Upper Lachlan Shire Council

Crookwell Landfill

Stage 1 Landfill Gas Collection and Venting System Operation and Maintenance Plan

October 2017

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1. Introduction

1.1 Overview

Upper Lachlan Shire Council (Council) owns Crookwell Landfill (the site) located on Grabben Gullen Road in Crookwell, NSW.

Council has recently engaged GHD Pty (GHD) to prepare detailed design documentation of the Stage 1 landfill redevelopment works (Stage 1 works). The Stage 1 works include (amongst other things):

- The detailed design of a landfill gas (LFG) collection and venting system (Stage 1 system)
- The development of an Operations and Maintenance Plan (OMP) for the Stage 1 system

This document constitutes the OMP for the Stage 1 system. A description of the Stage 1 system and its operation and maintenance requirements are provided in the following sections.

1.2 Purpose

The purpose of this OMP is to describe the Stage 1 system and its associated operation and maintenance requirements.

1.3 Reliance

The following documents were relied on in preparation of this OMP:

- GHD (2017), *Landfill Gas Risk Assessment and Landfill Gas Management Plan*
- NSW EPA (2016), *Environmental Guidelines: Solid Waste Landfills, Second Edition*

1.4 Limitations

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

GHD otherwise disclaims responsibility to any person other than Upper Lachlan 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.

GHD has prepared this report on the basis of information provided by Upper Lachlan 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.

2. Summary of Stage 1 System

2.1 Overview

As identified in GHD (2017), LFG is currently being generated at the site. LFG has the potential to cause health, safety, amenity and/or environmental impacts due to the gases it typically contains (e.g., methane, carbon dioxide and hydrogen sulphide). LFG must therefore be appropriately monitored and managed at the site. As such, a passive LFG collection and venting system (the Stage 1 system) has been designed as part of the Stage 1 works and with consideration of GHD (2017).

The purpose of the Stage 1 system is to passively collect LFG generated by the waste mass to be capped as part of the Stage 1 works and to direct the LFG to known and safe release points (vents) away from potentially sensitive receptors such as on-site workers.

2.2 Description

The Stage 1 system is a passive LFG collection and venting system. It operates using naturally present differences in gas concentrations, gas temperatures and gas pressures that exist between the landfilled waste at the site and the surrounding atmosphere to collect and release the LFG. The Stage 1 system has the following key characteristics:

- It consists of two key parts: the collection network (network) and the LFG vents (vents). The network consists of a series of horizontal trenches (trenches) and vertical gas collection wells (wells) installed into the waste mass beneath the landfill cap. These trenches and wells contain perforated HDPE pipework within gravel to facilitate the collection of LFG from the waste mass. The network is connected to a series of vents which act as release points for the LFG collected. These vents consist of vertical pipes to facilitate the release and monitoring of LFG collected by the network
- It does not treat the LFG collected, just releases it to the local atmosphere at height for subsequent dispersion and dilution
- It is designed in such a way that under normal conditions it would always be operational (i.e. 'turned on')
- It is designed to be able to withstand certain potential impacts that were reasonably foreseeable at the time of its design. For example, adverse impact cause by typical landfill conditions (e.g. LFG, leachate and some waste settlement), minor accidental damage and/or minor vandalism
- It is relatively simple with very few moving parts. As such, its operation and maintenance needs are relatively limited

The detailed design drawings for the Stage 1 system are provided in Appendix A.

It is anticipated that the Stage 1 system will be progressively expanded across the remainder of the landfilled waste at the site over time. . Concept design sketches showing how this expansion may occur are provided as part of Appendix B.

3. Operational Requirements

3.1 Overview

As identified in Section 2.2, the Stage 1 system is relatively simple and has few moving parts. As such, its operational requirements are relatively limited and consist of the following:

- Limiting certain activities on and around the Stage 1 system
- Regular visual inspections (inspections)
- Regular LFG monitoring (monitoring).

Completing these operational requirements should help to ensure that the Stage 1 system is able to function appropriately following its construction.

Further information on these operational requirements is provided in the following sections.

3.2 Limiting certain activities

As identified in Section 2.2, the Stage 1 system has been designed to be able to withstand certain reasonably foreseeable impacts. However, it is noted that a number of typical waste management / landfill related activities have the potential to significantly impact upon the functionality of the Stage 1 system if undertaken around, above or into it. These activities include the following (this is not an exhaustive list):

- Use of heavy machinery / plant
- Placement of substantial additional waste materials
- Excavations
- Stockpiling of materials
- Fires
- Hotworks
- Pumping or insertion of materials
- Planting vegetation that is or could become substantial in size (for example trees)
- Major vandalism

These activities and others that could potentially significantly impact upon the functionality of the Stage 1 system should be minimised or avoided as far as reasonably practicable.

3.3 Inspections

Table 1 below identifies the inspections required for the Stage 1 system.

Table 1 Inspections required

Locations	Frequency	Responsible Party	Details
All vents	Quarterly	Council	Inspections to be competed as per the Inspection Log template provided in Appendix C. All completed Inspection Logs to be retained at the site office.

Any corrective actions identified as required during the inspections are to be recorded in the Issues and Corrective Actions Log template (refer to Appendix D) and scheduled for action. At the same time as each inspection is undertaken, monitoring must also be undertaken as outlined in Section 3.4 below.

3.4 LFG Monitoring

At the same time as each inspection is undertaken, monitoring must also be undertaken. Monitoring must be completed, assessed, reported and recorded in accordance with the requirements of the Preliminary LFG Management Plan (provided as part of Appendix B, refer specifically to Sections 1.3 and 1.4 of that document).

4. Maintenance Requirements

4.1 Overview

As identified in Section 2.2, the Stage 1 system is relatively simple and has few moving parts. As such, its maintenance requirements are relatively limited and consist of the following:

- Maintaining vegetation around all the vents

Completing these maintenance requirements should help to ensure that the Stage 1 system is able to function appropriately following its construction.

Further information on these requirements is provided in the following sections.

4.2 Required maintenance

Table 2 below identifies the maintenance required for the Stage 1 system.

Table 2 Maintenance required

Locations	Frequency	Responsible Party	Details
All vents	Quarterly	Council	Maintain vegetation around all vents. Vegetation to be maintained at 50 mm above the ground's surface for a 1 metre radius around all vents. Completed maintenance events to be recorded in maintenance log template provided in Appendix E. All completed Maintenance Logs to be retained at the site office.

Any corrective actions identified as required during the inspections are to be recorded in the Issues and Corrective Actions Log template (refer to Appendix D) and scheduled for action.

5. Work Health and Safety

5.1 Overview

As identified in Section 2.1, the purpose of the Stage 1 System is to passively collect LFG generated by the waste mass to be capped as part of the Stage 1 works and to direct it to known and safe release points (vents) away from potentially sensitive receptors such as on-site workers.

Nevertheless, it is noted that the operation and maintenance of the Stage 1 System does not completely eliminate certain LFG related risks including some relating to the operation (including inspections and monitoring) and maintenance (O&M) of the Stage 1 system.

Further information on these O&M related LFG risks and potential management measures for implementation by Council is provided in the following sections.

5.2 O&M related LFG risks

LFG risks relating to the O&M of the Stage 1 system include the following:

- Fire / explosion resulting in injury or death (for example of an on-site worker)
- Asphyxiation resulting in injury or death (for example of an on-site worker)
- Toxic effects resulting in injury or death (for example of an on-site worker)

Potentially appropriate management measures for these risks are identified in Section 5.3 below.

5.3 Potential management measures for O&M related LFG risks

Potential management measures for the O&M related LFG risks identified in Section 5.2 above include the following:

- Development and implementation of appropriate safe working method statements (SWMSs) for the required O&M tasks identified in this OMP. These SWMSs could include some or all of the following controls (as relevant to the O&M task being completed):
  - Use of appropriately qualified personnel to operate and maintain the Stage 1 system (refer Section 6)
  - Installation of appropriate warning signage at all vents
  - No smoking / naked flames around vents
  - No re-fuelling of equipment near vents
  - Use of herbicide around vents for vegetation control purposes rather than mechanical cutting devices
  - Use of appropriate personal gas detectors
- Prevention of trucks or other elevated vehicles / structures from being parked or manoeuvred in close proximity to the top of the vents

6. O&M Qualifications

6.1 Overview

As identified in Section 5.3 above, the Stage 1 system must be operated and maintained by appropriately qualified personnel.

For the purpose of this OMP, an appropriately qualified trained person is one who has read and intends to apply the following documents as relevant to the O&M of the Stage 1 system:

- The documents identified in Section 1.3
- This OMP
- All SWMSs developed for the O&M tasks identified in this OMP

Council will maintain a record of all persons who meet the requirements of an 'appropriately trained person' as per this OMP at the site office.

7. Updates to OMP

7.1 Overview

This OMP must be reviewed and updated as required on a regular basis and in accordance with the following:

- As part of any significant updates to the site's landfill gas risk assessment and/or landfill gas management plan
- Prior to any expansion of the Stage 1 system into other areas of the site
- At least once every 3 years.

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Appendices

Appendix A – Detailed Design Drawings of Stage 1 System (currently being finalised)

Appendix B – Preliminary LFG Management Plan including Concept Design of LFG Collection and Treatment System for Whole Landfill

Preliminary Landfill Gas Management Plan – Crookwell Landfill

1.1 Overview

This preliminary landfill gas management plan (LFGMP) has been developed based on the outcomes of the draft landfill gas risk assessment (LFGRA) prepared by GHD Pty Ltd (GHD) for the Crookwell Landfill site (the site) owned by Upper Lachlan Shire Council (Council).

This LFGMP presents the key landfill gas (LFG) related actions to be completed by Council in the near future and provides further information in relation to the following:

- A preliminary LFG monitoring program
- A preliminary concept perimeter bore network
- A preliminary LFG collection and treatment (venting) system

This LFGMP should be read in conjunction with the LFGRA report and the assumptions and limitations presented therein.

1.2 Key LFG related actions

1.2.1 Monitoring

- Commence regular landfill gas monitoring of the entire site's surface, on-site buildings and structures and adjacent off-site sub-surface services on a quarterly basis for a 12 month period to confirm if elevated methane concentrations are present. At the end of this period, formally review and assess the data to confirm on-going monitoring and/or remediation requirements.
- Design and install an appropriately designed and located landfill gas monitoring bore network adjacent to the site's perimeter (and consider the value in using other existing monitoring bores for the purposes of LFG monitoring). Monitor the newly installed bores on a quarterly basis for a 12 month period to confirm if elevated methane and/or carbon dioxide concentrations are present at the site's boundary (or otherwise). At the end of this 12 month period, formally review and assess the data to confirm on-going monitoring and/or remediation requirements
- If possible, install and monitor a "background bore" (same monitoring frequency as presented above) in a nearby location (say within 500 metres of the site boundary) into geology of a similar kind that is likely to be representative of prevailing natural ground gas conditions. This data could then be used to help determine the source of any gases identified in the sub-surface geology around the site.

1.2.2 Operational

- Council to proceed with formal rehabilitation works, including the design and installation of a landfill gas collection and treatment system
- Council to retain existing landfill buffer zone around the site
- Council to ensure that site penetrations (predominantly monitoring bores) are sealed and secure.

1.2.3 On-site WH&S

- Council to consider landfill gas as part of their WHS management system (e.g. Safe Work Method Statements and Risk Assessments) at the site
- Council to ensure that workers/visitors on-site are made aware of and adequately manage LFG risks potentially present.

1.2.4 External communications

- Council to ensure any requirements/processes are implemented to ensure that the following receptors are aware of and adequately manage LFG risk:
  - Off-site residents / visitors adjacent to the site
  - Owners/users of off-site buildings and structures adjacent to the site
  - Owners/users of off-site sub-surface services adjacent to the site.

The following sections provide further information on the following:

- The preliminary LFG monitoring program developed for the site
- The preliminary concept perimeter bore network developed for the site
- The preliminary LFG collection and treatment (venting) system developed for the site.

1.3 Preliminary landfill gas monitoring program

1.3.1 Monitoring locations, parameters and frequencies

The preliminary landfill gas monitoring program for the site is presented in Table 1 below.

Table 1 Landfill gas monitoring program

Monitoring	Locations	Frequency	Parameters	Method and Assessment Criteria (Threshold)
Surface emission monitoring	Final and intermediate cover areas	Quarterly	Methane, weather conditions, ground conditions, wind speed, technician's observations	As per Section 5.2 of the NSW EPA Environmental Guidelines: Solid Waste Landfills, Second Edition 2016
Sub-surface emissions monitoring	LFG monitoring bores *(none yet installed)*	Quarterly	Methane, Carbon dioxide, Oxygen, balance, weather conditions, technician's observations, groundwater levels including base of bores	As per Section 5.3 of the NSW EPA Environmental Guidelines: Solid Waste Landfills, Second Edition 2016
Accumulation monitoring in on-site buildings / structures	All existing or future on-site buildings / structures	Quarterly	Methane, weather conditions, building comments, technician's observations	As per Section 5.4 of the NSW EPA Environmental Guidelines: Solid Waste Landfills, Second Edition 2016
Accumulation monitoring in off-site sub-surface services	Any future on-site sub-surface services (as accessible)	Quarterly	Methane, weather conditions, ground conditions, technician's observations	As per Section 5.4 of the NSW EPA Environmental Guidelines: Solid Waste Landfills, Second Edition 2016
Landfill gas collection and treatment (venting) system (refer section 1.6)	All installed landfill gas vents	Quarterly	Methane, Carbon dioxide, Oxygen, balance, weather conditions, technician's observations, flow rate, pressure	Method in general accordance with the requirements of Section 5.3 of the NSW EPA Environmental Guidelines: Solid Waste Landfills, Second Edition 2016. Assessment criteria to be selected following completion of one years' worth of landfill gas monitoring.

Landfill gas monitoring to be undertaken by appropriately qualified personnel. An appropriate quality control program must be implemented to ensure the results of monitoring are representative of prevailing conditions.

1.3.2 Monitoring Assessments and updates to LFGRA and LFGMP

Following each LFG monitoring event, results are to be assessed against relevant assessment criteria and appropriate action taken as required. In the first instance, the relevant assessment criteria for environmental monitoring (surface emissions, sub-surface emissions, accumulation) should be those contained in the NSW EPA (2016) Environmental Guidelines: Solid Waste Landfills, Second edition 2016. The relevant assessment criteria for the landfill gas collection and treatment (venting) system are to be selected following completion of one years' worth of landfill gas monitoring.

Following the completion of one years' worth of landfill gas monitoring, the data shall be assessed and consideration made for updates to the site specific LFGRA and LFGMP. Updates to the LFGRA and LFGMP may include, though not be limited to, increases or decreases in monitoring locations, monitoring frequencies, and installation of additional monitoring bores.

1.4 Reporting and Record Keeping

The following reporting and record keeping requirements are recommended.

1.4.1 Incident Reporting

Any landfill gas related incident that represents a threat to health and safety and/or the environment and/or may/does lead to a breach of EPL conditions should be communicated by Council to the NSW EPA immediately. Written notice will follow within 14 days of the incident. Examples of incidents that typically require reporting include, though are not limited to, exceedances of nominated assessment criteria.

A written incident report to the NSW EPA typically includes, but is not limited to, the following details:

- The cause, time and duration of the event.
- The type, volume and concentration of every pollutant discharged as a result of the event.
- The name, address and business hours telephone number of employees of Council or other witnesses.
- Actions taken by Council in relation to the event.
- Details of any measure taken to proposed to be taken to prevent or mitigate against a recurrence of such an event.

1.4.2 Record Keeping

The results of all monitoring are recommended to be recorded and retained in accordance with EPL No. 6054 record keeping. The legibly-produced records should include the following:

- Sampling dates(s)
- Sampling time(s)
- Sampling point(s)

- Sampling results
- The name of the person who collected the sample.

The monitoring records should be kept for at least four years after the monitoring event, for submittal to the NSW EPA on request.

1.5 Preliminary concept landfill gas bore network

A preliminary concept LFG bore network design is presented in Attachment A. This preliminary network has been developed with consideration of the recommendations of the NSW EPA Environmental Guidelines: Solid Waste Landfills, Second Edition 2016 and the draft LFGRA report.

1.6 Preliminary concept landfill gas collection and treatment system

A preliminary concept LFG collection and treatment system is presented in Attachment B. This preliminary collection and treatment system has been developed with consideration of the recommendations of the NSW EPA Environmental Guidelines: Solid Waste Landfills, Second Edition 2016, the draft LFGRA report and previous GHD experience.

Attachment A: Preliminary concept LFG bore network

LEGEND

- LANDFILL GAS MONITORING PERIMETER BORE
- SITE BOUNDARY
- 150 M RADIUS FROM NORTH WEST DEVELOPMENT
- 250 M RADIUS FROM NORTH WEST DEVELOPMENT

0 25 50 75m
SCALE 1:2500 AT ORIGINAL SIZE

NOTE

1. THIS SKETCH IS CONCEPTUAL ONLY AND IS TO BE REVISED BASED ON FUTURE MONITORING DATA OR OTHER RELEVANT ASPECTS
2. THIS SKETCH IS TO BE READ IN ACCORDANCE WITH GHD (2017) 'LANDFILL GAS PERIMETER BORE LOCATION JUSTIFICATION' DOCUMENTATION

PRELIMINARY

rev	description	app'd	date
	FOR APPROVAL		
A	INITIAL ISSUE		

UPPER LACHLAN SHIRE COUNCIL
CROOKWELL LANDFILL

LFG MONITORING SYSTEM PERIMETER BORE LOCATIONS

Level 15, 133 Castlereagh Street, Sydney NSW 2000 Australia
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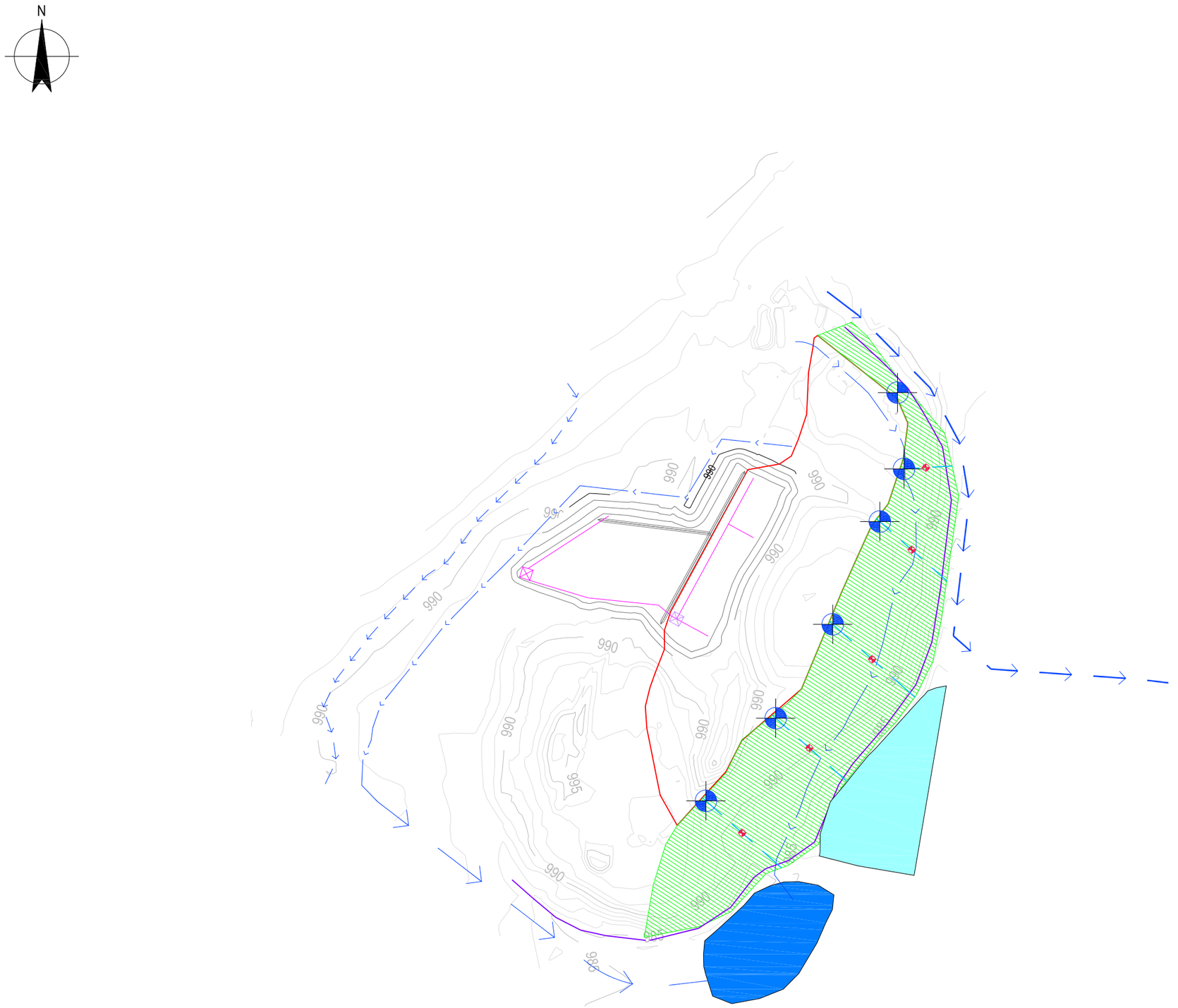
scale	1:2000 for A3	job no.	21-25153
date	JAN 2017	rev no.	A

approved (PD) SK027

Plot Date: 10 January 2017 - 11:22 AM Plotted by: Fabrice Cheong Cad File No: G:\21\25153\CADD\Drawings\21-25153-SK27-PERIMETER LFG MONITORING BORES.dwg

Attachment B: Preliminary concept landfill gas collection and treatment system



LEGEND

- EXISTING SURFACE
- DESIGN SUBGRADE
- ACTIVE FILLING AREA
- FINAL CAP AREA
- SURFACE WATER MANAGEMENT
- LEACHATE INTERCEPTION TRENCH
- LEACHATE COLLECTION PIPE
- LEACHATE SUMP
- AREA OF WASTE TRIMMING
- EXISTING SURFACE WATER DRAIN
- SURFACE WATER DRAIN 1
- SURFACE WATER DRAIN 2
- SURFACE WATER DRAIN 3
- SURFACE WATER DRAIN 4
- LANDFILL GAS VENT
- LANDFILL GAS COLLECTION BORE
- LANDFILL GAS COLLECTION TRENCH

0 20 40 60m
SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

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A	INITIAL ISSUE	MW	

UPPER LACHLAN SHIRE COUNCIL
CROOKWELL LANDFILL

LANDFILL GAS SYSTEM LAYOUT PLAN - STAGE 2

GHD

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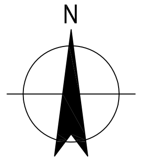

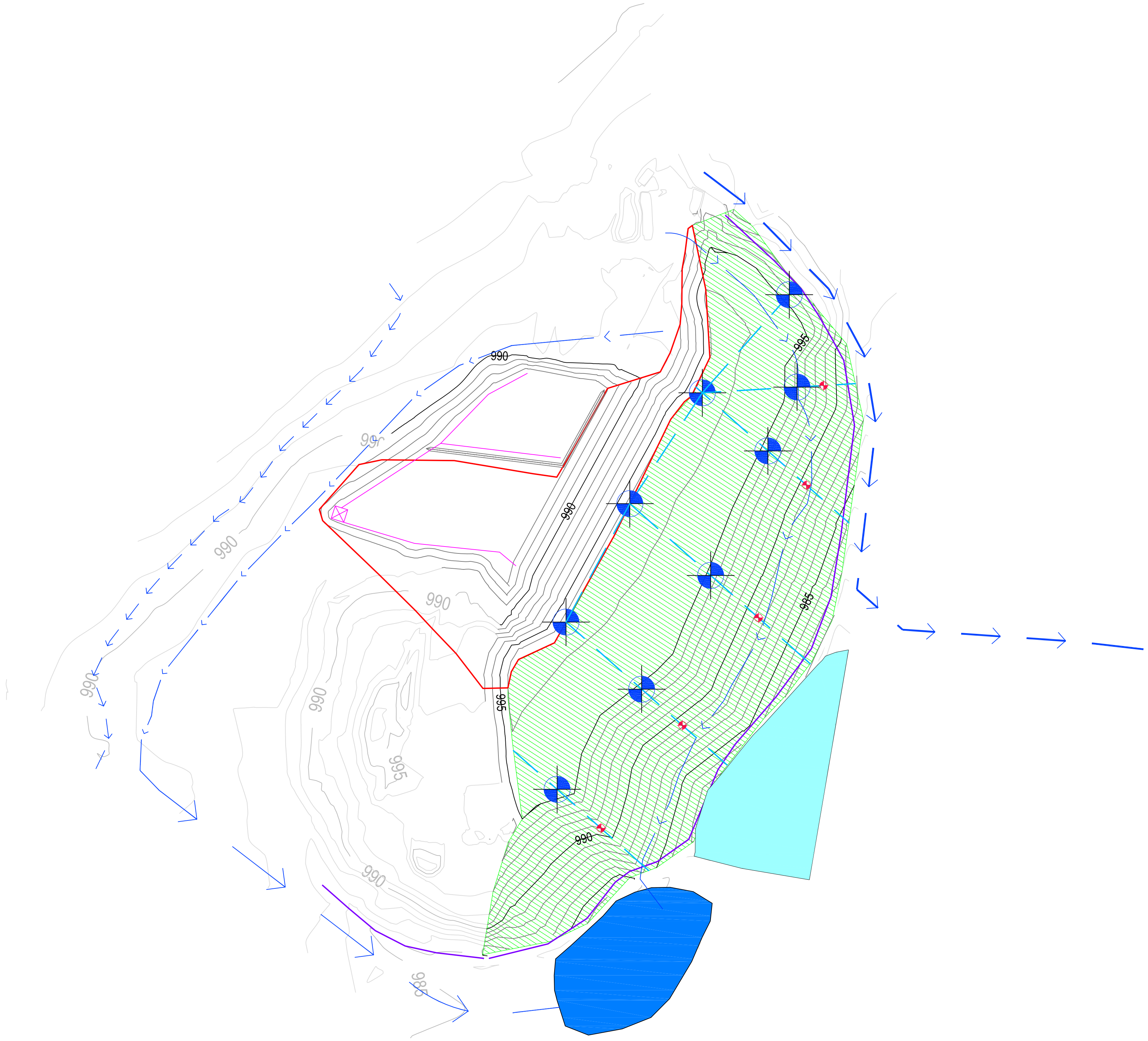

LEGEND

- EXISTING SURFACE
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- SURFACE WATER DRAIN 3
- SURFACE WATER DRAIN 4
- LANDFILL GAS VENT
- LANDFILL GAS COLLECTION BORE
- LANDFILL GAS COLLECTION TRENCH

0 20 40 60m
SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

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A	INITIAL ISSUE		

UPPER LACHLAN SHIRE COUNCIL
CROOKWELL LANDFILL

LANDFILL GAS SYSTEM LAYOUT PLAN - STAGE 3

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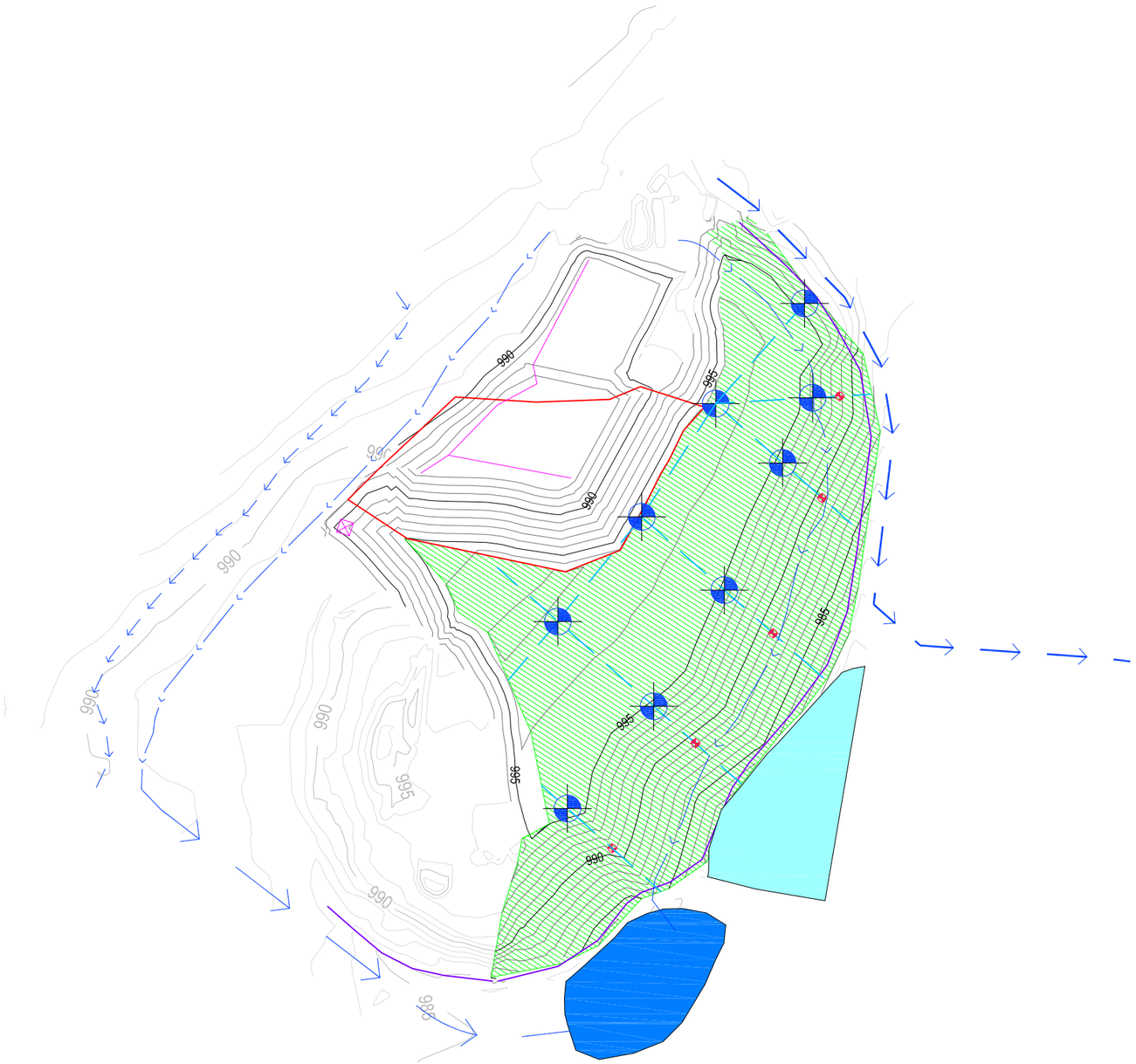

LEGEND

- EXISTING SURFACE
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- ACTIVE FILLING AREA
- FINAL CAP AREA
- SURFACE WATER MANAGEMENT
- LEACHATE INTERCEPTION TRENCH
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- SURFACE WATER DRAIN 3
- SURFACE WATER DRAIN 4
- LANDFILL GAS VENT
- LANDFILL GAS COLLECTION BORE
- LANDFILL GAS COLLECTION TRENCH

0 20 40 60m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

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UPPER LACHLAN SHIRE COUNCIL
CROOKWELL LANDFILL

LANDFILL GAS SYSTEM LAYOUT PLAN - STAGE 4

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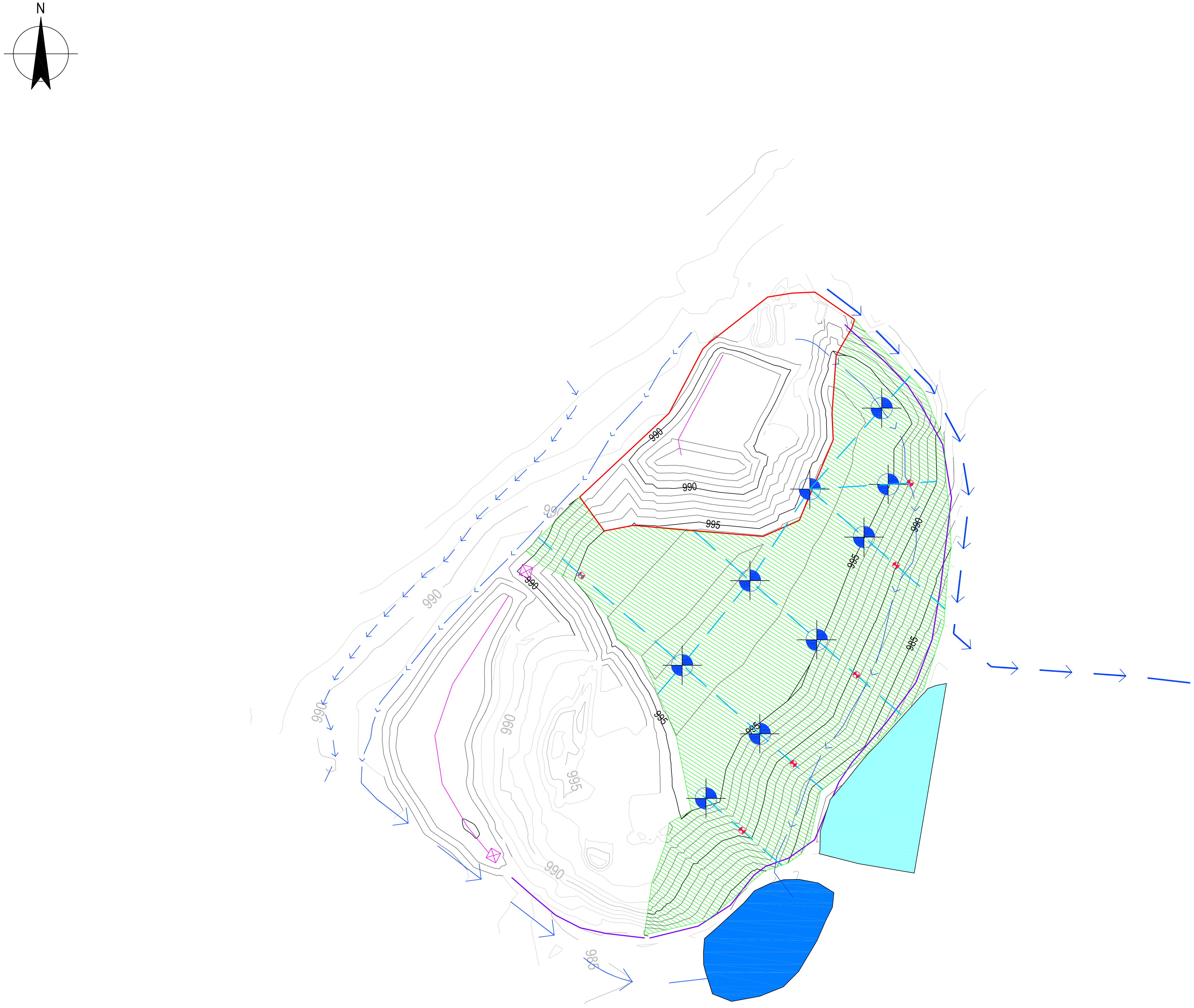

LEGEND

- EXISTING SURFACE
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- SURFACE WATER DRAIN 3
- SURFACE WATER DRAIN 4
- LANDFILL GAS VENT
- LANDFILL GAS COLLECTION BORE
- LANDFILL GAS COLLECTION TRENCH

0 20 40 60m
SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

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A	INITIAL ISSUE		

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STAGING PLANS
STAGE 5

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LEGEND

- EXISTING SURFACE
- DESIGN SUBGRADE
- ACTIVE FILLING AREA
- FINAL CAP AREA
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- LEACHATE INTERCEPTION TRENCH
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- SURFACE WATER DRAIN 4
- LANDFILL GAS VENT
- LANDFILL GAS COLLECTION BORE
- LANDFILL GAS COLLECTION TRENCH

0 20 40 60m
SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

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A	INITIAL ISSUE		

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LANDFILL GAS SYSTEM LAYOUT PLAN - STAGE 6

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Plot Date: 9 January 2017 - 2:08 PM Plotted by: Fabrice Cheong Cad File No: G:\21\25153\CADD\Drawings\21-25153-SK21-SK27-LFG SYSTEM LAYOUT PLAN.dwg

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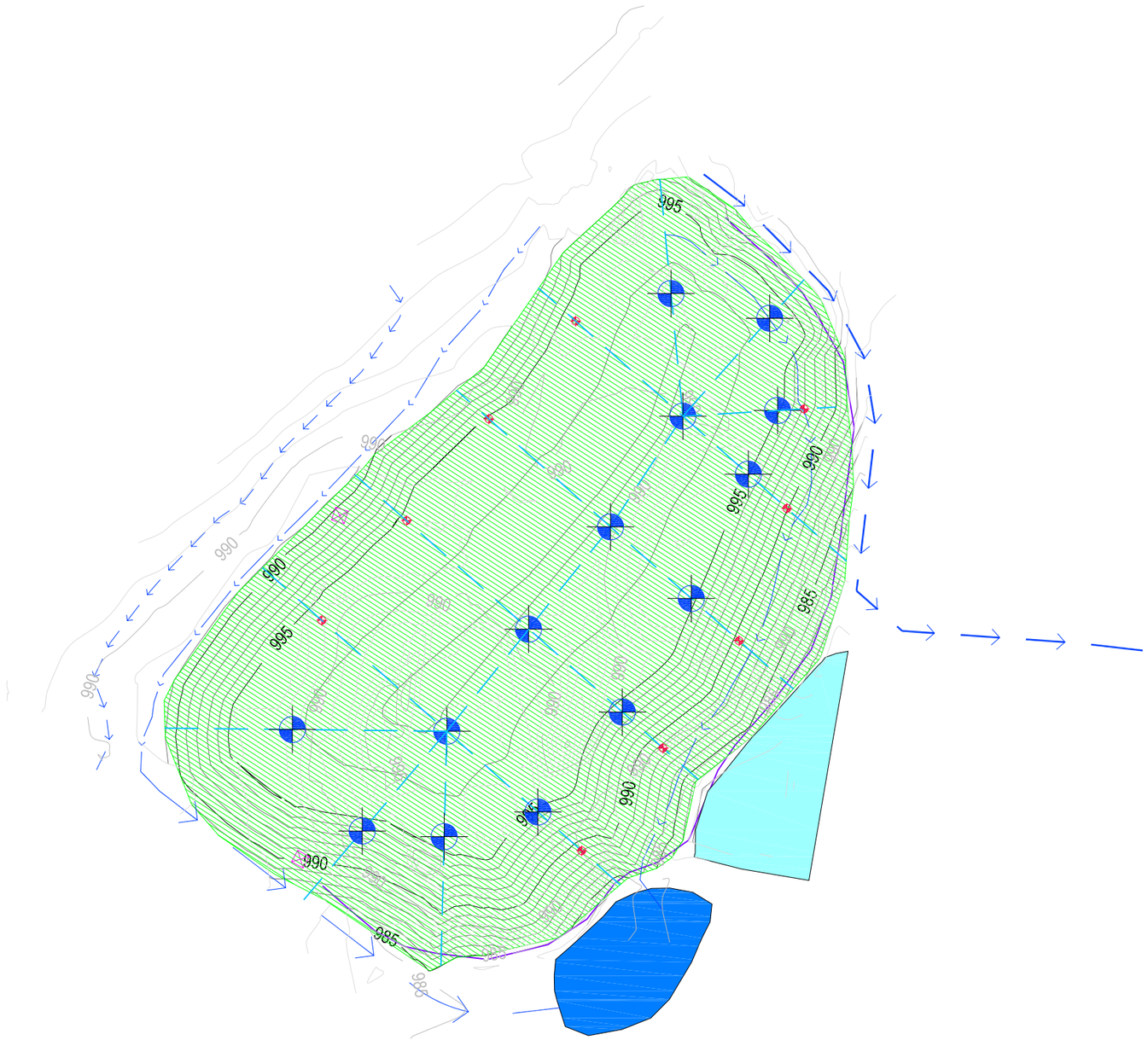

LEGEND

- EXISTING SURFACE
- DESIGN SUBGRADE
- ACTIVE FILLING AREA
- FINAL CAP AREA
- SURFACE WATER MANAGEMENT
- LEACHATE INTERCEPTION TRENCH
- LEACHATE COLLECTION PIPE
- LEACHATE SUMP
- AREA OF WASTE TRIMMING
- EXISTING SURFACE WATER DRAIN
- SURFACE WATER DRAIN 1
- SURFACE WATER DRAIN 2
- SURFACE WATER DRAIN 3
- SURFACE WATER DRAIN 4
- LANDFILL GAS VENT
- LANDFILL GAS COLLECTION BORE
- LANDFILL GAS COLLECTION TRENCH

0 20 40 60m
SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE	A	

UPPER LACHLAN SHIRE COUNCIL
CROOKWELL LANDFILL

LANDFILL GAS SYSTEM LAYOUT PLAN - FINAL STAGE

GHD

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scale	1:2000 for A3	job no.	21-25153
date	JAN 2017	rev no.	A

approved (PD) SK026

SURVEY PROVIDED BY LANDTEAM AUSTRALIA PTY LTD AND DATED 10 FEBRUARY 2015

Plot Date: 10 January 2017 - 7:45 AM Plotted by: Fabrice Cheong Cad File No: G:\21\25153\CADD\Drawings\21-25153-SK21-SK26-LFG SYSTEM LAYOUT PLAN.dwg

Appendix C – Inspection Log Template

CROOKWELL LANDFILL – STAGE 1 LFG COLLECTION AND VENTING SYSTEM – INSPECTION LOG TEMPLATE

Site name:		**Reference no.:**
Inspector(s):		
Date:	**Arrival time:**	**Departure time:**

Weather and ground conditions:

Workplace Health and Safety (have the inspection staff completed relevant safety procedures and training? Have the inspection staff undertaken a pre-inspection safety assessment?):

General site observations (identify inspection locations on current site plan and assign number to location of observation. Attach marked up site plan to completed inspection form):

1. **Condition of vents (vent pipes, rotating cowls, gas sampling valves etc.):**

2. **Condition of ground surface around base of vents (cracked, depressions, ponding water, dead vegetation etc.):**

CROOKWELL LANDFILL – STAGE 1 LFG COLLECTION AND VENTING SYSTEM – INSPECTION LOG TEMPLATE

3. Other:

Corrective actions proposed and/or performed (including maintenance and monitoring):

Photographs taken, references and descriptions:

Signature:	
Inspection plan attached:	

Appendix D – Issues and Corrective Actions Log Template

Crookwell Landfill - Stage 1 Landfill Gas Collection and Venting System - Issues and Corrective Actions Log Template

Reference	Date Raised	Issue	Proposed Corrective Action(s)	Responsible Person	Date Corrective Action(s) Completed

Appendix E – Maintenance Log Template

Crookwell Landfill - Stage 1 Landfill Gas Collection and Venting System - Maintenance Log Template

Date of Maintenance Event	Locations	Responsible Party	Signature

GHD

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2125974-10599/https://projects.ghd.com/oc/Sydney/crookwelllandfilldet/Delivery/Documents/21-25974-PLN-Landfill Gas Venting System Operation and Maintenance Plan.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft	F. Cheong	É. Bordeleau		A. Roberts		

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