP004_PCSM_DissolvedExceedances
Print date: 27 May 2025 - 18:50

Data source: GHD: Project components (2023).Nearmap WMS Server: Extracted 27/05/2025. Created by: Imanasan

Legend

- Subsurface methane > criteria
- Surface methane > criteria
- Foxglove Oval EMP boundary
- Extent of landfill (approximate)
- 1975 disturbed land
- Leachate treatment infrastructure
- Building 1 (B1) - amenities building
- Playground
- Leachate trench design
- Drainage channel
- Former channel
- Watercourse
- [Surface feature]

Paper Size ISO A4

0 50 100

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

GHD

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

Ground gas contamination distribution between April 2023 and March 2024 (methane)

Project No. **12567731**
Revision No. **0**
Date **27/05/2025**

FIGURE B.4

\\ghdnet\ghd\AU\Sydney\Projects\21\12567731\GIS\Maps\EMP.aprx\EMP006_PCSM_MethaneGas
Print date: 27 May 2025 - 18:50

Data source: GHD: Project components (2023). Nearmap WMS Server: Extracted 27/05/2025. Created by: lmanasan

The EMP site boundary is defined as Lot 507 DP 752053, Lot 19 DP1002578, the Chestnut Road Reserve (Crown Land), the northern road verge on Foxglove Road, and the western road verge on Lancelot Street.

Legend

- Soil impacts > criteria
- Foxglove Oval EMP boundary
- Extent of landfill (approximate)
- 1975 disturbed land
- Leachate Treatment Infrastructure
- Building 1 (B1) - Amenities building
- Playground
- Leachate trench design
- Drainage channel
- Former channel
- Watercourse
- [Surface feature]

Paper Size ISO A4

0 50 100

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

Soil contamination distribution between December 2020 and October 2024

Project No. **12567731**
Revision No. **0**
Date **27/05/2025**

FIGURE B.5

\\ghdnet\ghd\AU\Sydney\Projects\21\12567731\GIS\Maps\EMP.aprx\EMP008_PCSM_SoilContaminant
Print date: 27 May 2025 - 18:50

Data source: Nearmap WMS Server: Extracted 27/05/2025. Created by: lmanasan

Legend

- Oval Area
- North-western Boundary Area
- Northern Boundary Area
- Eastern Boundary Area
- Southern Boundary Area
- Western Boundary Area
- Foxglove Oval site (VMP) boundary
- Leachate trench design
- Drainage channel
- Former channel
- Watercourse

Paper Size ISO A4

0 50 100

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

Hornsby Shire Council
Foxglove Oval, Mount Colah, NSW
Environmental Management Plan

Project No. **12567731**
Revision No. **0**
Date **19/05/2025**

Foxglove Oval VMP Boundaries

FIGURE B.6

\\ghdnet\ghd\AU\Sydney\Projects\21\12567731\GIS\Maps\EMP.aprx\EMP002_VMPBoundaries
Print date: 19 May 2025 - 00:50

Data source: GHD: Project boundary, Project regions, Leachate design (2023). LPI: Watercourse (2023). Nearmap WMS Server: Extracted 19/05/2025. Created by: lmanasan

Appendix C

Example EMP review checklist

C-1 Example EMP review checklist

Table C.1 Example EMP review checklist

Item	Check	Comment
Body of EMP		
Introduction	Are the contents of the identified sections still considered to be appropriate for the EMP?	
Summary of EMP		
Site information		
Existing and residual Contamination		
Management structure and communication		
Environmental management measures		
Review and cessation of EMP		
Contingency Plans		
References		
Appendices of EMP		
Management procedures	Are the management procedures still considered to be appropriate for the EMP?	
Figures	Are the figures still considered to be appropriate for the EMP?	
Additional site details and background information	Are the contents of the identified section still considered to be appropriate for the EMP?	

Item	Check	Comment
Source-Pathway-Receptor linkage assessment and Conceptual Site Model	Are the contents of the identified section still considered to be appropriate for the EMP?	
Clean up notice, Declaration and VMP	Has there been any changes to the declaration, CUN, or VMP? Do those changes impact the EMP?	
Example inspection records	Are the example inspection records still considered to be appropriate for the EMP?	
Example EMP review checklist	Is this example EMP review checklist still considered to be appropriate for the EMP?	

Appendix D

Example inspection records

Site inspection form - Final landform and final cover layer

Site name: Foxglove Oval, Mt Colah, NSW				Reference number:	
Inspector(s) (name and organisation):					
Date		Arrival time		Departure time	

Each section below must be completed

Weather							
Cloud cover	Clear	Scattered clouds	Cloudy	Overcast	Other:		Maximum temperature:
Rainfall:	Nil	Showers	Rain	Heavy rain	Other:		
Wind:	Nil	Light breeze	Moderate wind	High winds	Other:		
Ground conditions	Dry	Wet	Other:				
WHS assessment complete?			Induction complete?				
Other activities undertaken during inspection:							

Were any cracks, erosion, holes, depressions and/or flaking of landform surface and/or batters identified?	Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Were any areas of the landform surface and/or batters over steepened, slumping and/or flat so holding surface water?	Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Site inspection form - Final landform and final cover layer

Were drainage issues (for example, ponding, excessive surface water seeping into landfilled waste, leachate seepages) identified on any areas of the landform surface and/or batters?		Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan			
Item 1			
Item 2			
Item 3			

Was the condition and suitability of vegetation on all areas of the landform surface and/or batters considered appropriate (for example, no large areas of dead vegetation, no significant areas of invasive species, no large trees of landfill areas)?		Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan			
Item 1			
Item 2			
Item 3			

Any other notable potential issues on any areas of the landform surface and/or batters (for example, exposed waste, landfill gas odours)?		Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan			
Item 1			
Item 2			
Item 3			

Were there any other additional oberservations of note (for example, development or demolition on site, illegally dumped materials or stockpiled materials)?		Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan			
Item 1			
Item 2			
Item 3			

Site inspection form - Final landform and final cover layer

Is a management response required in relation to any of the matters identified above (for example, additional monitoring, rectification works)?		Yes	No
If yes, state what is considered to be required and why?			
Item 1			
Item 2			
Item 3			

If a management response was considered to be required, has that need been reported to Council's Legacy Site Manager (including provision of a copy of this completed checklist) and logged?	Yes	No

Additional notes:

Signature(s):
Inspection plan attached:

Site inspection form - Monitoring wells

Site name: Foxglove Oval, Mt Colah, NSW				Reference number:	
Inspector(s):					
Date		Arrival time		Departure time	

Each section below must be completed

Weather							
Cloud cover	Clear	Scattered clouds	Cloudy	Overcast	Other:		Maximum temperature:
Rainfall:	Nil	Showers	Rain	Heavy rain	Other:		
Wind:	Nil	Light breeze	Moderate wind	High winds	Other:		
Ground conditions	Dry	Wet	Other:				
WHS assessment complete?			Induction complete?				
Other activities undertaken during inspection:							

Has Attachment 1 been completed for all inspected monitoring wells?

Were there any other additional oberservations of note (for example, development or demolition on site, illegally dumped materials or stockpiled materials)?	Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Is a management response required in relation to any of the matters identified above and/or any of the inspections of the monitoring wells (for example, additional monitoring, rectification works)?	Yes	No
If yes, state what is considered to be required and why?		
Item 1		
Item 2		
Item 3		

If a management response was considered to be required, has that need been reported to Council's Legacy Site Manager (including provision of a copy of this completed checklist) and logged?	Yes	No

Site inspection form - Monitoring wells

Additional notes:
Signature(s):
Inspection plan attached:

Site Inspection Form - Monitoring wells - Attachment 1: Inspection checklist

Site name: Foxglove Oval, Mt Colah, NSW	Reference number
Inspector(s):	
Well ID	

Accessibility	Acceptable	Needs improvement	Inaccessible/ obstructed
Notes:			
Condition of well monument/gatic	Acceptable	Needs improvement	
Notes:			

Condition of Well Cap	Acceptable	Needs improvement	Is correct cap present? Yes/No	Does cap provide an airtight seal? Yes/No
Notes:				
Condition of Pipework	Acceptable	Needs improvement	Damaged/ loose	Aligned correctly? Yes/No
Notes:				

Is well able to lock? Yes/No	Is well appropriately labelled? Yes/no

What were standing water level and base level of well?	SWL:	Base level of well:
Relevant photographs taken of any matters of note identified? Yes/No		

Is a management response required in relation to any of the matters identified above (for example, additional monitoring, rectification works)?		Yes	No
If yes, state what is considered to be required and why?			
Item 1			
Item 2			
Item 3			

Additional notes:

Signature(s):
Inspection plan attached:

Site inspection form - Runoff and drainage

Site name: Foxglove Oval, Mt Colah, NSW				Reference number:	
Inspector(s):					
Date		Arrival time		Departure time	

Each section below must be completed

Weather							
Cloud cover	Clear	Scattered clouds	Cloudy	Overcast	Other:		Maximum temperature:
Rainfall:	Nil	Showers	Rain	Heavy rain	Other:		
Wind:	Nil	Light breeze	Moderate wind	High winds	Other:		
Ground conditions	Dry	Wet	Other:				
WHS assessment complete?			Induction complete?				
Other activities undertaken during inspection:							

Were any cracks, erosion, scour or slumping in surface water drains identified?	Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Were any areas of the landform surface and/or batters over steepened, slumping and/or flat so holding surface water?	Yes	No
If no, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Site inspection form - Runoff and drainage

Was the condition and suitability of vegetation in all surface water drains considered appropriate (for example no thick / excessive vegetation, no vegetation scour, no significant areas of invasive species)?	Yes	No
If no, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Were any areas of leachate seepage and/or excessive surface water run-off identified?	Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Any other notable potential issues in relation to surface water drains? (for example obstructions, damaged lining, sediment accumulation)	Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Were there any other additional oberservations of note (for example, development or demolition on site, illegally dumped materials or stockpiled materials)?	Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Site inspection form - Runoff and drainage

Is a management response required in relation to any of the matters identified above (for example, additional monitoring, rectification works)?		Yes	No
If yes, state what is considered to be required and why?			
Item 1			
Item 2			
Item 3			

If a management response was considered to be required, has that need been reported to Council's Legacy Site Manager (including provision of a copy of this completed checklist) and logged?	Yes	No

Additional notes:

Signature(s):
Inspection plan attached:

Site inspection form - Signs and fences

Site name: Foxglove Oval, Mt Colah, NSW				Reference number:	
Inspector(s):					
Date		Arrival time		Departure time	

Each section below must be completed

Weather							
Cloud cover	Clear	Scattered clouds	Cloudy	Overcast	Other:		Maximum temperature:
Rainfall:	Nil	Showers	Rain	Heavy rain	Other:		
Wind:	Nil	Light breeze	Moderate wind	High winds	Other:		
Ground conditions	Dry	Wet	Other:				
WHS assessment complete?			Induction complete?				
Other activities undertaken during inspection:							

Were all signs at the site present and legible?	Yes	No
If no, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Were all fences at the site present and serving their purpose?	Yes	No
If no, state what was identified, its approximate extent and location, photograph it and mark it on site plan		
Item 1		
Item 2		
Item 3		

Site inspection form - Signs and fences

Were there any other additional oberservations of note (for example, development or demolition on site, illegally dumped materials or stockpiled materials)?		Yes	No
If yes, state what was identified, its approximate extent and location, photograph it and mark it on site plan			
Item 1			
Item 2			
Item 3			

Is a management response required in relation to any of the matters identified above (for example, additional monitoring, rectification works)?		Yes	No
If yes, state what is considered to be required and why?			
Item 1			
Item 2			
Item 3			

If a management response was considered to be required, has that need been reported to Council's Legacy Site Manager (including provision of a copy of this completed checklist) and logged?		Yes	No

Additional notes:

Signature(s):
Inspection plan attached:

Appendix E

Background and site information

E-1 Conditions of consent

Contamination at the site is currently regulated under a VMP. Council intends to use the VMP to inform the management of the site where actions may interface with the landfilled waste and/or contamination derived from that waste. Site approvals that have been granted for previous and current uses of the site are provided in Table E.1 below. A review of those documents did not identify any conditions of relevance to the current and future management of the site. For example, no requirements to maintain the existing cover layer were identified.

Table E.1 Known site approvals

Application number	Date approved	Description
N/A (NSW Department of Health, 1964)	July 1964	Department of Public Health approval for use of the site as a sanitary depot for the disposal of garbage
DA/15/1983 (Woodward, 1983)	28/02/1983	Approval for sports fields
DA/334/1996 (Ball, 1996)	09/10/1996	Approval for extensions to Amenities Building for storage of athletic equipment
BA/2136/1996 (Clarke, 2020)	06/01/1997	Extensions to Amenities Building for storage of athletic equipment

E-2 VMP Area details

The site is segregated into six VMP Areas as described in Table E.2 below and shown on Figure B.6 in Appendix B. The VMP Areas are defined as general spatial areas and do not have fixed boundaries due to the variable spatial natures of groundwater and ground gas migration.

It is noted that:

– There is a slight discrepancy between the EMP boundary that applies to this EMP and the VMP boundary that relates to the VMP. The EMP boundary is shown on Figure 1.1 in Section 1 of this EMP and the VMP boundary is shown on Figure B.6 in Appendix B. The main difference is the inclusion of the northern road verge on Foxglove Road and the western road verge on Lancelot Street in the EMP boundary
– For the purposes of the QS Guide at the front of this EMP, the site has been subdivided into five regions. The regions overlap as they are used to describe general parts of the site, they do not have strict boundaries and are different to the VMP areas. The EMP regions are shown on the figures in Attachment 2 of the QS Guide at the front of this EMP

Table E.2 Details of the VMP Areas

Information	Details
Oval Area (main part of landfill)	
Use	The Oval encompasses the grassed playing surface.
Boundary general extent	– North: Adjacent Northern Boundary Area – East: Adjacent Eastern Boundary Area – South: Adjacent Southern Boundary Area – West: Adjacent Western and North-western Boundary Area
Eastern Boundary Area	
Use	Encompasses the carpark area, playground and Amenities Building.
Boundary general extent	– North: Adjacent Northern Boundary Area – East: Edge of Lancelot Street – South: Southern Boundary Area and generally the entrance to the carpark at the site – West: Oval Area

Information	Details
Southern Boundary Area	
Use	Encompasses the southern batter.
Boundary general extent	– North: Oval Southern Boundary Area – East: Adjacent Eastern Boundary Area/edge of Lancelot Street – South: Edge of Foxglove Road – West: Adjacent Western Boundary Area
Western Boundary Area	
Use	Encompasses the Western Batter, Chestnut Road Reserve and parts of the leachate infrastructure including the leachate trench, leachate sump, treated leachate tank and part of the leachate treatment area (shared with North-western Boundary Area)
Boundary general extent	– North: The Leachate Treatment Area and bushland (Council land) – East: Oval Area, adjacent Southern Boundary and North-western **b**oundary Areas – South: Corner of Foxglove Road and Chestnut Road – West: Chestnut Road and Chestnut Road Reserve boundary
Northern Boundary Area	
Use	Encompasses the northern batter extending to the boundary of the Residential Area and Lancelot Street. The Residential Area and larger Gloria Close Area are included as part of the investigation of Northern Boundary Area as potential areas of contaminant migration.
Boundary general extent	– North: Gloria Close, residential properties – East: Edge of Lancelot Street – South: Oval northern boundary fence line and landscaped carpark area – West: North-western Boundary Area
North-western Boundary Area	
Use	Encompasses the Western Paddock and part of the leachate treatment area (shared with Western Boundary Area).
Boundary general extent	– North: Bushland (Council land), residential properties – East: Northern Boundary Area, Residential Area and Gloria Close – South: Oval Area – West: Western Boundary Area

E-3 Site history

A detailed summary of site history is provided in Table E.3 below.

Table E.3 Site history summary

Year	Activity
Prior to development of landfill	
Prior to the 1950s	The site appeared to comprise undeveloped bushland. From historical topographic maps (1920 and 1942), the site was on the south-eastern side of the valley at the headwaters of Gleason Creek, which was an ephemeral creek flowing north-west into Calna Creek.
1950s – 1970	Several structures and surface scraping activities were noted on the site in aerial photographs. However, the exact land use at the time remains unknown
1956 – 1965	Heavy clearance of vegetation and possible earthworks were observed.
Prior to 1970	The site may have been used partially as a sand quarry (State of Play Report, 2020) (Coffey, 1980) with excavations up to 6 m deep.
1970	Earthworks (quarrying and/or landfilling) were visible on site, whereas vegetation covered the area currently occupied by the Gloria Close Area, the Western Paddock, Lancelot St, with some trees along Foxglove Road.

Year	Activity
Development of landfill and identification of leachate	
1970 – 1980	– The site operated as a landfill accepting both putrescible and non-putrescible municipal waste. – Waste was placed in excavations until the original ground level was reached by alternating 1.5 m thick layers of waste with 0.3 m thick layers of soil over each rubbish layer. Little or no compaction was undertaken (Coffey, 1980). Excavations were to bedrock or just above as follows: • The southern half was excavated first to a depth approximately 6 m below the ground surface and fill over a two-year period • The northern half was then excavated also to approximately 6 m below ground surface • Recent pilot drilling through landfilled waste on the northern batter in September 2022 shows that in the north-eastern corner (south of 1 Gloria Close) the depth to sandstone bedrock is only 2.8 to 3.5 m which is a similar depth to sandstone observed directly adjacent to the east outside of the landfill where the depths ranged from 2.0 to 3.3 m (GW23, GW28, and GW28A) – The landfill was constructed without a leachate drainage system or basal liner (Arcadis, 2018) – 1973: Leachate production was first observed from the south-west end with ammonia concentrations ranging from 70 – 90 mg/L – No landfill gas collection or treatment system was installed at the site to manage landfill gas – 1979: By this time, the Western Paddock was cleared and looks to be filled with waste. Also cleared of vegetation with the start of development were the Gloria Close Area, Lancelot St, and Foxglove Road
Residential development, landfill closure and leachate management	
1979 – 1982	Gloria Close Area was developed along with the southern end of Lancelot Street
1983 – 1984	Landfill was covered with a clay layer without substantial waste compaction and rehabilitated to become an Oval for sporting and recreational activities. Facilities associated with the sporting fields, including car parking and an amenity building, were also constructed at the time (GHD, 2020g).
1986	Northern part of Lancelot Street and Foxglove Road had also been developed
1985 – 2008	Various remedial actions were undertaken in relation to off-site leachate migration from the landfill including: – 1996: construction of a leachate collection trench and sump on the western side of the site. The trench is approximately 160 m long and estimated maximum depth of 6m. The final depth was excavated 150 mm below underlying bedrock to minimise seepage downgradient – 2004: construction of a shallow wetland in the north of the site to treat captured leachate – 2007: re-contouring of the Oval and installation of a landfill cap to prevent rainfall infiltrating the underlying soil circa 2007 – 2008: installation of a nitrification biological treatment facility at the shallow wetland to remove ammonia from treated leachate – The leachate capture and treatment system both still operate today. Treated leachate is pumped to a holding tank near the Amenities Building before being used to irrigate the sporting Oval
Sewer and stormwater systems	
1981 – 2021	– 1981: The Sydney Water Mt Kuring-Gai Sewer Carrier tunnel was constructed using a tunnel boring machine. The tunnel is 2400 mm high and 1500 mm wide and runs approximately 50 m below the Oval. The tunnel is much deeper than the nearby residential sewer systems – 2018: A transverse inspection of the Mt Kuring-Gai Sewer Carrier tunnel was conducted, and report findings indicated the sewer is generally in good structural condition with low infiltration – 2021 (June): Sydney Water attended a fault on the 12th of June 2021 at 1 Gloria Close which was found to be a private boundary trap issue – 2021 (November): Closed Circuit Television (CCTV) inspections of the sewer network were undertaken by Sewer Care for Sydney Water in November 2021 – Overall, eleven pipeline faults (structural fault grade 3 to 5) were identified
1983 – 2021	– 1983: The Sydney Water sewer main at the rear of 1 to 7 Gloria Close, Mount Colah was installed in 1983. Construction details are as follows: • The shallow sewer main is within the southern property boundary of 1 to 9 Gloria Close • The sewer main consists of 150 mm in diameter vitrified clay (VC) pipes and rubber ring joints laid in an excavated trench with granular bedding • The depth of the sewer: a. Behind 1 to 5 Gloria Close ranges from 1.05 to 1.46 mbgl (email from Sydney Water dated 05/11/21)

Year	Activity
	b. From the Sydney Water DBYD Plans, the depth to the pit inverts are as follows going east to west: 1.4 mbgl on Lancelot Street, 1.4 mbgl boundary of 5 and 7 Gloria Close, and 1.5 mbgl at boundary of 7 and 9 Gloria Close. At the boundary of 7 and 9 Gloria Close is a pit invert at 2.7 mbgl where the shallow sewer line drops vertically into the deeper line of the Mt Kuring-Gai Sewer Carrier tunnel – 2016: A sewer surcharge was reported to Sydney Water at the maintenance hole behind 5 Gloria Close on the 14th of May 2016. The cause of the blockage was identified as roots in the 150 mm sewer line – 2021 (March): Sydney Water staff attended Gloria Close after Council reported high gas readings on the 23rd of March 2021. Sydney Water staff gas tested the maintenance hole at the rear of 5 Gloria Close and the lamp hole at the rear of 3 Gloria Close and found no high readings at either location. There were no problems found with the sewer main at that time
1985 – 2009	– 1985: Council memos indicate that leachate was entering the stormwater drainage system through sub-soil drainage connections into a drainage pit located behind the Gloria Close properties. The connections were mortar filled to mitigate the leachate leaks – 1995 –1996: CCTV used by Council to trace leakage of landfill leachate into the stormwater pipe leading from the Gloria Close area to Gleeson Creek. Further details leading to these works are unclear and the location where the leachate was detected is not known – 2001: Gloria Close to Gleeson Creek stormwater pipe repairs by sealing of joints (joint grouting and internal liner) – 2003: Council contractors completed the sealing of a stormwater pipeline that ran 120 metres parallel to the oval (which experiences leachate infiltration). GHD believe these works were related to the same matter identified above – 2009: The stormwater pipe was repaired again after finding leakage of leachate into it
Recent events	
2021	– Two properties adjacent to the site were evacuated by Fire and Rescue New South Wales (FRNSW) in March 2021 due to the presence of methane concentrations >5% v/v on the properties – Environmental monitoring works were commenced in March 2021 by GHD
2022 - 2023	Remediation construction works involving the installation of a landfill gas venting system on the northern batter commenced in August 2022.

E-4 Site infrastructure

The site has above-ground and below ground infrastructure that could become sources of, pathways for, and/or receptors of landfill contaminants. The following outlines the more extensive subsurface systems related to the site:

– There are two primary Council stormwater systems directing residential stormwater around the site:
  - The northern stormwater system captures runoff from Lancelot Street, Excelsior Street and Gloria Close. Council Plan 138.5 shows that the section of this line that runs westward from the western end of Gloria Close to the western site boundary was installed in a historic drainage channel
  - The larger southern stormwater system captures runoff from the Pacific Highway, Foxglove Road, and Red Cedar Drive catchment areas
– Sydney Water owns and manages the sewer system around the site. Council owns and manages the sewer line that runs from the Amenities Building to the Sydney Water's sewer main on Foxglove Road
– Leachate lines run from the leachate trench in the Chestnut Road Reserve to the leachate treatment area, and then to the irrigation header tank by the Amenities Building

The locations of known site infrastructure including subsurface services is shown on the figures provided in Attachment 2 of the QS Guide at the front of this EMP. The locations of some subsurface services identified in this EMP are approximate only. A summary of the known subsurface services is provided in Table E.4 below. Additional detail on the landfill gas venting system is provided in *Northern Batter Operation and Maintenance Plan* (OMP) (GHD, 2023b).

Table E.4 On-site subsurface utilities summary

Area	Description
Oval Area	– **Stormwater:** There is a sand slit drainage system beneath the Oval surface with a western swale that has northern and southern outlets that connect to the larger stormwater system – **Leachate**: One leachate line runs along the northern boundary of the Oval Area approximately 15 metres to the south of the residential properties – **Electrical:** There are electrical lines that run around the boundary of this area and a line that runs east-west under the middle of the Oval. – **Potable water:** There is a potable water line that runs along the western side at the top of the Western Batter
Eastern Boundary Area (upgradient)	– **Stormwater:** Two stormwater drains are located at the southern end of the carpark on either side of the access road. Additionally, there is a stormwater drain at the northern end of the carpark in the turning circle – **Sewer:** A sewer main runs south from the Amenities Building through the nature strip between the carpark and Lancelot Street. This sewer line connects to Sydney Water's off-site sewer main near the main site entrance – **Leachate:** The leachate line on the Northern Boundary of the Oval follows the carpark turning circle then heads south to the Amenities building which it then enters and subsequently exits into the irrigation header tank – **Electrical:** There is an electrical line that runs from the Amenities Building south to Foxglove Road – **Potable water:** There is a line that runs west from Lancelot Street to the eastern side of the Amenities Building
Southern Boundary Area	– **Stormwater:** The stormwater runs from the south-western corner of the Oval down to join the mains off site on the southern side of Foxglove Road – **Potable water**: There is a potable water line that runs from the playground west along the upper part of the Southern Batter and then turns north to run along the top of the Western Batter
Western Boundary Area (downgradient)	– **Stormwater:** The northern stormwater line runs from the North-western Boundary Area into this area with the stormwater outlet to the west of Chestnut Road Reserve – **Sewer:** A sewer line runs from Chestnut Road to the north-western portion of the site boundary – **Leachate:** Leachate lines in the Western Boundary Area join up with the line that runs from the Northern Boundary of the Oval

Area	Description
	– **Electrical:** There is an electrical line that runs from the leachate sump south along Chestnut Road Reserve Street and another line connects the electrical line in the Oval Area to the Leachate Treatment Area
Northern Boundary Area	– **Stormwater:** A stormwater line runs north from the carpark turning circle and then traverses the rear yards of several Gloria Close properties before entering the North-Western Boundary Area – **Leachate**: A portion of the leachate line runs along the Oval's Northern Boundary towards the Eastern Boundary Area and crosses through the Northern Boundary Area at the top of the Northern Batter, approximately 15 m to the south of the residential properties
North-western Boundary Area	– **Stormwater:** A stormwater line runs from Gloria Close through the western paddock towards Gleeson Creek. It is joined by the stormwater line that previously traversed the rear yards of several Gloria Close properties in the Western Paddock (refer Northern Boundary Area text above) – **Sewer:** The Sydney Water Mt Kuring-Gai Sewer Carrier tunnel runs from the rear of 7 Gloria Close under the North-west corner of the Oval and across the Chestnut Road Reserve (Western Boundary Area) – **Leachate:** There is a leachate overflow line that runs from the southeastern corner of the Leachate Treatment Area to the stormwater pit near 7 Gloria Close

E-5 Environmental setting

GHD completed a detailed summary of the site environmental setting as presented in Table E.5 below.

Table E.5 Environmental setting summary – applicable for Foxglove Oval, Residential Area, and associated VMP Areas

Topic	Details
Climate	– The Terrey Hills automatic weather station (AWS) is located approximately 10 kilometres east-southeast of the site Long-term climatic data from Terrey Hills AWS indicates the site has: – Temperate to Mediterranean climate with a long-term average maximum temperature of 21.9 ºC and long-term average minimum temperature of 13.2 ºC (2004 to 2023 average) – Mean annual rainfall is 1,187.5 mm (2004 to 2024 average) – Since 2020, notably high rainfall events (nominally > 100 mm rainfall in 24 hours) occurred during: • 2020: December (105 mm) • 2021: March (112.8 mm) • 2022: March (125 mm) • 2023: February (127.2 mm) • 2024: April (161.2 mm)
Surface and near surface	
Topography	**<u>Historical topography</u>** – From the historical topographic maps (1960s and 1973) and historical aerial photographs (1947, 1956, 1961, and 1965), the north, east, and south-east sides of the site were bounded by sandstone cliffs that appear to have ranged from 3 to 10 metres in height above ground surface. The 2022 electrical resistivity imaging (ERI) geophysical survey of the Northern Batter identified likely subsurface 2 to 4 m historical sandstone cliff faces along parts of the Northern Boundary which were buried during development of the landfill – Historically, the site was the eastern to north-eastern side of the headwaters of Gleeson Creek – Gleeson Creek was an ephemeral creek that flowed north-west to Calna Creek – There appears to have been several ephemeral drainage channels running westward across parts of the site and draining into Gleeson Creek. The following provide lines of evidence for these channels: • Coffey reported there were nine historical ‘erosion scars’ on the original surface prior to being filled with waste (Coffey, 1980). These are most likely related to historical ephemeral drainage channels. A large erosion scar was noted in the north-eastern corner of the site, immediately to the south of the Residential Area. The scar was described as U-shaped with a westward downslope. This “scar” aligns with the historical topographic contour lines (1960s and 1973) and imagery in historical aerial photographs (1947, 1956, 1961, and 1965) that all suggest this was drainage channel draining into Gleeson Creek • Two ‘old stream channels’ were also noted by Coffey (1980), one in the north-western corner flowed to the south-west (likely through what is now the Western Paddock and shown on Council Plan No. 138.5) and the other being the main historical channel in the south-west corner flowed to the north-west. Both of these historical channels are evident on the historical topographic contour lines (1960s and 1973) and imagery in historical aerial photographs (1947,1956, 1961, and 1965) – Prior to 1970, parts of the site may have been used as borrow pits or small sand quarries from what appear to be small discrete excavations and sheds appearing in parts of the site from the historical aerial photographs (1947, 1956, 1961, 1965 and 1970). This is no evidence of large-scale excavations at the site from these aerial photographs – From 1970 to 1980 the site was filled with waste and then capped at the current elevations and landscape feature – In the late 1980s and early 1990s, materials such as concrete, road base and mulch were deposited on the Chestnut Road Reserve. These materials were sourced from driveways, footpaths, and vegetation clearing within Council’s Local Government Area (LGA). As perceived by Council, the flat space of the Chestnut Road Reserve was historically wider, but has become narrower as filling with concrete, road base and mulch occurred (circa late 1980s and early 1990s) along with potentially mass movement of the Western Batter – From August 2022 through June 2023 the Northern Batter Remediation Works included both excavations and soil placement that altered the topography of both the Northern Batter and the Western Paddock

Topic	Details
	Current topography **Oval Area** – The current Foxglove Oval is generally flat and is located at approximately 174 metres Australian height datum (m AHD) **Eastern Boundary Area:** – Sandstone outcrops are present on the eastern boundary of the Oval and there is a steep incline from the adjacent properties along Lancelot Street (approximately 182 m AHD) down to the surface of the Oval. The eastern boundary of the site slope becomes more gradual towards the southern end of Lancelot Street **Southern Boundary Area:** – To the south of the playing fields there is an embankment down to Foxglove Road (approximately 170 m AHD) **Northern Boundary Area:** – The Northern Boundary of the site has an inclined batter that slopes steeply downwards to the north towards the residential properties on Gloria Close – The north-eastern boundary has a similar topographic level to the playing field. The topography rises to the north of Gloria Close to approximately 194 m AHD on Excelsior Road **North-western Boundary Area:** – There is a steep embankment on the north-western boundary of the site which intersects with a sandstone outcrop near the dwellings on Dianella Way at approximately 186 m AHD **Western Boundary Area:** – The western side of the playing field has a steep embankment down to the Chestnut Road Reserve (approximately 160 mAHD), which flattens out prior to a decline to the west following Gleeson Creek – In 1980 the following observation about the northern end was made. A localised slide has occurred on the western batter near its northern corner. The slide is about 25m wide and extended almost the full height of the slope. The cause is unknown – This localised depressson at the northern end was observed in 2022 in the Landslide Risk Assessment, Foxglove Oval Western Batter and described as … The depression appeared as a linear feature sub-parallel to the batter crest alignment at its northern end, with a curving arc-shape 'petering out' at its southern end within the grass cover. There was a slight (10mm or so) drop of the ground surface (down to the western side) across the feature
Surface Drainage	**Stormwater lines** There are two Council stormwater systems directing residential stormwater around the site: – There are stormwater pipes running east to west located both north and south of the Residential Area which convey stormwater from the Gloria Close area to Gleeson's Creek, which is located to the west of the site – A preliminary review of the closed-circuit television (CCTV) inspections completed in 2021 identified several stormwater pipes that are defective or partially blocked **Stormwater infiltration:** – Council had indicated that between 2006 and 2007 the existing landfill clay rich covering layer of the Oval Area was re-profiled to prevent rainfall from entering the fill – A sand slit drainage system was installed on the Oval's surface in January 2011. These drains consisted of perforated plastic agricultural lines at depths ranging from 75 to 100 mm deep surrounded by sand and/or gravel. The installation quote for the system suggests the pipes were laid in trenches that were lined with a PVC membrane. These drains connect to a central north south running collector drain. It is understood that there are northern and southern outlets that connect to the local stormwater lines – The following areas have an increased potential for surface water infiltration into the underlying landfill: • The lack of kerb and gutter on the western side of Lancelot Street, eastern site boundary, at times may allow increased run-off into the landfill • If the Oval collection swale cannot adequately drain run-off during periods of increased rainfall. This swale is on the western edge of the Oval and is the part of the sand slit drainage system that connects to the stormwater lines at the northern and southern ends • The drainage channel in the Western Paddock during periods of increased rainfall could overflow – Currently, landfill leachate underneath the site is understood to drain to the west into a leachate trench located along the foot of the Western Batter from where it is pumped to the leachate treatment

Topic	Details
	area in the northwest corner of the site. The northern extent of the trench is constrained by the sewer line and the southern extent is constrained by the culverts under Chestnut Road Reserve **Surface water receptors:** – The nearest surface water body to the site is Gleeson Creek, located west and down-gradient of the site. Gleeson Creek flows in a north-west direction into Calna Creek approximately 1.5 km to the north-west of the site – An unnamed ephemeral drainage channel is located along the Northern Boundary at the eastern side of the Western Paddock. This channel drains behind 9 Gloria Close to the southeast towards stormwater pit 13 behind 7 Gloria Close. The channel is approximately 20 centimetres deep at its northern end and becomes approximately 1 metre deep at its southern end
Surface Cover	– Most of the site (approximately 70%) is grass covered and forms part of the playing fields – 20% covered by Chestnut Road Reserve, and non-native vegetation to the north, west and south – 10% of the site is covered by the Amenities Building, carpark (eastern portion) and the leachate treatment area (north)
Soils Landscapes	– The soil landscape series sheet (Sydney 1:100,000 scale, Sheet No. 9130) (Chapman et al, 2009) indicates that: • The site is underlain by the Hawkesbury Soil Landscape with disturbed terrain on the site of the landfill itself • The Hawkesbury Soil Landscape comprises colluvial landscape features rolling to very steep hills on Hawkesbury Sandstone with narrow crests and ridges, narrow incised valleys, steep side slopes with rocky benches, broken scarps and boulders – Soil is susceptible to extreme erosion with risk of mass movement. It is also highly permeable with low soil fertility – Subsurface conditions are described as general fill comprising reworked clay, sandy clay and landfilled waste was encountered to variable depths ranging from 0.8 metres to 11.50 metres below ground level (mbgl). The maximum depth of the landfill or thickness is unknown; however, based on topography it could be up to 16 m or so deep – Understanding of the surface and near surface material of the site has been updated based on investigation works undertaken recently: • It is understood that the Oval is underlain by a clay-rich capping layer. Eleven shallow hand augers (less than 1 m) have been advanced across the Oval and encountered sand and sandy clay before the capping layer was observed at 0.5 to 1.0 mbgl • Northern Batter cover material is sandy clay to clay with an average clay content up to 40% and the material is up to 2.5 m depth • Natural soils adjacent to the Northern Batter are thinner at generally 1 m or less depth and contain less clay (i.e., more sand) with an average of 8.3% clay • Southern Batter cover material is silty sand, sandy clay, and silty clay up to 3.0 m depth • Western Batter cover material is gravelly clay, sandy clay, and clay up to 15 m depth • Eastern carpark and grass verge have sandy clay and sand up to 1.8 m depth
Acid Sulfate Soil	The site and Residential Area have no known occurrence of acid sulphate soils as per the risk maps prepared by the (Department of Land & Water Conservation, 1997)
Subsurface	
Geology	The geological series sheet for the site (Sydney 1:100,000 scale, Sheet No. 9130 (Herbert, 1983)) indicates: – The site and surrounding area to the north, south, east and west is underlain by the Triassic Hawkesbury Sandstone Formation which comprises medium to coarse grained quartz sandstone, very minor shale and laminate lenses – Sandstone outcrops are observed on the boundaries of the site To the south of the site, along the southern ridge line, the Triassic Mittagong Formation overlies the Hawkesbury Sandstone
Hydrogeology and Registered Groundwater Bore Search	The site is located within the Hawkesbury hydrogeological landscape which comprises a semi-confined aquifer with flow through both fractures and connected pore spaces within the sandstone bedrock as per eSPADE (Department of Planning, Industry and Environment, 2022) **Water bearing units:** – Shallow unconfined perched groundwater has been observed in the overburden (soil and/or fill) in discrete areas around the site

Topic	Details
	– Intermediate unconfined perched groundwater has been observed in the upper heavily weathered part of the sandstone bedrock on the eastern parts of the site where the depth to the regional aquifer is greater. On the western half of the site, the regional aquifer is closer to the top of the sandstone surface with the sandstone sometimes almost completely saturated – There is a regional unconfined to semi-confined aquifer in the sandstone bedrock **Groundwater at the site does not uniformly respond to rainfall:** – In general, monitoring wells in the regional aquifer show a delayed response to increased rainfall as expected from a deep unconfined to semi-confined aquifer. The delay ranges from week to months depending on the wells' location, surface cover, and condition of local sandstone. In areas where there is more open ground, the deep groundwater levels tend to respond more rapidly and over a larger range than those in the deep wells in the Residential Area where there is more hardstand – Shallow wells in perched unconfined groundwater tend to show more rapid, less extreme, and not sustained changes in standing water level due to rainfall than the deep wells **Groundwater flow:** – Deep regional groundwater flow is generally westerly in alignment with the topography of the local area and location of nearby surface water bodies. The northern part of the site has a south-westerly flow direction while the southern part of the site has a north-westerly flow direction – Groundwater elevations at the site during the fourth quarter monitoring event (January to March 2022) were between ~166.6 mAHD along the Eastern Boundary of the site on Lancelot Street and ~151.7 mAHD along the Western Boundary of the site – Shallow perched groundwater flows may be influenced by fill materials and/or landfilled wastes at the site. The areas of perched groundwater are localised and are not continuous across the site area **Hydraulic conductivity:** – The hydraulic conductivity of the Hawkesbury Sandstone is highly variable and depends on the depth of the groundwater well and what bedrock defects and structures (e.g., joints, crushed seams, fractures) are intersected. In general, hydraulic conductivities have been observed to decrease with depth. Some published values are listed as follows: • eSPADE (DPIE, 2023) reports that hydraulic conductivity within the aquifer through porous rock and fractures and joints is high (> 10 m/day) and salinity is fresh (< 0.8 dS.m) • A study of 450 packer tests on 150 bores observed a mean of 0.1 m/day in near surface wells and a mean of 0.002 m/day at 50 m depth (Tammetta & Hewitt, 2004) • Published permeability data from various authors was collated (Dale, 2015) and showed a range of 8.6×10^{-5} to 2.0 m/day – The results of site-specific hydraulic conductivity testing as outlined indicated: • There was a large range of values from 0.002 to 0.385 m/day based on whether wells intersected fracture zones, crushed seams or other bedrock features. MW6 is an outlier with a value of 2.624 m/day • The wells along the Western Boundary (hydraulically downgradient of the site) had higher hydraulic conductivities with a range of 0.006 to 0.385 m/day (mean 0.090 m/day). That range was calculated after removing one high outlier of 2.358 m/day. It is noted that those values were generally three to nine times greater than results from the nine hydraulically upgradient wells • In the hydraulically up gradient Northern Boundary Area and adjacent Residential Area, the wells had lower conductivities by 3 to 10 times than along the Western Boundary. The wells along the site's Northern Boundary had a mean of 0.035 m/day while the Residential Area wells were even lower with mean of 0.007 m/day **Registered bores:** A search of the Australian Groundwater Explorer (BOM, 2025) did not identify any registered groundwater bores within 500 metres of the site as of 27 February 2025

E-6 Information on landfilled waste extent

GHD completed a detailed summary of the landfilled waste extent as presented in Table E.6 below. Figure B.5 in Appendix B shows the inferred extent of the landfilled waste at the site and locations where waste was encountered during intrusive investigations.

Table E.6 Landfilled waste extent depth by VMP Area

VMP Area	Details on waste extent and depth
Oval	Eleven hand auger samples (HA01 – HA11) were collected during the SCI to depths of between 0.25 – 1 mbgl. The cover material was generally sandier near the surface with increasing clay content at depth. No landfilled waste was encountered in the hand augers.
Eastern Boundary Area	– The eastern boundary of the landfill is generally considered to be somewhere between the eastern edge of the carpark and the sandstone ridge that runs along the western side of Lancelot St • Waste has been observed in bores at the northern end (GW2) and southern end (GW4), but not in the central part of this area (not present at GW3) • The aerial photos from the early 1970's shown that parts of the Eastern Boundary Area were highly disturbed, especially along the southern part of the boundary – The waste appears to generally be deeper than 3 m when it is present. There may be areas where shallow waste is present from the landfill or more recent waste/fill placement • Waste was observed at depths of 3.4 to mbgl (GW2, northern end of boundary) and 3.6 to mbgl (GW4, southern end of boundary). And there was refusal on a brick at 0.5 m for HA14 (north of Amenities Building • In the central part of the boundary, waste was not observed at either GW3 (sandstone at 1 mbgl) or HA15 (east of the Amenities Building) had refusal on sandstone at 0.15 m • No test pits have been advanced in the Eastern Boundary Area
Southern Boundary Area	– The extent of the landfilled waste boundary is generally considered to be the northern side of Foxglove Road, to the south of the site boundary • Waste was present in all test pits on the northern side of Foxglove Road but it was unclear whether the waste was part of the landfill or potentially windblown from the site during its operational period. The aerial photos from the early 1970's shown that this area was highly disturbed. • The boreholes for wells along the southern side of Foxglove Road were clear of waste – Waste was present in all test pits on the northern side of Foxglove Road starting at depths of 0.15 mbgl, 1.5 mbgl, and 2.5 mbgl
Western Boundary Area	– The extent of waste materials seems to extend into the Chestnut Road Reserve in places and has been observed at depths starting at depths of 1.5 mbgl, and 2.5 mbgl in this area • It is unclear whether the waste observed was part of the landfill area, or windblown during the site's operational period, or from localised placement of fill material outside the landfill. • Information gained from the Leachate Workshop was that in the late 1980s and early 1990s, materials such as concrete, road base and mulch were deposited on the Chestnut Road Reserve. These materials were sourced from driveways, footpaths, and vegetation clearing within Council's Local Government Area (LGA) • As such, the western boundary of the landfilled waste is considered to end at the toe of the Western Batter – Estimated maximum waste depths for the top of the Western Batter were gathered from the following: 1) GHD (2022) *Supplementary Contamination Investigation* logs for GW41 to GW423; 2) Douglas Partners (2000) *Report on Geotechnical Investigation - Proposed Leachate Irrigation Scheme* CPT logs for CPT1,2A, 3; and 3) recent Douglas Partners (2023*) Existing and Proposed Monitoring Locations Western Batter Slope Monitoring* draft logs for INCL1 to INCL3: • Northern end of the top of the Western Batter: 16.0 mbgl (CPT4) to 17.6 mbgl (INCL1) • Middle of the top of the Western Batter: 15.7 mbgl (INCL2) to 16.8 mbgl (CPT3) • Southern end of the top of the Western Batter: 14.7 mbgl (CPT2A) to 16.0 mbgl (GW43)
Northern Boundary Area	– Based on the local geology and drilling observations, the lateral extent of the landfill to the north appears to have been bounded by the historical sandstone surface • The historical sandstone ledge would have marked the higher part of the historical drainage basin and it appears to have been a natural barrier for the landfilling operations

VMP Area	Details on waste extent and depth
	• Waste did not extend into the residential properties as confirmed by the drilling of the boundary monitoring well network. – The depth of waste on the Northern Batter starts on average at 2.0 mbgl and then extends to depths ranging from 2.6 to 13.8 mbgl. • Northern Boundary remediation drilling works showed the starting depth of waste on the Northern Batter ranging from 1.0 to 4.0 m (average 2.0 m). • The final depths of the waste at the vents (southern, upslope, part of the Northern Batter) ranged from 3.0 to 13.8 mbgl. The final depths of the waste at the collection bores (downslope, mid-slope of the Northern Batter) ranged from 2.6 to 10.4 mbgl.
North-western Boundary Area	– The extent of waste in the Northern Paddock is generally considered to be south and west of the drainage channel that runs along the northern and eastern part of this area • Landfilled waste was observed in the northern test pits of TP06 and TP07 and eastern test pits of NB_14, NB_15 and NB_TP16 • Waste was not observed during drilling of GW20, GW37, GW36, or GW54 – The depth to waste is generally observed to start around 0.5 mbgl but may be deeper in the upper slope (western) part of the Western Paddock, near the Treatment Area. Waste was observed at GW15 to its final depth of 4.0 mbgl and at GW40 to its final depth of 8.0 mbgl • Historical test pits TP06 and TP10, and bores for GW15 and GW40 observed waste to generally start around 0.50 mbgl and continued to their completion depths • More recent test pits NB_TP13 to NB_TP19 also encountered waste at a depths of around 0.5 m and to their completion depths. Only one test pit (NB_TP13, western part of the Western Paddock) didn't observed waste at its final depth of 0.9 mbgl

Appendix F

Declaration, Clean-up Notice and Voluntary Management Proposal

Clean-up Notice

Section 110 Protection of the Environment Operations Act 1997

Variation of Clean-up Notice

Hornsby Shire Council
20 706 996 972
296 PEATS FERRY ROAD
HORNSBY NSW 2077

Attention:

Notice Number	3511273
Reference Number	VN-1531
Date	27-02-2025

VARIATION OF NOTICE OF CLEAN-UP ACTION

BACKGROUND

A. The Environment Protection Authority (EPA) issued Notice of Clean-up Action No. 3502130 to Hornsby Shire Council on 14-04-2022.
B. On 5 September 2022, Hornsby Shire Council contacted the EPA and requested an extension of time to comply with the dates specified under items 4, 5 and 6 in the Notice. The reasons for the request generally relate to the tender process, saturated ground conditions and additional sampling and analysis undertaken and are considered satisfactory.
C. The Environment Protection Authority (EPA) issued a Variation to the Clean-up No.VN- 536 to Hornsby Shire Council on 18-11-2022.
D. On 28 November 2022, Hornsby Shire Council contacted the EPA and requested an additional extension of time to comply with the dates specified under items 4, 5 and 6 in the Notice. Notice of Clean-up Action No. VN-615. The reason for the request relates to extended wet weather causing the delay and are considered satisfactory.
E. On 7 August 2023, Hornsby Shire Council contacted the EPA and requested an additional extension of time to comply with the dates specified under items 5 and 6 in the Notice. The reason for the request relates to delays in construction arising from limited space to undertake tasks safely and are considered satisfactory.
F. The Environment Protection Authority (EPA) issued a Variation to the Clean-up No.VN- 834 to Hornsby Shire Council on 09-08-2023.
G. On 5 December 2024, Hornsby Shire Council contacted the EPA and requested an additional extension of time to comply with the date specified under item 6 in the Notice. The reason for the request relates to additional investigations on leachate and secondary sources following from the Initial Validation Report. The extension will align the Clean Up Notice with the 2025 Voluntary Management Proposal for the Northern Batter deliverables and the Site Auditor Statement to be submitted at one time. The extension is considered satisfactory.
H. The EPA has reviewed and considered the request and agrees to extend the timeframes as noted below.
I. Hornsby Shire Council has completed Item 5 and this date been removed from the Notice.

Variation of Clean-up Notice

VARIATION OF NOTICE OF CLEAN-UP ACTION

1. By this notice the EPA varies Notice of Clean-up Action No. 3502130 ("the previous notice") in the following manner:

Notice of Clean-up Action No. 3502130	Date in Notice No.3506320	Approved revised date
1. Conduct the remediation work in accordance with the draft report *Foxglove Oval Northern Batter Landfill Gas Management Strategy – Remedial Options Assessment and Design Basis – Stage 1,* dated 15 February 2022.		
2. Finalise the detailed design of the Landfill Gas Management Strategy Stage by the 9 June 2022.		
3. Commence breaking ground for the installation of the active remediation system by the 16 June 2022.		
4. The gas collection bores and vents are to be installed. (Completed)		
5. Provide the initial validation report for the northern batter to the EPA. (Completed)		
6. Provide the final validation report for the northern batter to the EPA.	29 March 2025	17 March 2026
7. Waste is likely to be required to be exhumed as part of the remediation works (in 1). The EPA approves the exhumation of waste from the former landfill for the purposes of conducting the remediation work specified in 1 (above).		

Variation of Clean-up Notice

8. Any waste that is exhumed from the former landfill area must be managed in accordance with the Protection of the Environment Operations Act 1997		
9. Site work and reporting addressing directions (1) and (2) above must be in accordance with the statutory guidelines made or approved by the EPA. Further information may be found at https://www.epa.nsw.gov.au/your-environment/contaminatedland/statutory-guidelines		
10. Contamination reporting, including validation reports must be prepared by a contaminated land consultant that is certified by one of the schemes recognised by the EPA, prior to review by a site auditor accredited under the CLM Act. The reports must be approved by the site auditor prior to submitting to the EPA by the specified dates.		

George Orel
Unit Head
(by Delegation)

INFORMATION ABOUT THIS NOTICE

- Details provided in this notice will be available on the EPA's Public Register in accordance with section 308 of the Protection of the Environment Operations Act 1997.
- This notice is issued under section 110 of the Protection of the Environment Operations Act 1997.
- This notice operates from the date of issue of this notice unless a later date is specified in this notice.

Declaration

Environment Protection Authority

Declaration of significantly contaminated land

(Section 11 of the *Contaminated Land Management Act 1997*)

Declaration Number 20201102; Area Number 3453

The Environment Protection Authority (EPA) declares the following land to be significantly contaminated land under the *Contaminated Land Management Act 1997* ("the Act"):

1. Land to which this declaration applies ("the site")

This declaration applies to the land that is located at Foxglove Oval, Foxglove Road, Mount Colah, NSW (Lot 507 in DP 752053, Lot 19 in DP1002578 and part Chestnut Road Reserve to the west of the oval), within the Local Government Area of Hornsby Shire Council. The land to which this declaration applies is shown on the attached figure.

2. Nature of contamination affecting the site

The EPA has found that the site is contaminated with the following substances from the former use of the land as a landfill ("the contaminants"):

- Landfill gases, including methane and carbon dioxide
- Landfill leachate, including ammonia, heavy metals and organic contaminants.

3. Nature of harm that the contaminants may cause

The EPA has considered the matters in section 12 of the Act and has reason to believe that the land is contaminated and that the contamination is significant enough to warrant regulation under the Act due to the following:

- The site is a former landfill which was used for the disposal of municipal waste over many years. The decomposition of wastes contained in the landfill is a source of leachate and ground gases, including methane and carbon dioxide.
- Concentrations of methane and carbon dioxide measured in monitoring wells installed within the waste materials at the perimeter of the park on the north-west, north-east and south-east boundaries, exceeded the nominated assessment criteria.
- There is the potential for off-site migration of landfill gases via preferential pathways and for the landfill gases to accumulate in enclosed spaces, including service trenches and nearby residences.
- The initial air monitoring within residences adjoining the landfill have shown no risk, however further testing is required for confirmation, and to delineate the extent of the landfilled area and the migration of gases.
- Operational details and the efficiency of the leachate interception trench are not known. Further assessment is required to identify whether leachate is impacting groundwater and/or surface water and if there are potential risks from migration beyond the site boundaries.

4. Further action under the Act

The making of this declaration does not prevent the carrying out of voluntary management of the site and any person may submit a voluntary management proposal for the site to the EPA.

5. Submissions invited

The public may make written submissions to the EPA on:

- Whether the EPA should issue a management order in relation to the site; or

- Any other matter concerning the site.

Submissions should be made in writing to:

Director Regulatory Operations – Metro South
Environment Protection Authority
Locked Bag 5022
Parramatta NSW 2124

or emailed to: contaminated.sites@epa.nsw.gov.au

by no later than 21 March 2020.

[signed]

GISELLE HOWARD
Director Regulatory Operations – Metro South
Environment Protection Authority

Date: 18 February 2020

NOTE:

Management order may follow

If management of the site or part of the site is required, the EPA may issue a management order under s.14 of the Act.

Amendment/Repeal

This declaration may be amended or repealed. It remains in force until it is otherwise amended or repealed. The subsequent declaration must state the reasons for the amendment or repeal (s.44 of the Act).

Information recorded by the EPA

Section 58 of the Act requires the EPA to maintain a public record. A copy of this significantly contaminated land declaration will be included in the public record.

Information recorded by councils

Section 59 of the Act requires the EPA to give a copy of this declaration to the relevant local council. The council is then required to note on its planning certificate issued pursuant to s.10.7 (2) of the *Environmental Planning and Assessment Act 1979* that the land is declared significantly contaminated land. The EPA is required to notify council as soon as practicable when the declaration is no longer in force and the notation on the s.10.7 (2) certificate is no longer required.

Relationship to other regulatory instruments

This declaration does not affect the provisions of any relevant environmental planning instruments which apply to the land or provisions of any other environmental protection legislation administered by the EPA.

VMP

VOLUNTARY MANAGEMENT PROPOSAL UNDER THE CONTAMINATED LAND MANAGEMENT ACT 1997

Part 1

Preliminary Details

1. Proponent's Details

(a) Name and contact details

If a registered company, company name:
Trading as: Hornsby Shire Council

[redacted]

(b) Who the EPA should contact with technical enquiries about the proposal

[redacted]

2. Site to which proposal applies

The site to which the proposal applies ("the site") is:

The land located at Foxglove Oval, Foxglove Road, Mount Colah, NSW (lot 507 in DP 752053, lot 19 in DP1002578 and part Chestnut Road Reserve to the west of the oval), within the Local Government Area of Hornsby Shire Council. The land to which the proposal applies is shown bounded by the yellow line on Figure 1 below.

Figure 1 The land to which this proposal applies (bounded by the yellow line)

3. The contamination

Soil and/or groundwater and/or surface water are contaminated with substances of concern and the contamination is significant enough to warrant regulation under the *Contaminated Land Management Act 1997*.

The substances of concern ("the contaminants") are:

- Landfill gases, including methane and carbon dioxide
- Landfill leachate, including ammonia, heavy metals and organic contaminants.

4. The management proposal

The management proposal ("the proposal") comprises:

a) the information set out above;
b) the actions, works and other components set out in the following documents:
c) the undertakings set out in Part 2 of this document; and

d) the performance schedule set out in Part 3 of this document.

Title	Prepared by	Date
Report on Geotechnical Investigation Proposed Residential Subdivision, Stage 1, 23 Chestnut Road, Mount Colah, NSW	Douglas Partners	March 2015
Report on Preliminary Site (Contamination) Investigation Proposed Residential Subdivision, Stage 1, 23 Chestnut Road, Mount Colah, NSW	Douglas Partners	September 2016
Landfill Gas Assessment, Foxglove Oval, Mt Colah NSW	Arcadis	April 2018
Landfill Gas Delineation Assessment and Leachate Investigation Foxglove Oval, Mt Colah NSW	Arcadis	February 2019
Foxglove Oval – Landfill Support Works: Landfill Gas Monitoring Report - Summary	GHD Pty Ltd	November 2019
Foxglove Oval – Landfill Support Works: Preliminary Advice – Water Quality Monitoring Results and Assessment	GHD Pty Ltd	April 2020
Foxglove Oval – Landfill Support Works: Preliminary Advice – Landfill Gas Monitoring Results and Assessment	GHD Pty Ltd	April 2020
Landfill gas monitoring in amenities building, along new sewer alignment and at certain sub-surface service pits	GHD Pty Ltd	March 2020
Initial Voluntary Management Proposal	Hornsby Shire Council	Original dated 21 May 2020 and amended 13 August 2020
Interim Environmental Management Plan (IEMP)	GHD Pty Ltd	August 2020
Sampling, Analysis, and Quality Plan (SAQP) for IEMP	GHD Pty Ltd	September 2020
Preliminary Monitoring Round Report	GHD Pty Ltd	September 2021
Detailed Site Investigation (DSI)	GHD Pty Ltd	September 2021 (Draft to Auditor)
First Quarterly Monitoring Report (as per SAQP)	GHD Pty Ltd	September 2021 (Draft to Auditor)
Second Quarterly Monitoring Report (as per SAQP)	GHD Pty Ltd	December 2021 (Draft to Auditor)

Part 2

Undertakings Included in Voluntary Management Proposal

THE PROPOSAL INCLUDES THE FOLLOWING UNDERTAKINGS:

General

1. All works or activities carried out in connection with the proposal, including sampling and preparation of associated reports ("the activities"), will be carried out in accordance with applicable provisions of *State Environmental Planning Policy 55 – Remediation of Land* and any requirements imposed under it in relation to the activities.
2. All matters listed as relevant to a remediation action plan by the EPA's *Consultants reporting on contaminated land: Contaminated Land Guidelines* (2020) will be taken into account in the carrying out of the activities.
3. All the activities will be carried out consistently with guidelines made or approved under section 105 of the CLM Act.
   (See www.epa.nsw.gov.au/clm/guidelines.htm)
4. All the activities will be carried out in compliance with applicable NSW environmental legislation, and in particular:
   i) All the activities, including:
      (1) the processing, handling, movement and storage of materials and substances used to carry out the activities; and
      (2) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activities

      will be carried out in a competent manner;
   ii) All plant and equipment installed at the site or used in connection with the activities:
      (1) will be maintained in a proper and efficient condition; and
      (2) will be operated in a proper and efficient manner.
5. All the activities at the site will be carried out in a manner that prevents or minimises the emission of dust, odour and noise from the site.
6. Waste generated or stored at the Site will be assessed and classified in accordance with the EPA's *Waste Classification Guidelines Part 1: Classifying Waste*.

   (See www.epa.nsw.gov.au/wasteregulation/classify-guidelines.htm)
7. All waste transported from the Site that is required by the *Protection of the Environment Operations (Waste) Regulation 2014* to be tracked must be tracked using the EPA's on-line tracking system or an alternative tracking system approved in writing by the EPA.

   (See www.epa.nsw.gov.au/owt/aboutowt.htm)
8. The proponent will make this voluntary management proposal available to the public free of charge and consents to the EPA placing this proposal on its public website.

9. The proponent will make all documents referred to in, and required to be prepared under, this voluntary management proposal available to the public free of charge, unless the proponent identifies commercial-in-confidence or private/personal information (including information relating to a third party) within those documents. In these cases, the proponent will remove such information from the documents to make the documents suitable for public release.

10. The proponent will:

    i) prior to the implementation of the proposal provide for the EPA's approval a strategy for communicating about that implementation, particularly the actual management works, with members of the public who are likely to have a real interest in or be affected by that implementation; and

    ii) implement the strategy as approved in writing by the EPA.

Monitoring, Record Keeping & Reporting

11. At least until the EPA has notified the proponent that the EPA no longer considers that the contamination is significant enough to warrant regulation under the *Contaminated Land Management Act 1997*, record and retain all monitoring data and information and provide this record to the EPA at any reasonable time if so requested by the EPA and as specifically provided under the proposal.

    [Note: Specific details of monitoring and data reporting requirements, requirements for progress reports, etc are to be set out in the performance schedule in Part 3 of this document.]

12. The EPA will be informed in writing within 7 days of the proponent becoming aware of information or data indicating a material change:

    a) in conditions at the site, or

    b) in its surrounding environment,

    which could adversely affect the prospects of successful management of the site or result in harm to the environment.

13. The EPA will be informed in writing within 7 days of the proponent becoming aware of any failure, either by the proponent or any other person, to comply with any term of the proposal.

14. If the proponent becomes aware that they will not meet a key milestone or reporting requirement, they must notify the EPA in writing at least 21 days before the specified deadline. The notification must include:

    a) detailed reasons for not meeting the milestone or requirement,

    b) a revised time period within which the milestone or requirement will be met, and

    c) a statement explaining why compliance action should not be taken.

15. The EPA will be informed in writing as soon as practicable of any notification by the proponent, its employees or its agents to an appropriate regulatory authority other than the EPA of any pollution incident at the site within the meaning of the *Protection of the Environment Operations Act 1997*.

    (See http://www.epa.nsw.gov.au/licensing/dutytonotify.htm)

Performance Schedule

16. The performance schedule which is in Part 3 of this document will be adhered to.

Part 3

Performance Schedule

1. Objectives of the proposal

This new VMP divides the site into five different focus areas which are shown below on Figure 2:

1. Oval,
2. Northern Boundary (dark blue dashed line)
3. Western and North-western Boundary (orange dashed line)
4. Eastern Boundary (green dashed line)
5. Southern Boundary (light blue dashed line).

The boundary lines for each area are indicative only

Figure 1 Focus areas for new VMP

The proposal is to be undertake in three phases:

- **Phase 1 - Emergency Response:** this involves the emergency response investigation tasks related to the off-site migration of ground gases.
- **Phase 2 – Remedial Options Assessment**: this involves the investigations required to develop remedial options for the whole oval, northern boundary, western and northwestern boundary, southern boundary, and eastern boundary. The Remedial Investigation for each area may consist of several discrete detailed investigations which will be reviewed and endorsed by a NSW EPA Accredited Site Auditor.

Proponent: Hornsby Shire Council

Site: Foxglove Oval, Mount Colah

Proposal Date: 8 February 2022

- **Phase 3 – Remediation & Validation**: this involves remediation and validation on different parts of the oval, as required.

This Schedule focuses on Phase 1 and Phase 2. The Phase 3 components are included but may need to be updated after Phase 2, due to the current uncertainty in remediation requirements and remedial approaches for the different areas of the oval at this time.

The main contamination related objectives of Hornsby Council for the site are as follows:

O1. Confirm the nature, significance, and extent of contamination present at the site and offsite.

O2. Identify the risks that the contaminants may pose to human health and/or the environment.

O3. Where required, implement appropriate measures to manage the identified contamination thereby reducing the potential risks to human health and/or the environment at the site and off-site.

2. Principal features of the proposal

The principal features of Phases 1 and 2 include, but are not limited to:

a. Capital works

P1. Installation of shallow ground gas wells as part of the Emergency Response Investigation (related to the northern boundary) and in other areas if required. Installation of additional wells, if required, would be done as per an Auditor endorsed Sampling, Analysis and Quality Plan (SAQP).

P2. Installation of additional groundwater wells for the northern boundary and other areas if required. Installation of additional wells, if required, would be done as per an Auditor endorsed SAQP.

P3. Installation of additional landfill gas (LFG) perimeter wells for the northern boundary and other areas if required. Installation of additional wells, if required, would be done as per an Auditor endorsed SAQP.

P4. Repair and/or enhance, as required, the existing leachate management system

P5. Repair and/or enhance, as required, the existing stormwater management system

P6. Repair and/or enhance, as required, the existing amenities building and associated sewer infrastructure.

P7. Construction of an access track on northern batter, as required

P8. Installation of the first stage (Stage 1) of a staged LFG management strategy for the northern batter.

b. Remediation

Repairs will be undertaken to the leachate, sewer, and stormwater management systems, as required (see P4 to P6).

The first stage of the northern batter LFG management strategy (Stage 1) will be implemented. If needed, Stage 2 works will be installed after assessing the effects from the Stage 1 installation.

The works undertaken as part of the Phase 2 remedial options assessment(s) will inform the Phase 3 remedial action plan(s), remediation and validation works (see T3)

c. Monitoring

P9. Monitoring, as required, related to the emergency response investigation (T1 and R1). At the end of Phase 1 – Emergency Response, this monitoring program will be assessed, modified, and incorporated into a Residential Area Monitoring Program (RAMP). The RAMP will continue through remediation and validation of the northern boundary area and then be incorporated into the larger monitoring program for the oval as outlined in the IEMP and SAQP (see R3). These activities include monitoring and reporting of.

- Landfill gas in off-site buildings, surface, sub-subsurface, and select utility pits
- Groundwater standing water levels

P10. Ongoing monitoring of the oval as per the current IEMP and SAQP. This monitoring program will be reviewed and updated as required, but at a minimum annually (see R2 and R3). These activities will include monitoring and reporting of

- Landfill gas in on-site buildings, off-site buildings, surface, sub-subsurface, and utility pits
- Groundwater, surface water, leachate, and seepage.

3. Key milestones for investigation, remediation and other actions

All works set out in the proposal must be completed by the deadlines specified below:

Works	***Deadline***
T1. Phase 1 - Emergency Response	T1. Completion = 8 April 2022
T2. Phase 2 – Remedial Options Assessments[1] T2.1 - Northern Boundary T2.1 - Western and North-western Boundary T2.3 - Eastern Boundary, if required T2.4 - Southern Boundary, if required T2.5 – Oval, if required	T2. Completion[1] = as per dates shown in Section 4. Based on current knowledge this is likely to be completed in the second half of 2023 (see R4.4)
T3. Phase 3 - Remediation and Validation works[2] T3.1 - Northern Boundary T3.1 - Western and North-western Boundary T3.3 - Eastern Boundary, if required T3.4 - Southern Boundary, if required T3.5 – Oval, if required	T3. Completion[2] = as per dates shown in Section 4. Based on current knowledge this is likely to be completed in the second half of 2024 after all remediation and validation works completed.

NOTES:

[1]The Phase 2 - Remedial Options Assessment for each area includes up to three reporting deadlines: a Remedial Investigation Report, a Risk Assessment (if required), and a Remedial Options Assessment (if required). Additionally, the format of the Remedial Investigation Report will vary depending on the area. Some areas may be a single report while others (e.g., Northern Boundary) may be a Letter Report, pulling together several discrete Investigation Reports, with overarching conclusions and an updated conceptual site model (CSM). Deadlines for the reports in each area detailed in the Reporting Schedule in Section 4.

[2]The Phase 3 – Remediation and Validation Milestone for each area includes up to two reporting deadlines for each area (remedial action plan and validation report), if required based on the

outcomes of Phase 2: Remedial Options Assessment. Deadlines for the reports in each area detailed in the Reporting Schedule in Section 4.

4. Reporting requirements and timeframe for submission of reports

The EPA must be provided with the following reports by the deadlines specified below:

Report	***Deadline***
R1. Re-occupation Reports • R1.1 Emergency Response Report (EER) • R1.2 Ground Gas Risk Assessment (GGRA) • R1.3 Reoccupation Environmental Management Plans (REMPs) • R1.4 Residential Area Monitoring Program (RAMP)	R1.1 – 24 Feb 2022 R1.2 - 11 March 2022 R1.3 – 01 April 2022 R1.4 – 01 April 2022
R2. Monitoring Reports for the RAMP (R2.1 see P9) and the site wide monitoring (R2.2 see P10). • These will be monthly data letters, quarterly reports, and an annual report for the 4th quarter report. • The schedule will be updated, if needed, whenever the RAMP and/or the SAQP and IEMP are updated.	Within 14 weeks of the end of each monitoring period
R3. Updated IEMP and SAQP. These will be reviewed and updated at least annually, but more often if needed based on the outcomes of Investigations and Monitoring (see P9, P10, and R2).	Initial update – Within 14 weeks of completion of R1 reports Subsequent updates: Within 14 weeks of the end of each annual monitoring period, more often if required
R4. Northern Boundary • R4.1 LFG Management Strategy - Stage 1 Options Assessment • R4.2 LFG Management Strategy - Stage 1 Detailed Design • R4.3 Remedial Investigation Report[1] – for the northern boundary this report will come after completion of LFG Management Strategy Stage 1 design to ensure that all remedial investigation works related to Stage 1 are incorporated into an updated conceptual site model. • R4.4 Validation Report	R4.1 – 11 Feb 2022 R4.2 – 18 March 2022 R4.3 – 27 May 2022 R4.4 - TBD depends on implementation of remediation
R5. Western and North-western Boundary • R5.1 Remedial Investigation Report[1] • R5.2 Risk Assessment, if required • R5.3 Remedial Options Assessment, if required • R5.4 Remedial Action Plan, if required • R5.5 Validation Report, if required	R5.1 – 13 Feb 2023 R5.2 to R5.5 - TBD if required. To be updated if needed after completion of R5.1.
R6. Eastern Boundary	

• R6.1 Remedial Investigation Report[1] • R6.2 Risk Assessment, if required • R6.3 Remedial Options Assessment, if required • R6.4 Remedial Action Plan, if required • R6.5 Validation Report, if required	R6.1 – 06 Mar 2023 R6.2 to R6.5 - TBD if required. To be updated if needed after completion of R6.1
R7. Southern Boundary • R7.1 Remedial Investigation Report[1] • R7.2 Risk Assessment, if required • R7.3 Remedial Options Assessment, if required • R7.4 Remedial Action Plan, if required • R7.5 Validation Report, if required	R7.1 - 27 Mar 2023 R7.2 to R7.5 - TBD if required. To be updated if needed after completion of R7.1
R8. Oval • R8.1 Remedial Investigation Report[1] • R8.2 Risk Assessment, if required • R8.3 Remedial Options Assessment, if required • R8.4 Remedial Action Plan, if required • R8.5 Validation Report, if required	R8.1 - 09 Jan 2023 R8.2 to R8.5 - TBD if required. To be updated if needed after completion of R8.1
R9. Environmental Management Plan (prepared for the whole site following validation of all remedial works). This report will then replacement R3.	R9. – TBD based on completion of all Phase 2 and Phase 3 tasks. Based on current knowledge this is likely to be completed in the second half of 2024 (see R7)

NOTE:

[1]All Remedial Investigations would be undertaken according to an Auditor endorsed SAQP. The format of the Remedial Investigation Report will vary depending on the area. Some may be a single report while others (e.g., Northern Boundary) may be a Letter Report pulling together several discrete Investigation Reports with overarching conclusions and an updated CSM.

Signature of proponent

This application for approval of this voluntary management proposal may only be signed by a person(s) with the legal authority to sign it. The various ways in which the application may be signed, and the people who may sign the application, are set out in the categories below.

Please tick (✓) the box next to the category that describes how this application is being signed.

If the proponent is:		**The application must be signed and certified by one of the following:**
an individual	☐	the individual.
a company	☐	the common seal being affixed in accordance with the *Corporations Act 2001, or*
	☐	two directors, or
	☐	a director and a company secretary, or
	☐	if a proprietary company that has a sole director who is also the sole company secretary – by that director.
a public authority other than a council	☐	the chief executive officer of the public authority, or
	☐	by a person delegated to sign on the public authority's behalf in accordance with its legislation (Please note: a copy of the relevant instrument of delegation must be attached to this application).
a local council	☑	the general manager in accordance with s.377 of the *Local Government Act 1993* ('LG Act'), or
	☐	the seal of the council being affixed in a manner authorised under the LG Act.

I/We (the proponent):

- ***apply for approval of the voluntary management proposal set out in this proposal and in any documents referred to in Part 1.4 of this proposal***
- ***declare that the information in this proposal form (including any attachment or document referred to in Part 1.4 of this proposal) is not false or misleading.***

Signature	[redacted]	Signature	
Name (printed)		Name (printed)	
Position		Position	
Date		Date	

Seal (if signing under seal):

ghd.com

The Power of Commitment