

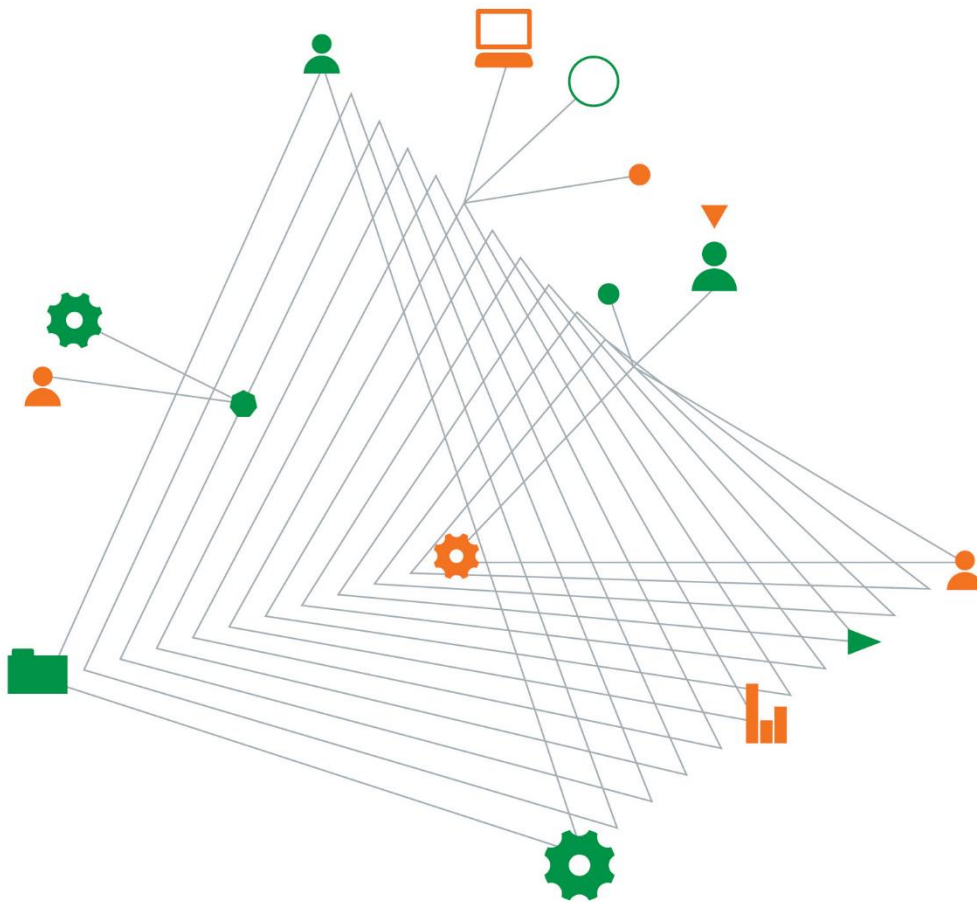
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Huntingdale Estate Nominees Pty Ltd

Construction Environmental Management Plan

Huntingdale Estate, 1221 to 1249 Centre Road and 22 Talbot Avenue, Oakleigh South, VIC

01 May 2020



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Construction Environmental Management Plan

Prepared for
Huntingdale Estate Nominees Pty Ltd

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1. Introduction

Huntingdale Estate Nominees Pty Ltd (Huntingdale Estate) engaged Coffey Environments Australia Pty Ltd (Coffey) to undertake an Environmental Site Assessment at 1221 to 1249 Centre Road and 22 Talbot Avenue, Oakleigh South, Victoria (the site).

The site comprises a former sand quarry and municipal landfill and is proposed to be redeveloped for a range of residential land uses including designated areas of open space and commercial land use.

The site is subject to an Environmental Audit Overlay under the City of Monash Planning Scheme which requires that:

“Before a sensitive use (residential use, child care centre, pre-school centre or primary school) commences or before the construction or carrying out of buildings and works in association with a sensitive use commences, either:

- *A certificate of environmental audit must be issued for the land in accordance with Part IXD of the Environment Protection Act 1970, or*
- *An environmental auditor appointed under the Environment Protection Act 1970 must make a statement in accordance with Part IXD of that Act that the environmental conditions of the land are suitable for the sensitive use”.*

The works undertaken as part of the ESA, including the preparation of this Construction Environmental Management Plan (CEMP), form part of the staged assessment for the site in support of the environmental audit. Ken Mival of EHS Support Pty Ltd (EHS) was engaged by Huntingdale Estate to act as the EPA accredited environmental auditor for the project.

As outlined in Table 1-1 *Roles and responsibilities for implementation of the CEMP (Section 1.4)*, at the time of preparing this CEMP, Mr Mival has indicated that he will not be available to be engaged for the post audit verification works at the site. Another environmental auditor will need to be engaged to undertake these works.

This CEMP has been prepared to support the environmental audit and is based on the available information at the time of writing in terms of the site condition, proposed site redevelopment and the management controls during construction.

To ensure that this CEMP is effectively implemented it should be revised as required as additional information becomes available. This includes revision of the CEMP at key construction milestones as outlined in this document (if required).

1.1. Intent of Construction Environmental Management Plan

The intent of this CEMP is to provide an overarching framework and specific requirements for the implementation of environmental management measures during the proposed site redevelopment (construction phase).

The management plan includes measures to address health, safety and environmental risks during construction, associated with residual soil, groundwater and landfill gas contamination at the site.

This CEMP has been reviewed by the appointed environmental auditor and the implementation of this plan will be a condition of the statement of environmental audit.

Any changes to this CEMP should be reviewed and verified by an appointed environmental auditor prior to implementation.

1.2. CEMP Objectives

The overarching objective of this CEMP is to describe how activities undertaken during the construction phase of the site redevelopment will be managed to avoid or mitigate negative environmental impacts on site (or off-site) and how these environmental management requirements will be implemented.

The CEMP includes information and guidance relating to the following:

- Providing a mechanism to implement the conditions of the statement of environmental audit relating to ongoing management of residual soil, groundwater and landfill gas contamination at the site.
- Advising parties with responsibility for the site during construction and their contractors of the environmental issues and potential hazards associated with construction works during the site redevelopment.
- Identifying measures to minimise potential risks to site workers, off-site receptors and the environment during construction.

The specific stages of construction and expected construction activities covered by this management plan are outlined in **Section 1.3**. Ongoing management measures required at the site (post construction) should be documented in a separate post construction environmental management plan (EMP). This EMP should be updated and verified by an appointed environmental auditor once construction works have been completed.

1.3. Scope of this CEMP (Stages of Construction)

Given the scale and complexity of the site redevelopment process the 'construction phase' of the project will be split into a number of distinct stages. These are outlined in the chart below.

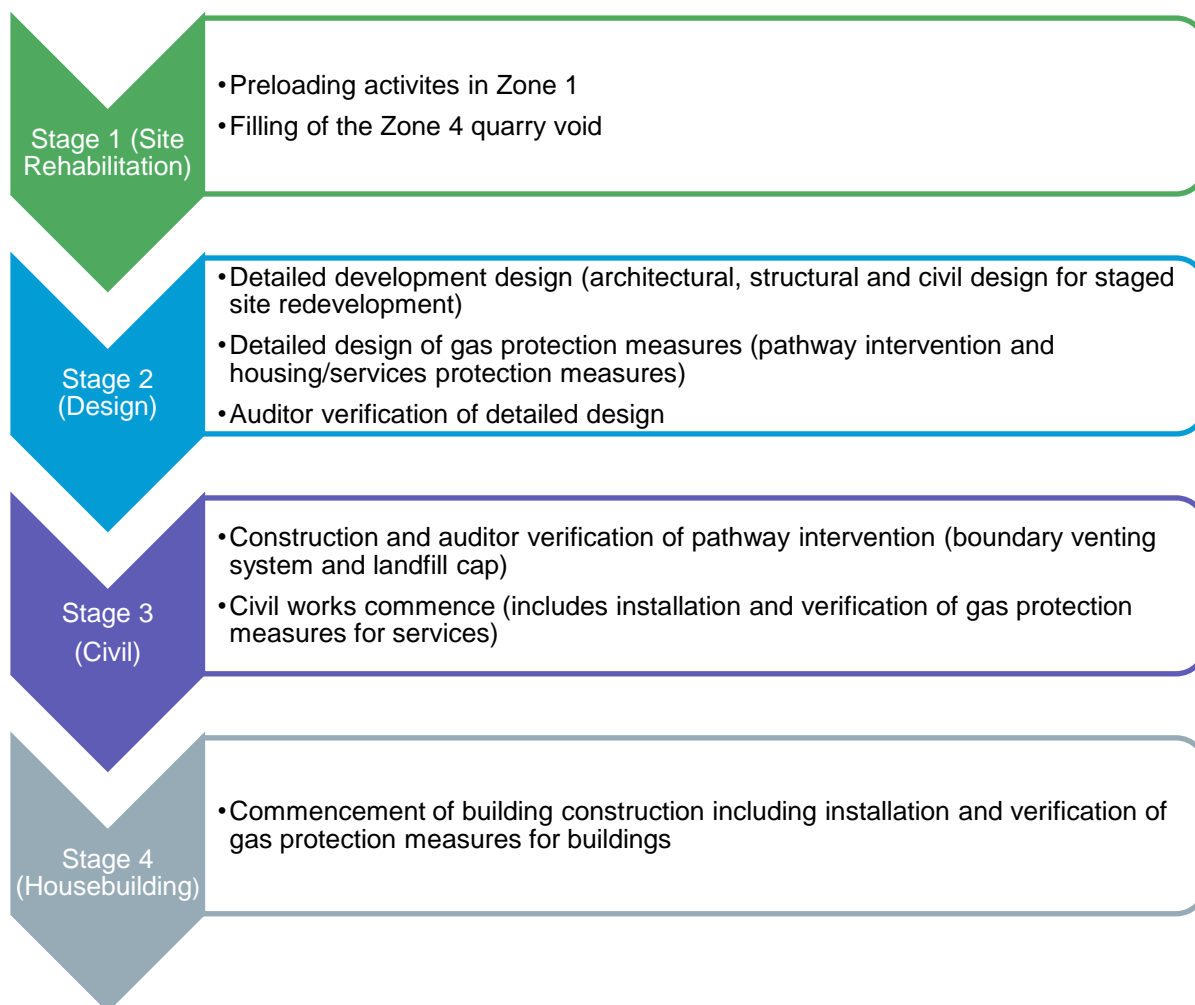


Chart 1-1: Construction Stages During Site Redevelopment

1.4. Responsible Parties for Implementation of the CEMP

This CEMP should be implemented (and where required updated) to include input from all parties involved in the construction phase of the development to which this plan applies.

A summary of the roles and responsibilities for the implementation of the CEMP is provided below in Table 1-1.

Table 1-1: Roles and responsibilities for implementation of the CEMP

Position / Title	Responsibility
Site Owner / Principal	<ul style="list-style-type: none"> - Preparation of this CEMP (or delegation to Environmental Consultant) - Appointing site management personnel and supporting consultancy services as outlined in this table - Overall responsibility (or delegation of authority) for the provision and implementation of the CEMP as the landowner - The Principal will retain overall responsibility for the implementation of this CEMP for the duration of construction works at the site

Position / Title	Responsibility
<p>Principal Contractor / Site Manager</p> <p>It is acknowledged there may be separate principal contractors for the different construction phases of the redevelopment. It is the responsibility of the site owner to ensure that each contractor is aware of their obligations under the CEMP</p>	<ul style="list-style-type: none"> - Engaged by the Principal to construct the development (e.g. civil and housebuilding construction) - Ultimate responsibility for management of the site in accordance with this CEMP - Overall implementation of this CEMP including allocation and identification of resources to meet the requirements - Induction and training of personnel and other sub-contractors working at site in regard to the requirements of the CEMP and documentation of this process - Maintenance of work process documentation including activity records, safe work method statements (SWMS), health and safety plan etc. - Overseeing of site activities and provision of regular progress reports to the Site Owner/Principal or Project Manager/Superintendent. - Undertaking site inspections and dust and noise monitoring (can be delegated to environmental consultant) - Completion and maintenance of reports and documentation - Identification of environmental risks (can be delegated to environmental consultant) - Investigation of complaints and ensure effective resolution - Communication with site personnel and subcontractors on compliance with this CEMP - Compliance with any regulatory requirements for the work (i.e. Council planning permit conditions and/or EPA Victoria requirements) - Modification of environmental controls where amenity issues (e.g. dust, gas, noise, odours, stormwater runoff etc.) are unacceptable - Allowing the Environmental Auditor, Environmental Consultant and Geotechnical Consultant access to the site for progress inspections, sampling and testing for the purposes of environmental monitoring, quality assurance and verification works
<p>Principal Contractor's Employees</p>	<ul style="list-style-type: none"> - Notifying the Site Manager/Principal Contractor of any situation that may represent a potential health or environmental risk - Notifying the Site Manager/Principal Contractor of any potential environmental risk - Reporting incidents, near misses and any complaints to the Site Manager - Following the directions of the Site Manager and this CEMP
<p>Sub-Contractors</p>	<ul style="list-style-type: none"> - Contractual obligations to comply with this CEMP - Attendance at site inductions, where appropriate - Reviewing this CEMP and adding supplemental control procedures, where necessary - Preparation of SWMS for specific work activities - Notifying the Site Manager/Principal Contractor of any potential environmental risk - Reporting incidents, near misses and any complaints to the Site Manager

Position / Title	Responsibility
	<ul style="list-style-type: none"> - In the preparation of this CEMP it is assumed that a specialist contractor or subcontractor will be engaged by the Principal or Principal Contractor to undertake works associated with the installation of landfill gas infrastructure, including the cap and venting systems and individual building and services protection measures. This requirement will be specified in the detailed design for the gas protection measures
<p>Project Manager/ Superintendent</p>	<ul style="list-style-type: none"> - Engaged by the Principal to ensure successful delivery of the project - Supervision of the implementation of the requirements of this CEMP and prioritisation of environmental and OH&S management alongside construction management (including compliance auditing of the CEMP) - Responsible for liaison between the Site Owner, Principal Contractor, Environmental Auditor and Environmental Consultant - Reviewing reports prepared by the environmental and geotechnical consultant - Managing community relations issues and concerns including implementing and maintaining a record of complaints
<p>EPA Accredited Environmental Auditor (Appointed Pursuant to the Environment Protection Act 1970)</p> <p>The currently appointed environmental auditor has advised that he will not be available to be engaged for the post audit verification works at the site, meaning that another environmental auditor will need to be engaged by the Principal. It is recommended that as part of this engagement a handover process is coordinated with the current auditor to ensure an effective transition and implementation of the CEMP</p>	<ul style="list-style-type: none"> - Engaged by the Principal to independently review and verify the design of environmental management measures at the site, including the following documentation: <ul style="list-style-type: none"> o Pathway intervention (landfill cap and boundary venting system); o Gas protection measures for underground services and buildings; o Construction Quality Assurance (CQA) plan for pathway intervention and gas protection measures; - Review and verify updated CEMP at completion of design works - Review and verify the subsequent construction and installation of landfill gas protection measures (pathway intervention and building/services protection measures) - Review and verify compliance with the conditions of the statement of environmental audit (where verification is required) - Review and verification of the backfilling of Zone 4 as being compliant with the site backfilling protocol¹ - Review and verification of the CQA report for the construction of the temporary boundary venting trench in Zone 1 - Notifying EPA of any 'imminent environmental hazard' arising during verification of construction works
<p>Environmental Consultant</p>	<ul style="list-style-type: none"> - Engaged by the Principal to provide environmental advice during construction and relating to the implementation of this CEMP, including the following:

¹ Coffey Environments (2105) *ENAUABTF00751AA_R02_Rev06 – Site Backfilling Protocol*

Position / Title	Responsibility
	<ul style="list-style-type: none"> - Preparation of detailed design for landfill gas protection measures at the site including pathway intervention (cap and venting systems) and individual building and services protection measures - Preparation of a CQA plan for the construction and installation of the landfill gas infrastructure - Revise the CEMP at the completion of the detailed design phase (and as required following any subsequent work phases) - Verify the installation of landfill gas infrastructure, this would include acting as the Geotechnical Inspection and Testing Authority (GITA) and Third-Party Construction Quality Assurance Inspector (TPCQA Inspector) during construction - Undertake ongoing and verification monitoring for soil, groundwater and landfill gas as required by this management plan - Reviewing the contractor’s compliance with the provisions of the CEMP and the site backfilling protocol
Geotechnical Consultant	<ul style="list-style-type: none"> - Engaged by the Principal to provide geotechnical advice during construction and relating to the implementation of this CEMP, including the following: - Conducting geotechnical investigations and assessment of the site including geotechnical advice regarding the design of the backfilling of Zone 4, as well as the management of Zones 1, 2, 3 and 5 with regards to the future redevelopment. - Providing Level 1 supervision during site preparation and placement of fill (including during backfilling of Zone 4) - Undertaking settlement monitoring and prepare a report when the settlement criteria is achieved to permit development at the site - Providing a level 1 compliance report following completion of the backfilling operations
Architect	<ul style="list-style-type: none"> - Engaged by the Principal to prepare the architectural design for the site redevelopment
Civil Engineer	<ul style="list-style-type: none"> - Engaged by the Principal to prepare the civil design for the site redevelopment - Direct input from the civil engineer will be required during the detailed design of the gas protection measures to ensure that the drainage and servicing strategy for the site is compatible with the landfill gas management infrastructure (and vice versa)
Structural Engineer	<ul style="list-style-type: none"> - Engaged by the Principal to prepare the structural design for the site redevelopment (i.e. built form)

2. Background Site Information

The site was formerly operated as a commercial sand quarry with the quarry pits then progressively filled including the presence of a former municipal landfill in the northwest portion of the site (Zone 1).

In addition to quarrying and landfilling activities, the site formerly housed a poultry farm and market gardens (located in the south west corner) and a concrete batching plant (to the east of Talbot

Avenue). Extensive earthworks have occurred at the site historically with all former infrastructure since removed and multiple stockpiles, mounds and trenches remaining.

As part of the site rehabilitation process, fill was progressively imported to the site by Lantrak East Projects Pty Ltd (Lantrak) from August 2016 to February 2019. Fill was stockpiled in the eastern portion of the site (Zones 2, 3 and 5) to pre-load the ground in these areas under a stockpiling permit (TPA/43337) issued by Monash City Council in June 2015.

A large quarry void is present in the south-western portion of the site (Zone 4), which is partially filled with water (quarry lake). The stockpiled material at the site is proposed to be utilised for filling of this quarry void.

The former quarrying operation also included a quarry pit on land immediately to the south of the eastern portion of the site, which currently comprises Talbot Park Reserve (owned by Monash City Council) and was formerly Talbot Park Landfill.

Huntingdale Estate intend to redevelop the site for primarily residential land use under application of a development masterplan.

Taking into consideration the previous uses of the site; including sand quarrying, landfilling, poultry farming and market gardening, and the proximity of parts of the site to a former municipal landfill (Talbot Park), there are a range of environmental and geotechnical issues to be addressed as part of the site redevelopment.

Based on the site history (previous quarrying and operational activities) and proposed redevelopment strategy the site has been divided into five (5) separate zones (Zones 1 to 5). The site layout including the location of the 5 zones is provided in Figure 1, **Appendix A**

2.1. Site Description

As outlined, for the purposes of assessment works at the site to date, the site has been divided into five distinct zones. A summary of the site condition for each of the zones is provided in the following section.

2.1.1. Zone 1 – Northwest portion of the site

Zone 1 comprises a former sand quarry pit that has been used as landfill. Based on boreholes drilled during historical investigations conducted at the site, the subsurface conditions within Zone 1 generally comprise uncontrolled fill and landfill materials extending to depths of up to approximately 18m. The landfill appears to be capped with un-engineered fill between 1 to 5 m in thickness.

Review of historical borelogs indicate that the content and extent of refuse material varies across the zone with trace amounts of refuse (generally consisting of domestic waste, green waste, tyres, fabric, plastic) and foundry wastes (generally consisting of black sands with inclusions of scrap metal, plastic and fabrics) being encountered at depths from 0.4 m below ground surface. Soil with a higher proportion of foundry wastes have been encountered at depths starting at 1 to 1.5 m bgs, with a higher proportion of refuse being encountered at depths starting at 5 m bgs.

Based on a review of available historical aerial photographs of the site, landfilling occurred between 1970 and 1975. Information from EPA Victoria indicates that approximately 535,000 m³ of solid inert and putrescible waste was accepted during its operation as a municipal landfill. Gas measurements taken within this area indicate that the landfill continues to produce some landfill gas; however, the generation rates are expected to have reduced from when the landfill was established, due to the landfill being in the later stages of its gas generation lifecycle.

2.1.2. Zone 4 – Southwest portion of the site

Zone 4 comprises an open former quarry pit approximately 15m deep. Some backfilling occurred in the north east portion of the pit using soil stockpiled in Zone 1 (stockpiled prior to ownership of the site

by Huntingdale Estate). There is potential that the southern extent of Zone 4 may also have been backfilled historically.

Some existing bunds, clay slimes and water are also present within parts of the pit. Surface water quality testing, as detailed in the *Zone 4 Soil, Sediment and Surface Water Report* (Coffey, June 2014d), indicated that the surface water is likely to be suitable for disposal to stormwater or sewer and for irrigation purposes; however, approval from the relevant authorities and land owners would be required before disposal or reuse can occur. The sediment in the base of Zone 4 quarry void is suitable for reuse on site, providing the soil meets the geotechnical requirements stipulated in the *Site Backfilling Protocol* (Coffey 2015), and the *Zone 4 Backfill Design Report* (Coffey 2019)

Residual slimes material, located in the northwest corner of Zone 4 is proposed to be excavated, dried and subsequently retained on-site.

Previously, dewatering of the pit occurred for several years mainly because water was being used for irrigation on the neighbouring golf course. This has caused a groundwater depression in this area. The groundwater depression remains at the time of preparation of this CEMP.

2.1.3. Zones 2, 3, and 5 – Eastern portion of the site

Zones 2 and 3 comprise former sand quarry pits that have been backfilled with remnant slimes from the former sand mining operations. Historical information indicates that Zones 2 and 3 were backfilled predominantly with slimes in the 1990s. Slimes are a waste product generated when the fine sand, clay and silt fractions are washed from natural sands during sand mining operations. Typically, the slimes are stored in a saturated state in former quarry pits and comprise very soft clays and silts and very loose sands. The slimes are highly compressible, with in-situ moisture contents higher than their liquid limit, giving the slimes fluid properties.

The subsurface conditions within Zones 2 and 3 generally comprise a 1m to 4m thick soil cover over slimes up to about 20m deep. Solid inert waste (building rubble) and some foundry waste is also present in these Zones.

In Zone 2 the solid inert waste layer is distinct overlying the slimes and generally comprises a 1 m to 4 m thick layer of construction and demolition waste (up to 80% waste content). The construction and demolition wastes were imported to the site in the late 1990s as part of historical site rehabilitation works. The wastes would have been used as a 'bridging layer' over the slimes to enable vehicle trafficking in these areas. This layer of material is considered likely to be a source of landfill gas in Zone 2.

Zone 5 formerly supported the processing plant used as part of the sand mining operations, a foundry sand plant and later a concrete batching plant, as such mining operations and slimes are more limited in this area. Uncontrolled fill up to 9m thick does exist within the western portion of Zone 5.

2.2. Adjacent Land Uses

The adjacent and surrounding land uses to the site include:

- North – Residential and athletics park (Davies Reserve), vacant land comprising the former Clayton West Primary School Site (proposed residential development site) located at the north east site boundary.
- East – Residential land use (primarily low to medium density).
- South – Talbot Park, residential (high density residential development) and Centre Road.
- West – Huntingdale Road and Huntingdale Golf Course, with residential land uses immediately adjacent to the north-west.

Further discussion on Talbot Park located immediately adjacent to the southern boundary of Zone 2 is presented in the following section.

2.2.1. Talbot Park

Although Talbot Park is not part of the site, the ground conditions in Talbot Park are relevant to the development of the site due to historical landfilling in this area. Talbot Park is a former municipal landfill and is located to the south of Zone 2. Information from EPA Victoria indicates that approximately 136,000m³ of solid inert and putrescible waste was accepted during its operation before it closed sometime between 1977 and 1978.

Previous landfill gas monitoring at Talbot Park in 2009 and 2010 (completed by others) indicate that the site was still producing methane. Similar to the landfill in Zone 1, the generation rates are expected to be reducing with the landfill being in the latter stage of its gas generating lifecycle.

Groundwater originating from Talbot Park is currently inferred to discharge to the quarry void in Zone 4, however it is predicted that following backfill of Zone 4, groundwater flow will resume a flow direction to the south or south-west. Based on that assumption, leachate generated from Talbot Park would be unlikely to have a significant impact on the Zone 4 part of the site in future.

2.3. Site History

An overview of the site history based on review of the previous reporting is provided in the following section.

The site originally comprised pastoral land and was developed as a poultry farm and for intensive (market garden) agriculture including orchards and nurseries in the first half of the 1900s. From the late 1950s or early 1960s until the end of the century, the site was progressively quarried for sand (initially operated by Consolidated Quarries then Pioneer Concrete Pty Ltd).

A foundry sand plant, concrete batching plant and associated infrastructure was located on Zone 5 from the early 1960s until its removal in 1990s. Landfilling with refuse (City of Oakleigh) occurred in Zone 1 between 1972 and 1975. Zone 2 and Zone 3 were used as a slime lagoon as was Talbot Park, to the south east of the site; filling of Zone 2 and Zone 3, predominantly with slimes, was completed by the 1990s. Talbot Park was filled with refuse between 1977 and 1978.

A summary of the historical use of the site, in chronological order is presented in Table 2-1.

Table 2-1: Site History Summary

Year Range (approximate)	Site History Summary
Pre 1950s	Pastoral Land Agriculture Poultry and market gardens commenced mid-1940s
Late 1950s / early 1960s	Melbourne Metropolitan Board of Works grants Consolidated Quarries an Interim Development Order to extract sand Quarrying commenced on eastern and north western areas Foundry sand plant, concrete batching plant and associated infrastructure present on-site. Poultry Farm and market gardens still present in Zone 4
1960s to early 1970s	Bund wall constructed between Zone 2 and Talbot Park area. Zones 2, 3 and Talbot Park area used as slime lagoons Quarrying in Zone1 commenced
1972-1975	Zone 1 filled with refuse (putrescible and solid inert waste)

Year Range (approximate)	Site History Summary
	Quarrying commenced in the northern section of Zone 4
1975-1978	Talbot Park filled with refuse (putrescible and solid inert waste)
1975-1993	Quarrying in Zone 4 progresses southwards and poultry farm removed Zone 2 being backfilled with wastes from concrete plant and other sand like materials and sands (slimes). Zone 2 appears to have been backfilled by 1991. Zone 3 backfilled with slimes and potentially other quarry wastes (undefined). Zone 3 appears to have been backfilled by 1993.
1993-1999	Foundry sand plant, concrete batching plant and associated infrastructure removed Quarrying completed. Filling completed in Zone 2, Zone 3 and Zone 5 Importation of construction and demolition wastes for slimes 'bridging layer' in Zone 2 Stockpiled material present in Zone 1
2008	Partial filling in Zone 4 north-eastern quadrant with to create fill platform from stockpiled material in Zone 1.
2008 - 2013	Water from Zone 4 quarry used for watering of Huntingdale Golf Course.
2016 - 2019	Importation of fill material for future backfilling works by the appointed earthworks contractor (Lantrak) under stockpiling permit (TPA/43337).

2.4. Current Site Condition

At the time of assessment, the site was vacant and/or subject to site preparation works as part of the on-going rehabilitation process and consisted of generally unpaved undulating ground, including soil stockpiles in some parts of the site.

Access to the site is primarily from the west via Huntingdale Road, a secondary access is via Centre Road to the south. The two (2) access points are linked via Talbot Avenue which is orientated north south through the centre of the site.

The eastern portion of the site (Zones 2, 3 and 5) encompasses the pre-load stockpiles. The existing open quarry void (Zone 4) is located in the southwestern portion of the site extending to approximately 15 m depth.

The topography of the site can be described as generally sloping to south-west with surface elevations generally between 56 m and 64 m AHD. The site topography has been altered significantly by the presence of a quarry void in the south-west portion of the site (Zone 4), and the presence of numerous large soil stockpiles across the remainder of the site (comprising material stockpiled at the site historically and material present in Zones 2,4 and 5 imported during current rehabilitation works).

Due to excavation at the site associated with its previous use as a quarry, the Zone 4 area slopes down from north to south by approximately 10 m. The lowest part of the Zone 4 area is the quarry lake in the southwest corner of the site. There are steep banks along the southern, eastern and western boundaries of the southern portion of the Zone 4 area.

The majority of stormwater run-off at the site drains to the quarry void low point (quarry lake) in the south-western portion of the site.

A site plan outlining the current site condition and relevant site features is provided in Figure 1 (**Appendix A**).

An existing groundwater and landfill gas monitoring network is present across the site. The location of this monitoring infrastructure is highlighted in Figure 2 in **Appendix A**.

2.5. Proposed Site Redevelopment

The recommendations of the Planning Panels Victoria Report (11th September 2018) relating to Monash Planning Scheme Amendment C129 included that the rezoning application for the site redevelopment be rejected and that an environmental audit be completed for the entire site prior to any prospective rezoning.

Given this current planning status of the site (i.e. no planning permit or rezoning application has been approved) and that no detailed development masterplan has been prepared, there is currently some uncertainty regarding the final development design.

The detailed development design will be undertaken during Stage 1 of the construction phase covered by this CEMP (i.e. will be completed prior to, or in conjunction with detailed design of the site management measures).

This CEMP must be reviewed (and if required updated) following finalisation of the development design and detailed design of the site management measures (landfill gas).

Notwithstanding the uncertainty regarding the final development design, the proposed redevelopment will primarily comprise residential land uses, consisting predominantly of high-density dwellings (townhouses and apartments).

Some low-density housing (lots exceeding 300 m²) may be included as part of the proposed redevelopment but will be confined to the northern and eastern site boundaries (i.e. interface with surrounding low-density residential land). The locations of these proposed low-density land uses are highlighted on Figure 3 in **Appendix A**.

Some medium density housing, commercial (retail) and open space land uses will also be included as part of the overall masterplan.

There is potential that basement construction may be incorporated in the development design in Zones 3, 4 and 5.

3. Current Environmental Condition of Site

A summary of the current environmental condition of the site is provided in the following section. More detailed information is provided in the following documents:

- Coffey (May 2020) *ENAUABTF00751AB_R01 Environmental Site Assessment, Huntingdale Estate 1221 to 1249 Centre Road, and 22 Talbot Avenue, Oakleigh South, VIC;*
- Coffey (May 2019) *ENAUABTF00751AB_R15 Clean Up to The Extent Practicable (CUTEP) Submission, Huntingdale Estate 1221 to 1249 Centre Road, and 22 Talbot Avenue, Oakleigh South, VIC;*
- Coffey (August 2019) *ENAUABTF00751AB_R16, Groundwater Quality Management Plan, Huntingdale Estate 1221 to 1249 Centre Road, and 22 Talbot Avenue, Oakleigh South, VIC; and*

- Coffey (May 2020) ENAUABTF00751AB_R14, Conceptual Design of Site Management Measures, *Huntingdale Estate 1221 to 1249 Centre Road, and 22 Talbot Avenue, Oakleigh South, VIC.*

Whilst a summary of the key environmental issues is provided in the following section it is recommended that the Principal's Environmental Consultant (refer Table 1-1) has a detailed understanding of these documents and the environmental conditions at the site.

3.1. Remaining Contaminant Sources On-Site

The following landfilling activities are considered to be the primary on-site sources of contamination at the site:

- Landfilling of municipal (putrescible and solid inert waste) in Zone 1.
 - Estimated 535,000 m³ of waste deposited in the early 1970s with wastes present at up to 20 m bgs.
 - The landfill is unlined and municipal (putrescible) wastes are generally present from at least 4.0 m bgs with the majority of the waste mass (>90%) present below the water table (~ 5.0 m bgs). The municipal wastes are largely capped with uncontrolled fill including approximately 35,000 m³ of foundry sands waste.
- Landfilling of solid inert (construction and demolition) wastes in Zone 2 as part of historical slimes rehabilitation works (slimes bridging layer).
 - The presence of a discrete layer of construction and demolition waste (up to generally between 1.0 and 4.0 m in thickness) is present directly overlying the slimes in Zone 2. The construction and demolition wastes were historically imported to Zone 2 in the 1990s as a bridging layer for the slimes and contains up to >80% waste in some areas of Zone 2 and comprises a total estimated volume of 67,000 m³.
 - The wastes within Zone 2 are shallower with approximately 60-70% of the waste mass above the water table.
- Landfilling of solid inert waste and other uncontrolled fill (including foundry wastes) in Zone 1 (utilised as capping material for municipal landfill) and Zones 2, 3, 4 and 5 (foundry wastes generally confined to Zone 1 but some present in Zone 2 and 3).

3.2. Contaminant Sources Off-site

Landfilling of putrescible and solid inert waste in Talbot Park Reserve, immediately off-site to the south-east represents a potential off-site source of contamination that may be impacting groundwater quality at the site.

Talbot Park was historically part of the Pioneer quarrying operations at the site and was then subsequently operated as a municipal tip between 1975 and 1978, with a reported 136,000 m³ of solid inert and putrescible wastes deposited.

3.3. Soil Contaminant Status

A total of 357 soil samples from were collected from 112 individual sampling locations across the site during the ESA and analysed for a wide range of potential contaminants of concern. In conjunction with the data from historical assessment works at the site, the soil investigation works undertaken as part of the ESA were considered to provide sufficient characterisation of soils at the site to facilitate an appropriate level of risk assessment, provide the basis for the development of an appropriate management strategy and support completion of an Environmental Audit.

The beneficial uses of land that need to be protected at the site under the SEPP *Prevention and Management of Contamination of Land*² based on the proposed sensitive residential land use include:

- Maintenance of Ecosystems (modified and highly modified);
- Human Health;
- Buildings & Structures;
- Production of Food, Flora and Fibre and
- Aesthetics.

A summary of the of the results of the soil assessment works at the site with reference to the protected beneficial uses of land is outlined in Table 3-1.

² State Environment Protection Policy (Prevention and Management of Contamination of Land), 2002 as amended 2013

Table 3-1: Summary of Soil Assessment Results and Impacts to Protected Beneficial Uses of Land

Beneficial use	Soil contamination issues impacting on beneficial use	Proposed soil management strategy to protect beneficial use
<p>Maintenance of ecosystems (modified and highly modified)</p>	<p>Elevated concentrations for various heavy metals (arsenic, copper, nickel and zinc), BaP and TRH C₁₀ – C₁₆ (F2) and C₁₆ – C₃₄ (F3) fractions were recorded in a number of locations within in-situ fill soils at the site that exceeded that the adopted maintenance of ecosystems criteria.</p>	<p>Exceedances of ecosystem criteria will largely be redundant on completion of the site redevelopment due to the majority of the site being covered with impervious surfaces (roads, building footprints etc.).</p> <p>In areas of accessible soil (i.e. open space or garden areas) soil contamination will be addressed by placement of the final validated soil cover (minimum 0.5 m thickness proposed for Zones 2, 3 and 5 and 2.0 m in Zone 1).</p> <p>Requirements for the validation of the final soil cover at the site are outlined in Section 4.2.</p>
<p>Human Health</p>	<p>Arsenic was reported at concentrations exceeding the adopted HILs at 3 sub-surface locations (TP14_3.0 in Zone 1 and TP47_2.0 and TP48_1.0 in Zone 3).</p> <p>Elevated concentrations of benzene, naphthalene and TRH (F2) fraction were reported in soil at a limited number of locations that exceeded the adopted health screening levels (for vapour inhalation) for a sensitive residential land use.</p> <p>The presence of bonded asbestos containing materials (ACM) in the form of cement sheet debris was observed within surface and subsurface soils in a number of locations at the site.</p>	<p>The elevated arsenic concentrations exceeding the adopted criteria were recorded at depths ranging from 1.0 – 3.0 m bgs and it was considered unlikely that future users of the site would come into contact with these soils, particularly given the proposed capping of the site (placement of final validated soil cover).</p> <p>The exceedances of the adopted health screening levels were considered unlikely to pose a risk to human health via the vapour inhalation pathway given that they were located at depths where they are unlikely to pose a risk (following capping) or are in areas that are proposed to include gas mitigation measures.</p> <p>The proposed capping of the site (placement of final validated soil cover, presence of building footprints and/or construction of the landfill cap in Zone 1) would be an effective control for minimising the potential exposure to potential asbestos contaminated soils for future site users.</p> <p>Proposed earthworks to be undertaken during construction need to consider the potential for ACM to exist and ensure appropriate management measures are implemented during the works (refer to Section 5.16).</p> <p>Requirements for the validation of the final soil cover at the site are outlined in Section 4.2.</p> <p>Potential landfill gas risks to be managed through engineered controls (refer Section 4.2 and 4.3).</p>
<p>Buildings and Structures</p>	<p>The recorded soil pH for in-situ soils ranged from acidic (pH 4.3) to moderately alkaline (pH 9.3) but was generally neutral (site average pH 7).</p>	<p>A detailed assessment of the buildings and structures beneficial use was considered outside of the scope of the ESA. However, based on the pH range recorded, soil conditions would be classified as mild (for exposure classification for concrete piles) and non-aggressive (exposure classification for steel piles) and were unlikely to preclude this beneficial use.</p>

Beneficial use	Soil contamination issues impacting on beneficial use	Proposed soil management strategy to protect beneficial use
<p>Production of Food, Flora and Fibre</p>	<p>Elevated concentrations for various heavy metals (arsenic, copper, nickel and zinc), BaP and TRH C₁₀ – C₁₆ (F2) and C₁₆ – C₃₄ (F3) fractions were recorded in a number of locations within in-situ fill soils at the site that exceeded that exceeded the adopted maintenance of ecosystems criteria which indicate there is a potentially unacceptable risk to this beneficial use.</p>	<p>In areas of accessible soil (i.e. garden areas) soil contamination will be addressed by placement of the final validated soil cover (minimum 0.5 m thickness proposed for Zones 2, 3 and 5 and 2.0 m in Zone 1) allowing domestic scale growing of plant species for food and flora. During detailed development design (landscaping) the final surface cover thickness will need to take into account the required depth of soil for any trees (where trees may be proposed).</p>
<p>Aesthetics</p>	<p>The presence of building rubble and ACM within surface and near surface soils at the site may pose aesthetic concerns to future occupiers of the site where exposed.</p>	<p>On the proviso that visible rubble and ACM is appropriately managed during the site development process (i.e. covered by the placement of final validated soil cover, buildings and/or the landfill cap in Zone 1) the soil beneficial use of 'aesthetics' was considered unlikely to be precluded.</p> <p>Validation of the 'aesthetic' suitability of the final soil cover in open areas would occur as part of the construction CEMP. Requirements for maintenance of the soil cover would be outlined in the owner's corporation rules.</p>

Whilst exceedances of soil human health investigation levels are outlined in Table 3-1 it should be noted that these were confined to the adopted criteria for future residential use. Contaminant concentrations in soil were less than the investigation levels that would be adopted for the protection of construction workers health during redevelopment works at the site (as covered by this CEMP).

The primary soil contamination issues relevant to this CEMP were considered to include the following:

- Potential for unexpected contamination and ACM to be encountered during bulk excavation works at the site (refer [Section 5.16](#))
- Design, establishment and verification of a minimum 0.5 m thickness of validated 'clean fill' soil cover in areas of accessible soil (i.e. open space or garden areas) in Zones 2, 3 and 5 and at least 2.0 m thickness in Zone 1 (refer [Section 4.2](#))

3.4. Groundwater Contaminant Status

Elevated concentrations arsenic, cadmium, copper, lead, manganese, nickel, zinc, ammonia, nitrate, benzene, chloride, sodium, TDS, pH, PFOS and sum of PFHxS & PFOS were recorded in groundwater at the site that exceeded the investigation levels adopted for the protection of one or more designated beneficial uses of groundwater.

Beneficial uses of groundwater at the site were considered to be precluded by the recorded contamination.

With the exception of arsenic, nickel and zinc which may be indicative of naturally occurring conditions, the elevated contaminant concentrations were associated with the presence of landfill and buried wastes on-site and the subsequent mobilisation and migration of landfill leachate.

The contaminant plumes were considered to be effectively delineated during the assessment. In the site's current condition contaminated groundwater associated with landfill leachate and buried wastes is confined to the site boundaries by the Zone 4 quarry void with the exception of limited off-site migration of contamination to the southeast of Zone 2 associated with localised groundwater mounding in this area.

Following filling of the Zone 4 quarry void, normalisation of groundwater levels and a return to steady state (regional groundwater flow) conditions there is potential that groundwater contamination from Zone 1 will migrate off-site to the south / south west, however this situation is likely to take several years and potentially decades to be realised.

A groundwater quality restricted use zone (GQRUZ) has been established at the site (and extending off-site) and on-going groundwater monitoring is required as part of the EPA CUTEF determination ([Appendix E](#)).

Groundwater is not expected to be encountered during construction works, with the exception of dewatering in Zone 4 during filling of the quarry void (refer [Section 4.1](#)) and during piling works (where required).

The requirements for on-going groundwater monitoring at the site are addressed separately in the Groundwater Quality Management Plan (Coffey 2019).

3.5. Landfill Gas

Elevated concentrations of landfill gas are present in the subsurface at the site associated with historical landfilling activities, and may be encountered anywhere on the site. Landfill gas mitigation (gas protection) measures are required to be implemented at the site as part of the proposed

redevelopment to ensure that no unacceptable landfill gas risks exist on or off-site during construction and/or following the proposed redevelopment.

Detailed consideration of potential landfill gas risks at the site (tier 2 landfill gas risk assessment) adopting the 'Gas Screening Value' approach detailed in British Standard 8485:2015 +A1 (2019) and CIRIA C665 (2007) has been provided in the as part of the Environmental Site Assessment (Coffey ref: ENAUABTF00751AB_R01, May 2020) to inform the gas protection measures required.

A concept design for the gas protection measures required at the site has been prepared by Coffey³ based on the findings of the ESA and landfill gas risk assessment. These measures are summarised below.

In Zone 1 and Zone 2A landfill gas risks have been classified as 'Characteristic Gas Situation 4' (Moderate to High Hazard Potential). In these areas, gas protection will include pathway intervention measures comprising a constructed landfill cap and associated horizontal venting layer connected to passive vertical venting barrier (boundary venting). Regardless of the implementation of pathway intervention, any buildings in this area will be required to be constructed with individual gas protection measures that achieve the minimum gas protection score required in British Standard 8485:2015 +A1 (2019) for a moderate to high hazard potential and the particular building type.

With the exception of areas of Zone 4 (along the Huntingdale Road boundary) which are classified as 'Very Low Hazard Potential' (Characteristic Situation 1), Characteristic Situation 2 (Low Hazard Potential) has been adopted in all other areas of the site. Buildings in these areas will be required to be constructed to achieve the minimum gas protection score required in British Standard 8485:2015 +A1 (2019) for a low hazard potential and the particular building type to be constructed. Examples of measures to achieve the required gas protection score would include a combination of the following:

- Passive sub-floor ventilation with 'Good' performance as defined within 8485:2015 +A1 (2019);
- Reinforced concrete cast in situ suspended slab with minimal service penetrations; and
- Gas resistant membrane meeting the requirements of 8485:2015 +A1 (2019).

The concept design (Coffey 2020) for building protection measures in CS2 areas includes both a passive ventilation system (of at least good performance) and a vapour barrier (membrane). This design allows for a standard slab construction (cast in-situ ground-bearing floor slab) and provides a greater level of system redundancy (higher level of gas protection), with the associated gas protection score sufficient for CS3 (moderate hazard potential) gas risks.

Whilst landfill gas conditions in Zone 4 have been characterised as 'Very Low Hazard Potential' (Characteristic Situation 1), as a precautionary measure Zone 4 buildings to be constructed are proposed to include ventilation measures (e.g. pressure relief pathway, passive slab dispersal layer or ventilated car park).

In addition to building protection measures the construction of underground services at the site will also need to incorporate appropriate gas protection measures.

An outline of the gas hazard potential for the different areas of the site is provided in Figure 3 in **Appendix A**.

A conceptual design of the site management measures required to mitigate landfill gas risks for the proposed redevelopment has been prepared by Coffey (April 2019). This conceptual design document should be reviewed in conjunction with the CEMP and referenced during the detailed design of gas protection measures.

³ Coffey (November 2019) ENAUABTF00751AB_R14_DRAFT, Conceptual Design of Site Management Measures, Huntingdale Estate 1221 to 1249 Centre Road, and 22 Talbot Avenue, Oakleigh South, VIC.

4. Key Environmental Management Measures

An outline of the general environmental management measures to be implemented during all phases of construction is provided in **Section 5**.

The following section includes key measures to be implemented for specific stages of the construction process (refer **Section 1.3**).

4.1. Stage 1 – Site Rehabilitation

Key environmental management measures to be implemented during Stage 1 include:

- Undertake on-going periodic groundwater and landfill gas monitoring as outlined in the Groundwater Quality Management Plan (Coffey 2019) and State 1 Landfill Gas Monitoring Plan (**Appendix C**).
 - An appointed environmental auditor (refer **Table 1-1**) must be engaged to review and verify the ongoing groundwater and landfill gas monitoring data at the frequency specified in these documents.
- Prior to undertaking pre-loading activities in Zone 1, a temporary boundary gas venting system must be installed along the northwest site boundary (interface with sensitive residential land use).
 - An appointed environmental auditor (refer **Table 1-1**) must be engaged prior to construction of the temporary boundary venting system to review and verify the design and subsequent installation of the system.
 - The boundary venting system must be installed in accordance with the Coffey workplan verified by the environmental auditor⁴ (provided in **Appendix B**) or a revised workplan subsequently verified by an appointed environmental auditor.
 - Designated hold points to be enforced where construction of the trench as per the agreed design is not practicable to enable discussion and endorsement of the proposed design change from the auditor.
- During pre-loading activities in Zone 1 (following construction of the trench) on-going landfill gas monitoring must be implemented in accordance with the auditor approved workplan or a revised plan verified by an appointed environmental auditor.
- The backfilling of the Zone 4 quarry void (and associated importation and temporary stockpiling of fill material) must be undertaken in accordance with the most current version of the following documents developed for these works:
 - Coffey (2015) *Site Backfilling Protocol* (ref: ENAUABTF00571AA_R02_Rev06, 2014);
 - Coffey (2015) *Construction Environmental Management Plan – Backfilling Works* (ref: ENAUABTF00571AA_R03_Rev10, 2014);
 - Coffey (July 2019) *ENAUABTF00751AB_R16, Groundwater Quality Management Plan, Huntingdale Estate 1221 to 1249 Centre Road, and 22 Talbot Avenue, Oakleigh South, VIC*;
 - Coffey Geotechnics Pty Ltd (2019) *Zone 4 Backfill Design Report* (ref: GEOTABTF09257AA-AQ Rev11);

⁴ A copy of the workplan must be provided to the appointed environmental auditor prior to construction to verify the design as meeting the intent of the audit statement conditions (as they will be a different auditor to that appointed to undertake the original verification).

- Coffey Geotechnics Pty Ltd (2015) *Zone 4 Backfill Design Specification* (ref: GEOTABTF09257AA-BC Rev09); and
- Coffey Geotechnics Pty Ltd (2015) *Zone 4 Construction Quality Assurance Plan* (ref: GEOTABTF09257AA-BB Rev09).
- Specific landfill gas monitoring requirements during preload activities in Zone 1 are outlined in **Appendix B**. The requirements for landfill gas monitoring prior to and during filling of the Zone 4 quarry void are provided in **Appendix C**.

4.2. Stage 2 – Design Works

Whilst a conceptual design has been prepared for proposed landfill gas protection measures at the site it is recognised that further (detailed) design for these measures will be required prior to construction. An outline of the key measures to be implemented during the design stage of construction is provided below:

- Detailed design of gas protection measures at the site should reference the conceptual design prepared (Coffey 2020) and achieve the minimum gas protection score required for the specific building type to be constructed as specified in British Standard 8485:2015 +A1.
 - The detailed design must be prepared by a suitably qualified person who is able to justify the adopted design based on the site-specific situation.
 - If there is any doubt regarding whether the designer is suitably qualified, the environmental auditor may provide advice to the Principal on that matter.
 - The detailed design should be presented in a design report and include construction/building details and detailed drawings and specifications for each component of the gas protection measures.
 - The person who has selected the gas protection measures and whoever is preparing the detailed design should liaise during the development of the detailed design.
 - As a minimum the design report should include the recommended components outlined in Section 8.3 of British Standard 8485:2015 +A1.
- In addition to meeting the required gas protection score under British Standard 8485:2015 +A1 (2019), architectural, civil design, construction and structural/geotechnical limitations must be considered in selection of the final gas protection measures to be employed. This will require consultation and input from all related disciplines (refer **Table 1-1**).
 - In Zone 1 and Zone 2A (characteristic gas situation 4 areas) it is likely that the gas protection measures for buildings will include the requirement for an engineered slab design (e.g. cast in-situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations). The slab construction requirements must be discussed with the builder during detailed design. This condition would also apply were an engineered slab design (for gas mitigation) to be adopted in any other areas of the site.
 - The concept design for the cap in Zone 1 and Zone 2A incorporates a LLDPE Geomembrane Liner. Detailed design of the cap must consider future construction requirements such as where cap penetrations may be required (e.g. piling). Based on the concept design and adopted liner profile, any cap penetrations would be required to be installed prior to the cap construction and appropriately sealed with the cap so as to prevent the generation of a preferential pathway for landfill gas.
- The detailed design must include contingency measures for the provision of on-going access to the eastern and north eastern site boundary areas (such as through the provision of ‘easements’ or similar mechanism) to allow for the installation of gas protection measures (boundary venting system) in these areas should they be required in the future (i.e. to be determined during subsequent stages of development).

- The detailed design should include a methodology for the decommissioning and verification of the temporary boundary venting system in Zone 1 (if required) and decommissioning of existing groundwater monitoring and landfill gas bores (where required and verified as no longer being required for monitoring by the appointed environmental auditor and/or EPA).
- Detailed design of the boundary venting system(s) should include measures to ensure that discharge of trace landfill gases (carbon monoxide and hydrogen sulphide) are compliant with the SEPP (AQM)⁵.
- A construction quality assurance (CQA) plan must be prepared as part of the detailed design to outline how the installation of the gas protection measures will be verified.
 - Separate CQA plans should be prepared for the pathway intervention (cap and venting measures) and individual building protection measures.
 - There are different verification approaches and testing tools available to demonstrate the quality of installed gas measures. The verification approach must be best suited to the particular protection measures and installation methodology to be employed. This rationale should be outlined in the CQA plan.
 - The objective of the CQA plan should be to ensure that materials, construction methods and installation procedures meet the required performance criteria to ensure that the required level of gas protection is achieved.
 - The CQA plan should outline the specific landfill gas monitoring requirements to be implemented to verify the gas protection measures to be installed and assess any changes in landfill gas conditions during construction to ensure that the construction works do not result in an unacceptable landfill gas risk to on-site or off-site receptors.
 - As a minimum the CQA plan should include the following information:
 - How, when and by whom the verification task/s should be carried out (i.e. roles and responsibilities). This should include reference to the specific parties engaged to undertake tasks required under the CQA plan;
 - Compliance criteria (i.e. what constitutes a pass/fail);
 - Frequency of verification task/s;
 - Methodology;
 - QA/QC requirements;
 - How and when information should be reported;
 - Regulatory requirements; and
 - Contingency measures (i.e. what needs to be done if results fail to meet compliance criteria).
 - For the pathway intervention (landfill cap and boundary venting) the CQA plan should reference the requirements of the landfill BPEM⁶.
 - For building protection measures, the CQA plan must incorporate the verification processes outlined in CIRIA Publication C735 (2014)⁷.
- Prior to commencement of construction of the gas protection measures the detailed design report and CQA plan(s) must be reviewed and verified by an appointed environmental auditor.

⁵ State Environment Protection Policy (Air Quality Management), 2001

⁶ EPA Publication 788.3 (2015) *Best Practice Environmental Management, Siting Design, Operation and Rehabilitation of Landfills*

⁷ CIRIA (2014) Publication C735 *Good practice on the testing and verification of protection systems for buildings against hazardous ground gases*

4.3. Stage 3 – Civil Works

A summary of the key environmental management measures to be implemented during the civil construction phase are outlined in the following section. These requirements should be reviewed at the completion of Stage 2 and may be required to be revised as a result of detailed design.

- Prior to commencement of Stage 4 and during the earliest practicable stage of civil works pathway intervention measures (landfill cap and boundary venting system) must be installed in Zone 1 and Zone 2A.
- The boundary venting system for Zone 1 and Zone 2A must be installed and the installation verified in accordance with the CQA plan by the appointed environmental auditor **prior** to construction of the landfill cap.
 - Where practicable (such as for internal boundary trenches between Zones) the verification process should include landfill gas monitoring (program to be detailed in the CQA plan) on both sides of the trench.
- The installation of the cap and boundary venting system must be verified by the appointed environmental auditor prior to commencement of Stage 4 (house building phase).
 - The concept design for the landfill cap incorporates three geosynthetic components comprising the geocomposite, geomembrane and geotextile. Each component serves critical roles within the design, but may be susceptible to damage (such as during civil works) and perform poorly if installed improperly. As such they must be installed and covered under the full-time supervision of the TPCQA⁸. At the completion of the cap construction the TPCQA must produce a TPCQA report that includes (as a minimum) the following information:
 - Manufacturers' supplied Quality Assurance test data for all geosynthetics;
 - Independent (Construction) Quality Assurance test data for all geosynthetics;
 - Data for all trial welds;
 - Locations of all seams, panels and repairs;
 - In-situ test results and locations;
 - Independent Destructive test results and locations;
 - Detailed Construction Photographs;
 - Details of all non-conformances and actions taken to rectify, or where rectification was not possible, an opinion as to the acceptability or otherwise of the end result; and
 - An opinion as to the overall construction's conformance with the Design Documents.
- Prior to completion of the Zone 1 cap, the filling of the Zone 4 quarry void (refer **Section 4.1**) must be progressed to a sufficient degree that the cap construction at the interface of the Zone 1 and Zone 4 can be completed.
- Following installation of the boundary venting system and the landfill cap on-going landfill gas monitoring should be undertaken in accordance with the CQA plan to assess the functionality of the system and any changes in landfill gas migration.

⁸ This role would be performed by the GITA in the event a clay cap is selected as the final design solution

- Whilst the scope and frequency of gas monitoring is to be established in the CQA plan the sampling should include ongoing monitoring of landfill gas bores outside of the cap area and sampling ports within the boundary venting trench.
- Prior to Stage 4 construction works in Zone 2 and Zone 4 the boundary venting system at the western boundary of Zone 2 and around the boundary with Talbot Park (south eastern site boundary) must be installed, and the installation verified in accordance with the CQA plan by the appointed environmental auditor.
- The installation of underground services at the site during civil construction must include the provision of gas protection measures in accordance with the detailed design. The installation must be verified in accordance with the CQA plan by the appointed environmental auditor.
 - To ensure the protection of pathway intervention measures (cap) underground services should be designed to prevent or minimise any penetrations of the cap. Installation of mains services must be completed (for Zone 1 and Zone 2A) as part of the Stage 3 works (i.e. prior to commencement of housebuilding works) to minimise the potential for ad-hoc services excavation works to be required during housebuilding works that may damage the cap.
- The risks to contractors involved in the civil works phase (such as earthworks and the installation of the pathway intervention, roads and services) posed by landfill gas must be specifically addressed in the health and safety plan to be developed for the works.
 - Given methane has been reported exceeding the lower explosive limit (LEL) in the subsurface at the site, any ground opening works (excavations / piling etc.) should be completed under a hot works procedure. The procedure should include monitoring for explosive atmospheres. Stop work procedures should be implemented should the monitoring identify an exceedance of 5% LEL (0.25% v/v methane).
 - Entry into any enclosed or partially enclosed sub-surface space (including excavations) should be conducted under a confined space procedure and confined space permit system, with atmospheric monitoring (to include lower explosive limit (LEL) monitoring).

4.4. Stage 4 – House Building

A summary of the key environmental management measures to be implemented during the house building construction phase is outlined in the following section. These requirements should be reviewed at the completion of Stage 2 and 3 construction works (Section 4.2 and 4.3) and may be required to be revised as a result of detailed design.

- Prior to slab construction in each Zone or sub-Zone, building gas protection measures (e.g. sub slab ventilation measures and membrane) must be installed by a suitably qualified contractor in accordance with the detailed design in that Zone or sub-Zone.
- Whilst the construction requirements will be outlined in the CQA plan (refer **Section 4.2**) the following should be considered during the installation of building protection measures:
 - Given the landfill gas risks at the site, the installation of building gas protection measures must be undertaken by a specialist contractor with demonstrated experience in the installation of these measures. The contractor appointment should be discussed in consultation with the environmental consultant and appointed environmental auditor.
 - Where installed, gas membranes should be⁹:

⁹ Adapted from EPG Ltd (2019) *Gas membranes and "compliance" with BS8485*, Ground Gas Information Sheet No 5, Paper 52.0 4/4/2019

- Sufficiently impervious, both in the sheet material and in the sealing of sheets and sealing around sheet penetrations, to prevent any significant passage of methane and/or carbon dioxide through the membrane (refer Appendix C of the Coffey (2020) concept design);
- Capable after installation of providing a complete barrier to the entry of the relevant gas.
- Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;
- Sufficiently strong to withstand in service stresses (e.g. due to ground settlement if placed below a floor slab);
- Sufficiently strong to withstand the installation process and following construction activities until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, and dropping tools);
- Chemically resistant to degradation by other contaminants that might be present.
- Penetrations (such as for services conduits, vent pipes and pile caps) should be minimised wherever practicable, sealed appropriately (refer Appendix C of the Coffey (2020) concept design) and verified.
- It is essential that the integrity of gas protection measures is maintained post installation (and verification). Systems must be in place to ensure that follow on contractors (i.e. all contractors completing building works) are aware of the protection measures installed and how they can best be protected.
- The installation of the building gas protection measures must be validated in accordance with the CQA plan and verified by the appointed environmental auditor.
- Whilst the verification requirements will be outlined in the CQA plan (refer **Section 4.2**) the following should be considered during the verification of building protection measures:
 - Building protection measures must be validated in accordance with CIRIA C735 (2014).
 - Venting measures (both passive and active controls) should be subject to a visual verification inspection to establish that installation is adequate and complies with the design and the specification. If a granular layer is used, the material should be tested to ensure the grading will enable it to function as a venting layer.
 - The inspection should cover floor areas, paying particular attention to walls and any other locations where venting systems might be positioned. Any discrepancies with the design drawings should be highlighted. These may include missing air vents and air bricks, inadequate grading of gravel vent layers, and incorrect types of geocomposite or polystyrene vent layers. The size of connecting pipes, venting through sleeper walls, and voids and void formers should also be checked.
 - Inspections for vapour barriers (gas membrane) where installed should cover both the surface prepared for the membrane and the membrane itself over the whole floor area, with a particular focus on inspection laps, edges and the sealing of service entry points and penetrations.
 - In addition to visual inspections, integrity testing should be undertaken for gas membranes installed at the site (frequency to be determined in the CQA plan). Integrity testing should include both testing of membrane seams (e.g. pressurised air channel tests, mechanical point stress test or air lance test) and testing of large areas of flat gas membrane installed in its final position (e.g. smoke testing, tracer gas testing or dielectric porosity testing).
 - Given the scale of the development it would not be expected that the gas protection measures for every individual building is inspected or subject to integrity testing by the TPCQA. An established frequency and inspection regime should be agreed with the environmental auditor during the preparation of the CQA plan and include input from the installing contractor.

- All verification reports to be prepared should include photographs as supporting evidence. A pro forma (with the format agreed as part of the auditor verified CQA plan) should be completed for each inspection visit. All pro formas should be retained for inclusion within the final verification report in order to demonstrate the involvement of the TPCQA throughout the process and provide evidence of the appropriate installation of the gas protection measures. An example pro forma is provided in **Appendix D**.
- Where an engineered slab construction is required as part of the provision of building gas protection measures, the slab must be installed by a suitably qualified contractor in accordance with the detailed design.
 - The slab construction should be subsequently verified by the TPCQA and environmental auditor in accordance with the CQA plan prior to any further construction works (for the particular slab) occurring.
- On completion of the verification process for the installation of building protection measures a copy of the environmental auditor verification must be provided to the responsible authority (Monash City Council) prior to occupation of the buildings.
- As with the civil works phase, the potential risks to contractors involved in housebuilding works posed by landfill gas must be specifically addressed in the health and safety plan to be developed for the works. This should include a confined space entry procedure (see **Section 4.3**).
- Prior to completion of Stage 4 (i.e. prior to occupation) the placement of at least 0.5 m thickness of imported validated fill material (or site sourced material verified as suitable by the appointed environmental auditor) must be placed in Zones 2, 3 and 5 in areas of potentially accessible soil (i.e. outside of areas covered by hardstand or building footprints) overlying in-situ soils. The placement of this material must be verified by the appointed environmental auditor.

5. General Environmental Management Measures

The following measures should be referenced during all stages of construction. This CEMP should be considered a working document and these management measures should be periodically reviewed (particularly if there is any change in site condition) and may need to be updated to ensure the measures remain suitable (see **Section 8.1**).

A specific CEMP has been developed for the backfilling of Zone 4 (Coffey 2015) that should be referenced for these works.

This CEMP does not supersede any requirements on-site for construction works to comply with relevant environmental (EPA Victoria) and Victorian occupational health and safety legislation and/or specific requirements for the works imposed by the responsible regulatory authority (e.g. planning permit requirements imposed by Monash City Council or requirements documented in a statutory EPA Victoria notice).

The Site Manager should reference the EPA Victoria Publication 960 *Doing It Right On Subdivisions – Temporary Environmental Protection Measures For Subdivision Construction Sites* (2004) for further details on environmental measures to be implemented during construction.

Control measures should be implemented in accordance with the hierarchy of risk control, as outlined below in Plate 1.

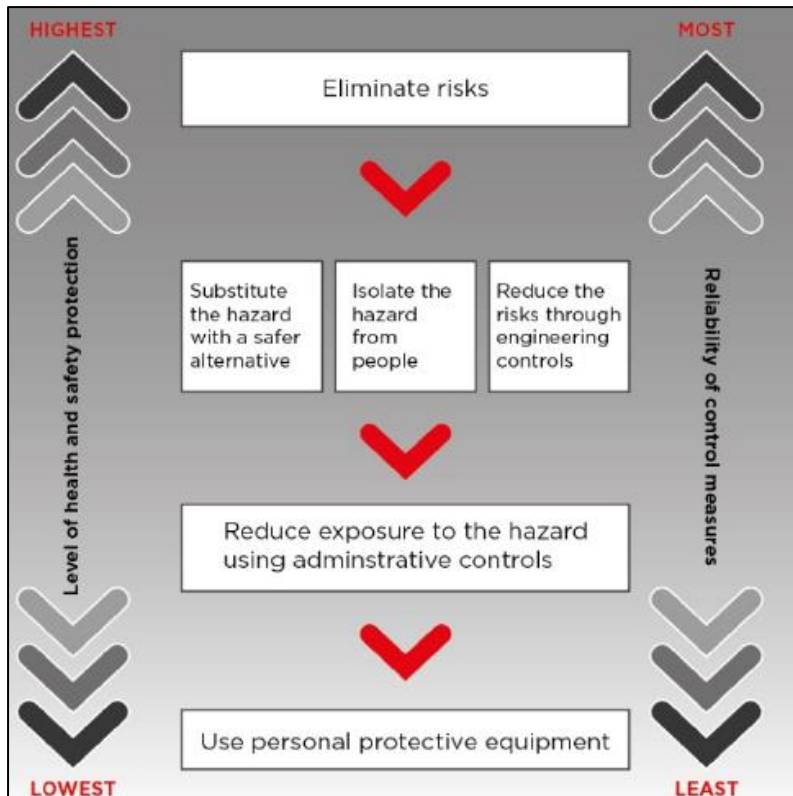


Plate 2 - The hierarchy of control measures (Safe Work Australia 2018, *Code of Practice - How to manage work health and safety risks*)

5.1. Site Personnel Training Requirements

All site workers should be inducted by the Principal Contractor and must be aware of and understand their obligations to comply with this CEMP prior to undertaking any works onsite.

The Principal Contractor/Site Manager shall be responsible for communicating the responsibilities of this CEMP to all personnel, including their sub-contractors.

Site personnel must sign an induction register prior to commencing work. Details of this induction should be documented and retained on-site.

In addition to complying with site specific induction and safety requirements, all site personnel should have undertaken WorkSafe Victoria recognised construction induction (white card) training, prior to undertaking works at the site.

Where required, the site manager shall arrange to provide additional training including knowledge, skills and awareness to site personnel to facilitate compliance with the CEMP.

The induction training should include, but not be limited to, the following information:

- Induction, toolbox meeting and training requirements;
- The existence and content of this document;
- The content and requirements of a Site Safety Plan to be developed by the Principal Contractor (including JSAs and Safe Work Method Statements (SWMS));
- Nature and location of contamination at the site;
- Responsibilities under this management plan;
- Controls and work practices which are required on site;
- Other training requirements specific to the site or task being undertaken by the personnel; and
- Incident reporting.

5.1.1. Tool Box Meetings

Toolbox meetings should be held onsite to provide information/training, as well as to outline changes to site management which may be applicable based on works schedule. As a minimum, it is recommended that a Toolbox meeting be held daily, with the minutes documented and available for review.

Discussion items could include:

- Environmental components of SWMS;
- Environmentally sensitive areas – contaminated soil, sediment, erosion control, dust and noise;
- Waste management;
- Health and Safety issues raised;
- Incidents which have occurred at the site or on similar sites in the recent past;
- Changes to project requirements; and
- Other relevant topics of conversation.

5.2. Hours of Site Operation and Complaint Management

To minimise amenity impacts to the local community site works must comply with Monash City Council requirements with regards to the hours of site operation.

The Principal Contractor should develop a complaints management process in accordance with Monash City Council requirements. The Site Owner or Project Manager shall audit the complaint handling process and require improvements where deficiencies are identified.

5.3. Traffic Management

Where required a Traffic Management Plan (TMP) should be prepared in accordance with VicRoads and Council requirements, approved by the Responsible Authorities and implemented by the Principal Contractor.

The TMP should include procedures for vehicle movement on-site, including consideration of the structural stability of Talbot Avenue to receive vehicular traffic prior to filling of the Zone 4 quarry void.

5.4. Site Security and Signage

Appropriate signs to warn of a construction zone and of the restricted area are mandatory.

The Site Manager shall utilise the following controls to ensure the site is isolated and controlled:

- Prior to and during construction works, access to the site should be restricted with adequate barriers erected and warning signage made visible to prevent entry by unauthorised personnel. Signs should be in accordance with AS1319-1994 Safety Signs for the Occupational Environment. This should include providing adequate security for after hours by the use of lockable fences/gates. Use of video monitoring systems should be considered at key entry points to the site;
- The site boundary/work zone should be maintained during proposed works at all times. Any contractor working within the work zone should be inducted in accordance with this CEMP and undertake the works subject to its requirements;
- Contractors should not enter the designated work zone without the prescribed PPE and the site supervisor should be aware of the number of contractors entering the work zone; and
- Additional barriers should be erected around all excavated areas across the site.

- The Site Manager is responsible for ensuring that regular evaluation of the site security is undertaken. To prevent unauthorised personnel accessing the site appropriate fences and barriers must be erected prior to and during any construction works being undertaken.

5.5. Identification of On-site Services

To avoid the potential for damage to overhead or underground services at the site; the following measures should be considered:

- Prior to undertaking works (i.e. excavation works) at the site a dial before you dig (DBYD) request for underground services plans should be made.
- Should on-site services plans exist it is the responsibility of the Site Manager to make these plans available where necessary and the responsibility of site personnel to carefully review these plans prior to undertaking earthmoving activities or related tasks.
- Where on-site services exist, these should be located and marked by a Telstra accredited service locator prior to intrusive works.

5.6. Soil Management

5.6.1. Bulk Excavation Works

Excavation to be undertaken during construction works at the site must be undertaken in accordance with WorkSafe Victoria Compliance Code – *Excavation* (May 2018). The compliance code outlines requirements for excavation works at the site to ensure compliance with Victorian Occupational Health and Safety Regulations (2017).

Recommend procedures to be implemented during bulk excavation works include (but are not limited to) the following:

- Excavation works at the site during construction may require ‘high risk construction work’¹⁰ including the excavation of trenches to greater than 1.5 metres depth and excavation in an area that may have a contaminated or flammable atmosphere. These works must be specifically addressed in a health and safety plan to be prepared by the Principal Contractor and should include:
 - Notification to WorkSafe Victoria is required at least 3 days prior to commencing excavation works involving a trench, where the excavated depth is more than 1.5 metres (e.g. boundary venting trenches will extend to approximately 5 metres depth).
 - Hot works procedure for any ground opening works (excavations / piling etc.). The procedure should include monitoring for explosive atmospheres (refer **Section 6.2**). Stop work procedures should be implemented should the monitoring identify an exceedance of 5% LEL (0.25% v/v methane).
 - Entry into any enclosed or partially enclosed sub-surface space (including excavations) should be conducted under a confined space procedure and confined space permit system, with atmospheric monitoring (to include lower explosive limit (LEL) monitoring).
- To ensure the protection of site personnel and members of the public on or near the excavation site, it is important to restrict access to the excavation area (refer **Section 5.4**).
- Should any deep excavation (i.e. greater than 1.5 m) be required during construction works at the site, the Principal Contractor should seek expert advice from a suitably qualified engineer to

¹⁰ As defined in Regulation 322 of the Victorian Occupational Health and Safety Regulations (2017)

ensure adequate controls are in place to maintain the structural integrity of roads, structures, infrastructure, stockpiles and existing excavations.

- The presence of any existing overhead and underground services at the site (refer **Section 5.5**) should be addressed in the health and safety plan to be prepared by the Principal Contractor and included in the site induction for any excavation works to be undertaken during construction.
- Excavation works undertaken during Stage 2 and 3 construction works following installation of the pathway intervention measures (landfill cap in Zone 1 and Zone 2A and boundary venting systems must not disturb the cap or venting infrastructure in these areas. A permitting system should be implemented where excavation may be required in these locations to ensure that site personnel are aware of this requirement prior to excavation works occurring.
- Excavation into areas of buried waste (Zone 1 landfill) should be minimised wherever practicable. Should bulk excavation works be required in these areas during construction, specific controls may need to be implemented by the Site Manager to control potential amenity impacts to site personnel and surrounding residents (and minimise the potential for release of pockets of accumulated gases and minimise fire risks associated with the exposure of buried wastes).

5.6.2. Material Segregation

During excavation works at the site, soils should be segregated by domains such as separation of fill or wastes from underlying natural material (where practicable) to optimise re-use potential and minimise the potential for cross contamination of materials.

Distinction between the soil horizons/domains should be informed by the existing geotechnical and environmental assessment borehole logs, as well as direct observation during excavation. Where off-site disposal is required this information should be presented in a waste categorisation report (refer **Section 5.6.5**) prepared by the Environmental Consultant and communicated to the Principal Contractor.

A segregation approach would also be recommended based on the higher likelihood of encountering unexpected contamination (such as asbestos containing materials (ACM) and building material) within fill and the differing structural properties of the materials.

5.6.3. Temporary Stockpiling

Where temporary stockpiling of soils is required prior to off-site disposal or on-site retention, controls to protect human health and the environment must be employed.

Stockpile management should include consideration of the following:

- Minimise the number and size of stockpiles where practicable;
- Movement of stockpiles should be tracked to prevent cross contamination of stockpiles;
- Access to stockpiles should be controlled. Members of the public should not have any access to the stockpiles of either contaminated/excavated soils or clean fill;
- Whether a low permeability surface/layer (e.g. stockpile on plastic sheeting) is required to minimise leaching into the underlying soil and controls implemented to mitigate the potential for dust generation and or/run-off; and
- Excavated soils should be segregated and stockpiled with soils of similar soil types to avoid the potential for cross contamination.
- The location and design of stockpiles needs to be carefully considered and should take into account the following factors:
 - Minimise the number and size of stockpiles where practicable;

- Any stockpiling of excess spoil along the eastern boundary must be confined to the site (western) side of the existing swale drain (i.e. away from the site boundary). In addition, any stockpiling of potentially contaminated soils or wastes should also be well away from other sensitive site boundaries (interface with surrounding residential land use) at the north western and north eastern boundaries.
- Distance to nearest drainage infrastructure (e.g. storm water) and potential for soils and/or leachate to leave the site;
- Contamination status of the soils;
- Distance from soil source and to final location;
- Stockpiles are to be located away from the edge of trenches/excavations;
- Structural stability of the stockpile;
- Protection from winds;
- Room for storage of clean soil;
- Ability to restrict access (i.e. no public access);
- Vehicle access to be possible without disturbing nearby soils;
- General site access is not to be compromised by the location of stockpiled soil, excavations or plant equipment;
- Topography;
- Stockpile identification and material tracking; and
- Control at exit points to prevent dust/mud being carried onto local roads.

5.6.4. Material Movement and Tracking

The movement, temporary stockpiling and/or on-site reuse of soils must be managed and monitored to prevent cross contamination and ensure future re-use opportunities are not precluded, and disposal costs are not unnecessarily increased.

Where soil is to be temporarily managed on-site prior to disposal the movement of this soil must be tracked. The tracking records should, as a minimum include:

- Date.
- Truck operator.
- Supervising site personnel.
- Soil source, and description of the material.
- Pre-established soil contaminant categorisation.
- Volume.
- Specified destination.
 - In the case of any material to be retained/re-used on-site this would include surveyed coordinates of the final destination and extent of the material.
- Number of truck loads.
- Confirmation of placement in the specified destination by the Site Manager.
 - In the case of any material to be retained/re-used on-site this would include a summary of the final volumes (surveyed) and records of field observations during the retention process including a photographic record.

5.6.5. Off-site Disposal

Soil management at the site should be undertaken in accordance with the EPA Victoria Waste Management Hierarchy as outlined below in plate 2.

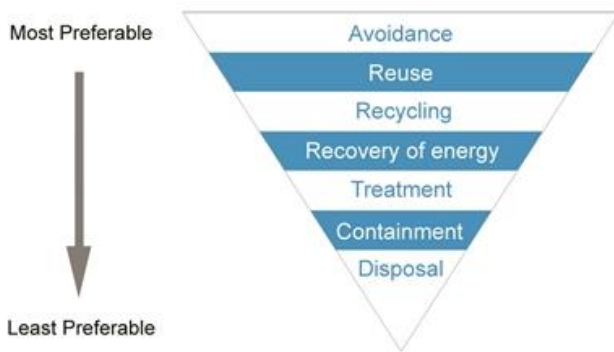


Plate 2: EPA Victoria Waste Hierarchy (Environment Protection Act 1970)

Soil will require off-site disposal where there is no suitable avoidance or re-use opportunity or where soil characteristics preclude re-use/on-site retention.

In accordance with Part 2 of the Environmental Protection (Industrial Waste Resource) Regulations (2009), a prescribed industrial waste producer must:

- Assess and categorise prescribed industrial waste in accordance with this Part; and
- Manage prescribed industrial waste in accordance with any relevant classification under this Part. (EPA Victoria, 2009).

The Environment Protection Amendment Act (2018) is due to take effect in Victoria on 1 July 2020. There is potential that associated subordinate EPA legislation governing the categorisation and management of prescribed industrial wastes may change. This CEMP should be reviewed, and where required updated (see Section 8.2) to ensure that any off-site disposal required is undertaken in accordance with current legislative requirements.

Soils with contaminant concentrations which exceed Fill Material criteria are classified as Prescribed Waste under the Environmental Protection (Industrial Waste Resource) Regulations 2009. Under these regulations the three categories of Prescribed Waste (Contaminated Soil) are as follows:

- Category C;
- Category B; and
- Category A.

Descriptions of maximum contaminant concentrations for these categories of Prescribed Waste (Contaminated Soil) are outlined in EPA Victoria Publication *Industrial Waste Resource Guidelines (IWRG 621) Soil Hazard Categorisation and Management*, June 2009.

Where asbestos is identified in the soil and disposal is the best option, under the Industrial Waste Resource Regulations, soils contaminated with asbestos are considered to be a Category C Waste (asbestos waste).

Soil with contaminants other than asbestos must be categorised using IWRG621 into either Category A, B, or C.

Soils containing asbestos must be packaged for transport and disposal as per the requirements of EPA Victoria Publication IWRG 611.2, Asbestos Transport and Disposal, June 2017.

Prior to the excavation or movement of soils designated for disposal during construction the following should be considered by the responsible contractor:

- If soils require disposal off-site, they should be categorised in accordance with EPA Victoria Guidelines and disposed of to a suitable receiving facility;
 - The receiving facility should initially be contacted to confirm that they can accept the soil and if further information is required prior to acceptance of the soil.

- Liaise with the Environmental Consultant to determine the categorisation information for the soil;
- Ensure all trucks loaded for prescribed waste disposal are licensed by EPA;
- Ensure waste transport certificates (on-line waste tracking) is completed for each load of prescribed waste removed from the site and include the relevant waste codes as determined by the categorisation;
- Keep accurate records of volumes, types and destinations of contaminated soils; and
- Ensure landfill dockets and completed waste transport certificates are retained and forwarded to all relevant parties following disposal.
- Where soils contain significant quantities of building rubble (bricks, concrete, rock etc.) the rubble should be segregated from the soil so far as reasonably practicable and classified as Solid Inert Waste, requiring either reuse, recycling or disposal to an appropriately licensed facility in accordance with the Waste Hierarchy.
- Where solid inert waste is present in soil categorised as Fill Material, in accordance with EPA Publication 1624 (2016), this should be removed prior to material re-use or further management wherever practicable. Consideration of the potential for aesthetic impacts of any soil containing solid inert waste should be given prior to re-use (off-site).

5.6.6. Importation of Fill

Any fill soils imported to site should be accompanied by appropriate documentation to assure that they meet EPA Victoria, NEPM (1999 as amended 2013) and site criteria (e.g. geotechnical).

Any imported fill must be approved by the Environmental Consultant prior to importation.

Specific requirements for the importation of fill during backfilling works (Construction Stage 1) are outlined in the Backfilling Works CEMP (Coffey 2014). Imported soil not required for backfilling, must meet equivalent requirements to those contained in the Backfilling Works CEMP.

5.7. Stormwater, Erosion and Sediment Control

Stormwater at the site currently drains to the Zone 4 quarry void. Prior to construction works commencing a stormwater management plan must be prepared by the Principal Contractor to manage stormwater quality and site drainage during construction.

Measures to minimise the potential for stormwater sedimentation should be adopted, including (but not limited to) the following:

- Keep land clearance to a minimum. Revegetate and mulch the cleared land as soon as possible, especially in areas of steep slope and /or highly erodible soils which are prone to wind and water erosion.
- Keep soil disturbance to a minimum where practicable;
- Install a stormwater drainage system prior to any land disturbance activities commence.
- Install rock structures, hay bales, geofabric on the site to retard water flows (where high water flows are expected) and reduce erosion and runoff.
- Place sediment control devices (like silt fences and straw bales) around stormwater drains and stockpiles.
- Use sediment detention dams, ponds or basins to hold sediment contaminated run-off long enough for suspended sediment to settle.
- Ensure vehicles are free from excess soil when leaving the site, to avoid tracking soil off-site.
- Clean up any soil spilt on roads adjoining the site.
- Establish a vehicle wash down area, if necessary.
- Avoid conducting vehicle or machinery maintenance or refuelling on-site, where feasible.

- Ensure any fuel, oil or other chemicals are stored safely and securely and are prevented from leaking (see **Section 5.13**).
- Repair or remove any leaking containers or machinery from the site.
- Clean up any spilt fuel, oil or other chemicals.
- Check sediment control measures regularly (at least daily) and clean and maintain as necessary.
- Inspect sediment control measures more frequently during rain periods, to ensure they are adequate.
- Use of designated haul roads for vehicular traffic. Ensure that haul roads are stabilised with gravel or similar all-weather material and are positioned away from sensitive receivers.
- Where off-site disposal of wastewater is necessary (i.e. water within excavations following heavy rainfall), it should be undertaken in accordance with EPA Victoria requirements. Wastewater should not be discharged into stormwater or sewer drains without authorisation from the relevant authorities.

5.8. Management of Groundwater Ingress and Extraction

Based on the current development design management of groundwater seepage during construction (dewatering) is unlikely to be required during construction with the exception of Stage 1 works. Dewatering requirements for Stage 1 are outlined in Backfilling Works CEMP (Coffey 2014).

The site is located within a GQRUZ (refer **Section 3.4**) and the beneficial uses of groundwater are precluded by the groundwater contamination. Groundwater should not be extracted for use during construction without prior testing to confirm it is suitable for the proposed use.

Should dewatering or groundwater extraction subsequently be required during future development stages at the site, this CEMP should be updated to include appropriate management requirements.

5.9. Dust Management

To minimize the potential for dust generation during construction works at the site the following measures should be considered:

- Minimise the movement and speed of vehicles on the site.
- Ensure the main haul roads are covered with rock and/or gravel.
- Prevent the generation of dust in preference to applying dust suppression measures.
- Minimise movement of soils during excavation, stockpiling, importation and/or backfilling.
- Use a water spray to dampen vehicle tracks, if excess dust is generated.
- Use a water spray to dampen soil prior to and during movement, if excessive dust is generated.
- Cover stockpiles (where practicable)
- Where stockpiles may be in place for 28 days or longer consideration should be given to revegetation or equivalent.
- Application of a physical barrier to airborne dust (e.g. shade cloth) on the work area fence if required.
- Contractors operating construction equipment should be instructed to operate heavy machinery in a manner that minimises the amount of dust generation, particularly when loading soil into trucks or on windy days.
- Dust monitoring (using a Dustrak or equivalent) should be considered during earthworks (or potential dust generating activities) to provide real-time monitoring during construction.
- In the case of extreme weather conditions such as strong winds excavation works should not be undertaken.

5.10. Odour Management

Wherever practicable excavation works (involving in-situ soils and wastes) at the site will be minimized during construction and the generation of odour is not expected to be a significant issue. Where odorous materials may be encountered during construction the following measures should be considered:

- Minimize the area exposed and duration of exposure for any odorous materials so far as practicable i.e. use a staged excavation strategy rather than a broad-scale approach;
- Any odour issues should be considered during stockpiling (**Section 5.6.3**);
 - Avoid extended stockpiling of odorous soils on site.
 - Cover stockpiles of odorous soils.
 - Keep odorous stockpiles wetted down.
- Where required a suitable odour suppressant should be applied to odorous materials.
- Time excavation activities to minimise off-site nuisance associated with odours soils (potentially in consultation with the local community that may be affected);
- Undertaking work in favourable weather conditions, i.e. lower temperatures and favourable winds;
- Reinstate site surfaces as soon as practical following their disturbance;
- Undertaken monitoring of ambient air (e.g. hydrogen sulphide) in work areas to ensure no risks to site personnel.
- Wear appropriate PPE (e.g. dust masks and/or half masks) during times when suppression is implemented and when working in the higher contaminated areas.

5.11. Noise Management

In addition to managing potential noise impact to site personnel (including the provision of appropriate PPE where required), construction works must be considerate of potential noise impacts to surrounding residents. Particularly given the site is located in a primarily residential use area and the proximity of neighbouring residents to the site boundary.

The following measures should be considered to manage noise impacts during construction:

- All plant and equipment should be serviced by a qualified mechanic and maintained in full working order.
- Minimise the duration of loud activities such as the use of excavators, construction equipment and vehicles so far as practicable.
- Comply with designated hours of site operation (**Section 5.2**).
- Retain existing sound protection (soil) mounds around the sensitive site boundaries for so long as practicable during the works.

5.12. Vibration Management

Vibration control measures may need to be implemented during the installation of piles and possibly for other works that have a potential to generate unacceptable levels of vibration off-site or to nearby structures. The following measures should be considered during any works that may generate ground vibration:

- Baseline vibration monitoring should be undertaken prior to relevant construction works, to assess any impact during the works.

- Where activities are planned which have the potential to generate unacceptable levels of vibration off-site, or to nearby structures a vibration management plan should be prepared to document specific vibration controls to be implemented during the works.
- Select appropriately sized machinery and equipment and design procedures for use in order to comply with vibration emission limits where practicable.
- Ensure equipment is operated and maintained in accordance with the manufacturer's instructions including replacement of engine covers, repair of defective silencing equipment, tightening of rattling components, repair of leakages in compressed air lines and shutting down equipment not in use.

5.13. Chemical Management

It is possible that limited quantities of fuels or chemicals may be required to be stored on-site during construction.

Where this is the case the use and storage should be managed in accordance with EPA Victoria Publication *Liquid storage and handling guidelines* (June 2019) and Worksafe Victoria Compliance Code *Hazardous substances* (July 2018).

Measures to manage chemical use and storage on-site may include the following:

- Minimise the number and quantity of fuels and chemicals stored on-site.
- Required signs and placards are appropriately displayed.
- Material Safety Data Sheets maintained for chemicals brought onto the site.
- No dangerous goods are to enter the site without prior advice and until suitable storage facilities are provided.
- Only staff that are suitably qualified in the handling and storage of dangerous goods will have access and permission to use and store dangerous goods.
- Store within housing, bunding or covering to prevent exposure to the elements and to reduce potential for disturbance, rainwater infiltration, spills, solubilisation and overflow.
- Implement a contingency plan for any leaks and spills and ensure a suitable spill kit is present on-site (where required) and that site personnel are aware of its location.

5.14. Waste Management

Waste management and minimisation measures should be implemented during construction works in accordance with the EPA Victoria Waste Hierarchy (**Section 5.6.5**) to minimize the environmental impact of construction and promote sustainable development.

Factors to be considered by the Site Manager and their contractors include:

- Attempt to minimise waste on site by avoiding over-estimation of purchasing requirements, minimising packaging materials, and buying environmentally approved and recycled products where practicable;
- Implement procedures for the segregation and collection of recyclable construction materials;
- Waste material (including liquid wastes such as paints and concrete slurry) should not be discharged to stormwater drains.
- Provision for the removal of waste materials that cannot be reused or recycled.

5.14.1. Litter Control

To manage litter generated during construction works, the following measures should be considered:

- Minimise the generation of litter through implementing waste management in accordance with the waste hierarchy;
 - This process should include regular waste audits to be implemented by the Site Manager.
- Bins to be provided at appropriate locations around the site and be suitably designed for the likely waste to be disposed;
- Collection frequencies to be sufficiently regular so that bins are not overfilled;
- Regular inspections shall be carried out to ensure litter around the site is controlled.

5.15. Occupational Health and Safety

Works conducted onsite during construction must comply with Victorian Occupational Health and Safety (OH&S) Regulations (2017). The Site Manager shall ensure appropriate OH&S measures are implemented and that all site personnel (including those employed / engaged by sub-contractors) are aware of all potential OH&S issues at the site.

Workers in Australian workplaces have specific health and safety obligations. While at work, a worker should:

- Take reasonable care for his or her own health and safety;
- Take reasonable care that his or her acts or omissions do not adversely affect the health and safety of other persons;
- Comply, so far as the worker is reasonably able, with any reasonable instruction that is given by the person conducting a business or undertaking to allow the person to comply with the OH&S Act (2004); and
- Cooperate with any reasonable policy or procedure of the person conducting a business or undertaking relating to health or safety at the workplace that has been notified to workers.

All contractors, staff, workers or attendees to the site are required to undertake a site induction process that alerts them to site-specific risks. Visitors who do not complete the induction briefing must be accompanied at all times by a nominated site representative.

The Principal Contactor is responsible for providing this induction briefing to all personnel working on the site. The site induction should include reference to the contents of this CEMP.

Prior to construction works occurring an overarching site specific OH&S plan (including an induction process) must be developed by the Site Manager to include the controls described in this CEMP.

Contractors and subcontractors shall prepare their own site specific OH&S plan and appropriate Safe Work Method Statements (SWMS) or similar as required.

The OH&S plan(s) to be developed should consider the following:

- Risks associated with proposed construction works to be undertaken;
- Risks associated with contaminated soil, groundwater and vapours (landfill gas);
- Identification of potentially contaminated soil at the site;
- Job Safety Analyses (JSA) or safe work method statements (SWMS) for tasks to be completed at the site;
- Environmental Management Requirements (as listed within this document);
- Works Specification;
- Site Responsibilities;

- Emergency Procedures;
- Site Contact Details;
- Key Personnel; and
- Key Site Safety Requirements.

Measures to manage exposure of site workers to potential contamination at the site during construction should be implemented by the Site Manager. An outline of controls to consider is provided in the following section.

5.15.1. Administrative Controls

- Each employee on site (including sub-contractor's employees / engaged workers) is to undergo the site induction.
- Unnecessary personnel shall be excluded from entering work areas where a contaminated environment may be present.
- Signage shall be placed at the entrance/s to work areas to clearly limit access to designated personnel and to define the personal protective equipment (PPE) and monitoring requirements for designated personnel to enter and work in the area.

'Hot work' and 'confined space entry' procedures must be developed and implemented by the Site Manager prior to any construction works involving ground disturbance or potential entry into any confined or partially confined spaces.

5.15.2. Hygiene Controls

- Smoking, eating or drinking shall not be permitted in construction areas and should only be undertaken in designated areas.
- Avoid handling of potentially contaminated soil.
- Adequate on-site hand washing facilities should be provided – workers should wash hands and face before eating, drinking or smoking.
- Store PPE, such as respirators, in a clean place to avoid contamination.
- Soiled clothing and footwear should be removed before leaving the site.

5.15.3. Personal Protective Equipment

- Workers should utilise personal protective equipment in accordance with site procedures including but not limited to:
 - High visibility overalls/long pants and shirts;
 - Hard Hat;
 - Safety boots;
 - Gloves (impermeable (latex or nitrile) gloves, if handling potentially contaminated soil/water or chemicals);
 - Eye protection;
 - UV Protection; and
 - Respiratory protection (if required):

- Specific respiratory protection may be required for construction works should asbestos be encountered (e.g. P2 particulate half face respirators) or where hazardous gases or an oxygen deficient atmosphere may exist. The required PPE in these situations should be specifically addressed in the OH&S plan.
- A half face dust mask with a particulate (P2/P3) filter should be available to wear when earthworks are undertaken at the site. Specifically, the mask is recommended to be worn when dust generating activities occur.

5.16. Unexpected Contamination

In the event unexpected contamination is identified during construction works (i.e. odorous or stained soil, the presence of underground storage tanks (USTs) or asbestos) during the works, the following steps should be undertaken to manage the contamination:

- Stop work;
- Report suspected contamination to the Site Manager;
- Isolate area with a physical barrier;
- Assume the area is contaminated until an assessment proves otherwise; and
- The Site Manager or their delegate shall notify the Environmental Consultant to enable them to assess the contamination.

As a result of the assessment additional control measures may be required to be implemented for ongoing construction work.

5.16.1. Potential Asbestos Containing Materials

Whilst observations of ACM in sub-surface soil at the site have been relatively limited, the presence of widespread building debris and construction and demolition waste is present in soil (particularly within the Zone 1 landfill area, slimes bridging layer in Zone 2 and the existing sound protection mounds).

Given the timing of the historical importation of fill/wastes to site and demolition of on-site structures (likely containing asbestos) there is potential that further asbestos may be present within landfill wastes and imported material.

The current concept design for the site redevelopment includes limited potential for bulk excavation works to be required in areas of buried wastes. However, there is still potential that construction and demolition wastes (including potential ACM) may be encountered during construction.

The following management measures should be considered for potential ACM that may be encountered during construction:

- During the site induction, personnel should be made aware of the potential for ACM to be present within subsurface fill soils. This should help ensure that appropriate management measures are put in place with regards to excavation works at the site that may encounter ACM.
- Any site personnel undertaking excavation activities at the site during construction should be aware of the potential for unexpected contamination (including ACM) and have received sufficient training (asbestos awareness training) to be able to identify potential ACM.
- Any potential ACM must be assumed to contain asbestos until it can be assessed by a suitably competent person (Environmental Consultant).
- If visible asbestos is present and it may be disturbed during work activities, it must be removed.
- Where asbestos is removed it must be managed in accordance with the Victorian OH&S Regulations (2017), WorkSafe Victoria Compliance Code *Removing asbestos in workplaces* (2018) and EPA Victoria requirements.

- The prohibition¹¹ on asbestos must be adhered to in relation to the management of asbestos contaminated soil at the site, prior to any use, removal, re-use, transport or storage. However, the prohibition does not apply to soil from which visible ACM has been removed to the extent 'so far as is reasonably practicable' as determined by a suitably competent person.
- The removal of non-fixed and installed asbestos, i.e. ACM in soil must be conducted by a Class A or Class B licensed asbestos removalist where the contamination is considered more than 'limited asbestos removal work'¹².
 - A Class A licensed asbestos removalist is required for the removal of friable asbestos or where a person with the requisite knowledge, skills and experience has determined that non-friable ACM is likely to become friable as a result of the work processes used.
 - Prior to removal works occurring the asbestos removal license holder must notify WorkSafe Victoria.¹³
 - Background asbestos air monitoring must be undertaken by a competent person during asbestos removal works.
 - Where asbestos removal work is undertaken a visual clearance inspection must be undertaken and a clearance certificate must be issued for the work by a suitably competent independent person prior to reoccupation of the area.

Whilst this CEMP provides general management measures to be implemented in the case potential asbestos is encountered during construction works, it is not sufficient for the removal of asbestos or ACM that is greater than *limited asbestos removal work*.

Should asbestos be encountered that requires removal a specific asbestos management plan (AMP) must be developed for the works prior to any removal works occurring.

6. Environmental Monitoring

To verify the environmental management measures to be implemented at the site, on-going environmental monitoring will be required.

The requirements of this monitoring are outlined in the following sections.

6.1. Groundwater Monitoring

On-going groundwater monitoring at the site is required as a condition of the statement of environmental audit.

Groundwater Monitoring Requirements are addressed in the Groundwater Quality Management Plan (Coffey 2019).

Existing groundwater monitoring infrastructure should be maintained during construction (refer **Section 7**).

¹¹ Prohibitions under the Dangerous Goods Act, 1985; as detailed in the Victorian Occupational Health & Safety Regulations (2007 as amended 2017).

¹² As defined in Regulation 250 of the Victorian Occupational Health & Safety Regulations (2007 as amended 2017)

¹³ As defined in Regulation 298 and 299 of the Victorian Occupational Health & Safety Regulations (2007 as amended 2017)

6.2. Ground Gas Monitoring

Landfill gas monitoring is required for the duration of construction works at the site to ensure that no unacceptable risks to site personnel or off-site receptors (surrounding neighbours) are posed by ground gas during the works. Monitoring is also required to verify the installation of gas protection measures at the site (**Section 4**).

The requirements for landfill gas monitoring include the following:

- Detailed landfill gas monitoring requirements during Stage 1 construction works are outlined in **Appendix B** and **Appendix C**;
- The CQA plan to be prepared during the design stage of construction (Stage 2) for the installation of gas protection measures, must include a detailed landfill gas monitoring plan outlining monitoring to be implemented during the civil and housebuilding construction phase (Stages 3 and 4).
 - The CQA plan and associated landfill gas monitoring program must be verified by an appointed environmental auditor.
- The landfill gas monitoring program should include regular monitoring of the existing landfill gas monitoring network across the site (including around the site boundary) as well as specific monitoring to verify the installation of gas protection measures.
- The landfill gas monitoring program to be implemented during Stage 3 and 4 construction should continue until the completion of stage 4 and verified as no longer being required by an appointed environmental auditor and/or EPA Victoria.
- Monitoring for the presence of hazardous ground gases or a potentially explosive or oxygen deficient atmosphere using an LEL meter must be undertaken as part of any ground opening works or prior to any entry to a confined or partially confined space (refer **Section 5.6.1**).
- Existing gas monitoring infrastructure should be maintained during construction (refer **Section 7**).

6.3. Dust Monitoring

The following dust monitoring requirements should be considered during construction:

- Dust suppression measures (**Section 5.9**) should be employed at all times during construction when it is considered likely that airborne dust will be generated.
- Visual assessment of air quality will be undertaken. If it is considered that dust is being generated unnecessarily, then works will be halted until dust preventative measures can be implemented.
- To protect the health and amenity of site workers from nuisance dust generated during earthworks dust levels should be maintained below the maximum allowable concentration of 10 mg/m₃ (8-hour TWA)¹⁴. Dust suppression measures should also aim to ensure that the concentrations of airborne particulates (nuisance dust) comply with the AQM SEPP¹⁵ at the site boundaries.
 - To provide direct feedback to the project with regards to the effectiveness of dust mitigation measures and illustrate compliance with air quality criteria, the provision of real time dust monitoring (such as through a Dustrak monitor(s)) should be considered during construction.

¹⁴ Safe Work Australia publication Workplace Exposure Standards for Airborne Contaminants (April 2013)

¹⁵ Ambient Air Quality State Environment Protection Policy (SEPP) (1999 as amended 2016)

6.4. Odour Monitoring

Notwithstanding the requirements for atmospheric monitoring during excavation works at the site (**Section 6.2**), where soils with a non-soil odour (such as petroleum or solvent odour or rotten egg smell) are encountered, works should cease pending further assessment by the appointed Environmental Consultant and implementation of appropriate health and safety and odour management controls (**Section 5.10**) where required.

7. Protecting the existing Environmental Monitoring Network

The location of the existing monitoring network at the site is outlined in Figure 2 in **Appendix A**.

It is the overall responsibility of the Site Owner (who may delegate this responsibility) to ensure that the monitoring network at the site is maintained during construction.

The following measures should be considered to ensure that the monitoring network is protected during construction:

- All monitoring locations are to be retained in a serviceable condition (such that representative samples can be collected) until it is deemed they can be decommissioned by the Environmental Consultant and/or verified by an appointed environmental auditor.
- The Site Manager is responsible for ensuring that monitoring infrastructure is not damaged and if any damage does occur, that it is rectified as soon as practicable in consultation with the Project Manager and Environmental Consultant.
 - If a bore requires relocation due to being irreparable or work restrictions, the location of the proposed new bore is to be as close as possible to the existing location (but at least 1.0 m away) and is to be approved by the Environmental consultant.
 - The damaged bore should be decommissioned, and the new bore constructed in accordance with the requirements of:
 - NUDLC (2012) *Minimum Construction Requirements for Water Bores in Australia* (groundwater bores).
 - EPA Victoria ((2015) Landfill BPEM (gas bores).
 - NEPM (1999 as amended 2013).
 - The bore location and measuring point level (top of casing and standpipe height if relevant) should be re-surveyed by a licensed surveyor.

8. CEMP Review and Reporting

8.1. Review

This CEMP will remain in effect during the completion of all construction works at the site. An ongoing (or post construction) EMP will need to be developed to document the on-going management measures to be employed post construction.

This CEMP must be reviewed by a competent person prior to the commencement of construction works and after any changes in site conditions, work requirements, legislation, environmental conditions, legislation and other relevant factors.

The CEMP should be revised to reflect any changes and provide adequate procedures to protect the health and safety of site personnel, off-site receptors (neighbouring residents) and the environment.

A mechanism for ongoing review and internal reporting of CEMP compliance performance by all stakeholders be implemented by the Site Owner. This may include the following components:

- Appointment of a representative (e.g. project manager or site foreman) who has responsibility for controlling all works at the site.
- Maintaining a log that records any breaches of the requirements of the CEMP and outlines actions taken to prevent recurrence of the breach.
- Maintain a record of site inspections by the site owner and/or site manager to confirm compliance with the requirements of the CEMP by site workers.

8.2. Reporting

It is recommended that the site owner (and/or delegates) maintain documentation demonstrating that the requirements of this CEMP have been met.

Such documentation is likely to include:

- Site induction and training records.
- Soil tracking records, including volumes, categorisation / characterisation, required controls and destination.
- Details of inspections associated with the environmental management measures and inspection program.
 - This would include verification inspections undertaken as part of the CQA plan for gas protection measures.
- Records of on-going environmental monitoring.
- Details of any non-compliance with this CEMP.
- Details of any corrective actions undertaken.
- Records of complaints and corrective actions taken

9. Statement of Limitations

This CEMP should be read in conjunction with the attached *Important Information About your Coffey Environmental Report*.

10. References

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Coffey (May 2019) ENAUABTF00751AB_R15 Clean Up to The Extent Practicable (CUTEP) Submission, Huntingdale Estate 1221 to 1249 Centre Road, and 22 Talbot Avenue, Oakleigh South, VIC;

Coffey (August 2019) ENAUABTF00751AB_R16, Groundwater Quality Management Plan, Huntingdale Estate 1221 to 1249 Centre Road, and 22 Talbot Avenue, Oakleigh South, VIC; and

Coffey (May 2020) ENAUABTF00751AB_R14, Conceptual Design of Site Management Measures, Huntingdale Estate 1221 to 1249 Centre Road, and 22 Talbot Avenue, Oakleigh South, VIC.

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EPA Victoria (July 2009). Publication IWRG611.1 Industrial Waste Resource Guidelines – Asbestos Transport and Disposal

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EPA Victoria (2016) Publication 1323.3, Landfill Licensing Guidelines.

EPA Victoria (2018). Publication 1490.1, Closed Landfill Guidelines.

EPA Victoria (2017). Publication 1624, Assessing Planning Proposals Near Landfills

NSW EPA (2012). Publication 0932, Guidelines for the Assessment and Management of Sites Impacted by Hazardous Ground Gases.

Safe Work Australia (2018). Code of Practice - How to manage work health and safety risks

Victorian Occupational Health & Safety Regulations (2017)

WorkSafe Victoria (2018) Compliance Code – Excavation

WorkSafe Victoria (2018) Compliance Code Removing asbestos in workplaces

Worksafe Victoria (2018) Compliance Code - Hazardous substances

Appendix A - Figures



no.	description	drawn	approved	date
A	ORIGINAL ISSUE	GH	RG	08.10.19

LEGEND	
	Fence
	Site boundary
	Zone boundary
	Boundary venting trench
	Cadastral

SCALE 1:2,250 (A3) METRES

 Projection: GDA 1994 MGA Zone 55

client:	TALBOT ROAD FINANCE PTY LTD
project:	ENVIRONMENTAL SITE ASSESSMENT 1221-1249 CENTRE ROAD & 22 TALBOT AVENUE OAKLEIGH SOUTH, VICTORIA
title:	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN
project no:	ENAUABTF00751AB-R17
figure no:	FIGURE 1
rev:	A

MJD Template Reference: ENAUABTF00751AB_R17_GIS001_v0.3

IMAGERY SOURCE: Nearmap (11-09-2019)



no.	description	drawn	approved	date
A	ORIGINAL ISSUE	GH	RG	08.10.19

LEGEND

- Monitoring well
- Gas bore
- City of Monash Talbot Park Monitoring Location
- Fence
- Site boundary
- Zone boundary
- Cadastre

IMAGERY SOURCE: Nearmap (11-09-2019)

SCALE 1:2,250 (A3) METRES

 Projection: GDA 1994 MGA Zone 55

drawn	GH
approved	RG
date	08.10.2019
scale	1:2,250
original size	A3

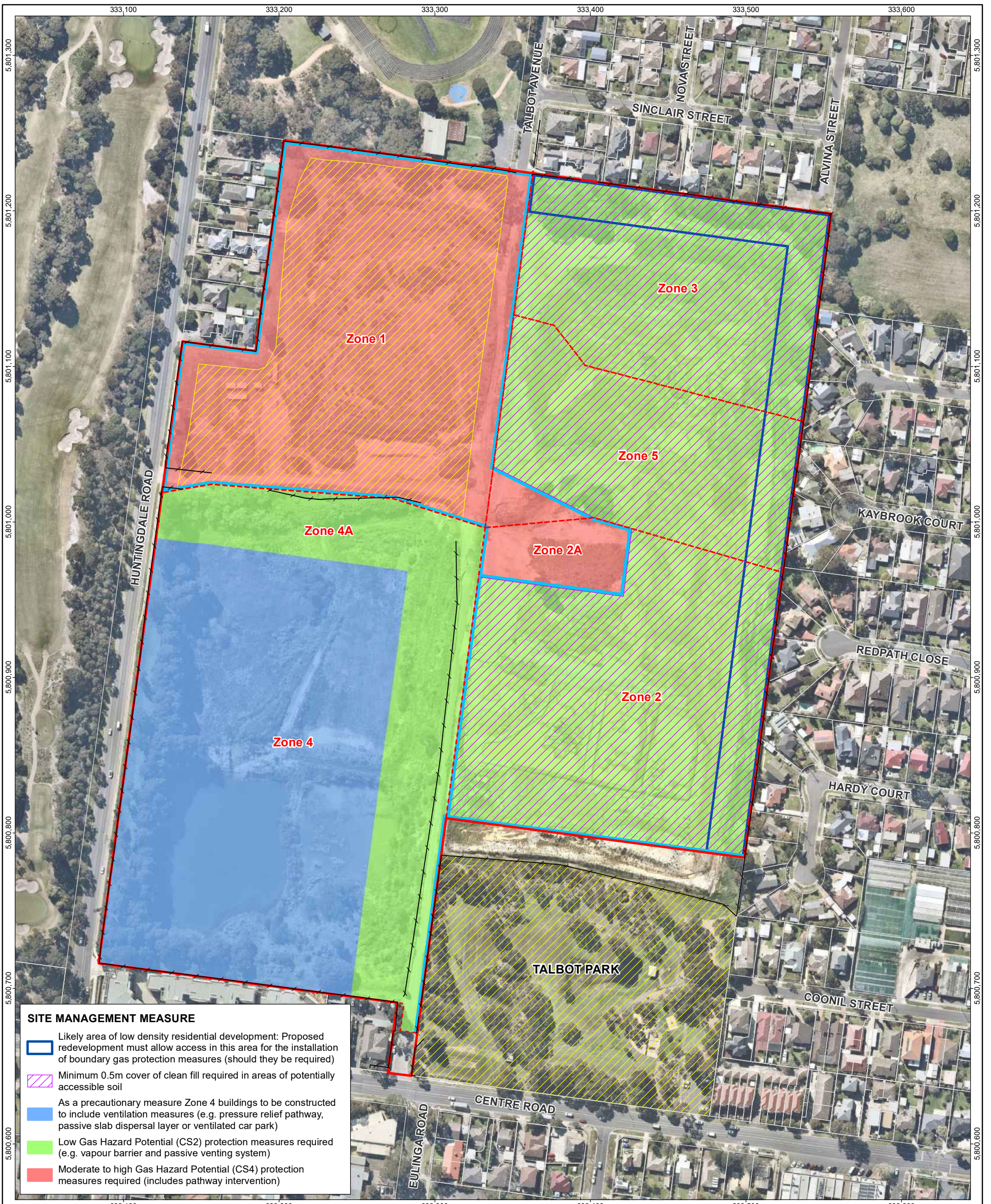
client: TALBOT ROAD FINANCE PTY LTD

project: ENVIRONMENTAL SITE ASSESSMENT
1221-1249 CENTRE ROAD & 22 TALBOT AVENUE
OAKLEIGH SOUTH, VICTORIA

title: CURRENT GROUNDWATER AND LANDFILL GAS MONITORING INFRASTRUCTURE

project no: ENAUABTF00751AB-R17 **figure no:** FIGURE 2 **rev:** A

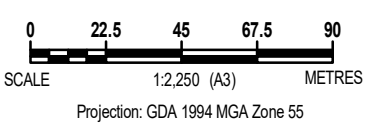
M:\D_Templates\Reference\ENAUABTF00751AB_R17_GIS202_v0_3



SITE MANAGEMENT MEASURE

- Likely area of low density residential development: Proposed redevelopment must allow access in this area for the installation of boundary gas protection measures (should they be required)
- Minimum 0.5m cover of clean fill required in areas of potentially accessible soil
- As a precautionary measure Zone 4 buildings to be constructed to include ventilation measures (e.g. pressure relief pathway, passive slab dispersal layer or ventilated car park)
- Low Gas Hazard Potential (CS2) protection measures required (e.g. vapour barrier and passive venting system)
- Moderate to high Gas Hazard Potential (CS4) protection measures required (includes pathway intervention)

no.	description	drawn	approved	date
A	ORIGINAL ISSUE	GH	RG	08.10.19



LEGEND	
	Fence
	Site boundary
	Zone boundary
	Vertical (boundary) gas venting system
	Approximate extent of landfill waste
	Cadastre



client:	TALBOT ROAD FINANCE PTY LTD
project:	ENVIRONMENTAL SITE ASSESSMENT 1221-1249 CENTRE ROAD & 22 TALBOT AVENUE OAKLEIGH SOUTH, VICTORIA
title:	SITE MANAGEMENT MEASURES
project no:	ENAUABTF00751AB-R17
figure no:	FIGURE 3
rev:	A

M:\D_Templates Reference: ENAUABTF00751AB_R17_GIS\03_00_3

IMAGERY SOURCE: Nearmap (11-09-2019)

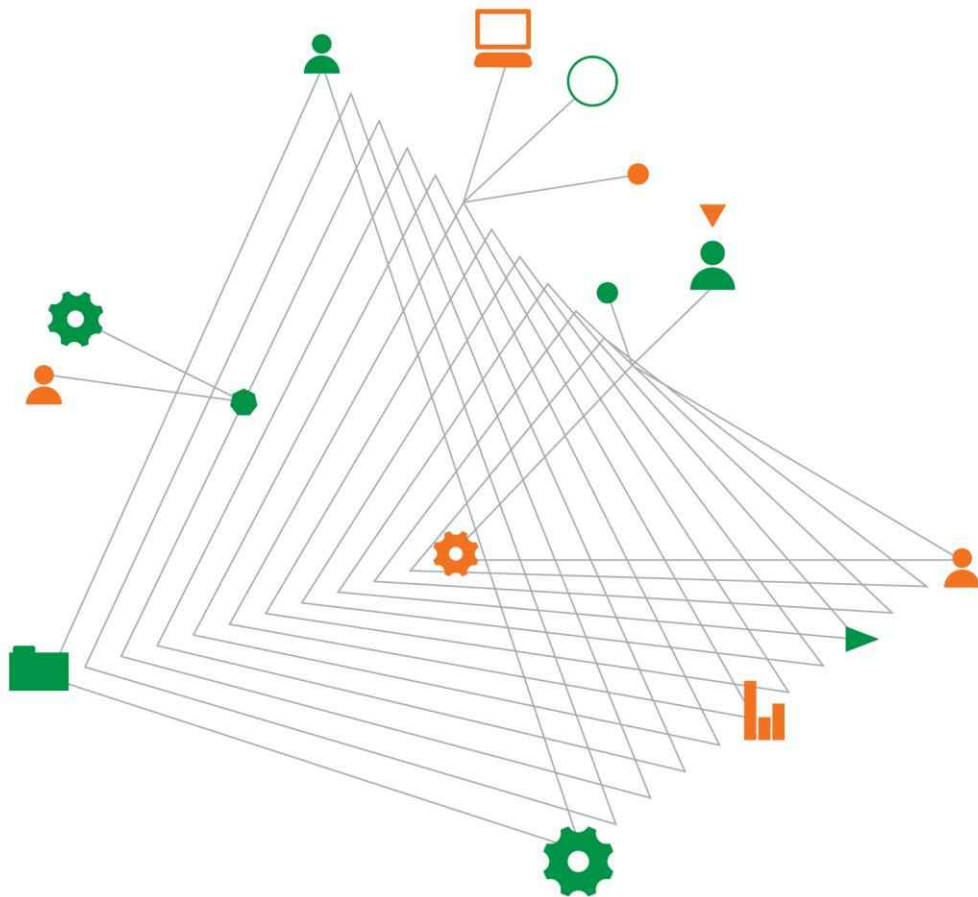
**Appendix B – Workplan For Zone 1 Temporary
Boundary Venting System**

Huntingdale Estate Nominees Pty Ltd

**Huntingdale Estate: 1221 – 1249 Centre Road
& 22 Talbot Avenue, Oakleigh South, Victoria**

Workplan For Zone 1 Temporary Boundary
Venting Measures

4 December 2019



Experience
comes to life
when it is
powered by
expertise

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Huntingdale Estate: 1221 – 1249 Centre Road & 22 Talbot Avenue, Oakleigh South, Victoria

Prepared for
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4 December 2019

ENAUABTF00751AB

Quality information

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Rev01	1	PDF	Ken Mival (Environmental Auditor) – EHS Support Pty Ltd	11 October 2019
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Attachment A – Figures

Attachment B - Important Information About Your Coffey Environmental Report

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Figure 1: A1-A12 Preload Stockpile with Trench

Figure 2: Boundary Venting Trench – Detail 1

Figure 3: Boundary Venting Trench – Detail 2

Figure 4: LFG sampling locations

Abbreviations:

AHD	Australian Height Datum
BGS	Below Ground Surface
CQA	Construction quality assurance
EPA	Environment Protection Authority (Victoria)
ESA	Environmental Site Assessment
HDPE	High density polyethylene
LFG	Landfill gas
MGA	Map Grid Australia
MQA	Manufacturing quality assurance
PVC	Polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
RL	Reduced level
SOP	Coffey Standard Operating Procedure

1. Introduction

Huntingdale Estate Nominees Pty Ltd (Huntingdale Estate) engaged Coffey Services Australia Pty Ltd (Coffey) to undertake an Environmental Site Assessment at 1221 to 1249 Centre Road and 22 Talbot Avenue, Oakleigh South, Victoria (the site).

The site comprises a former sand quarry and municipal landfill and is proposed to be redeveloped for a range of residential land uses including designated areas of open space and commercial use.

The site is subject to an Environmental Audit Overlay under the City of Monash Planning Scheme, with Ken Mival of EHS Support Pty Ltd engaged by Huntingdale Estate to act as the EPA accredited environmental auditor for the environmental audit of the site.

Coffey prepared a Construction Environmental Management Plan (CEMP) in May 2020 (Coffey ref: 754-ENAUABTF00751AB_R17_CEMP) in support of the environmental audit.

This workplan was originally prepared in December 2018 as part of the environmental audit and verified by the appointed environmental auditor. The workplan has been updated to reflect that the proposed works will be undertaken as a component of the site redevelopment as outlined in the CEMP (Coffey 2020) and should be read in conjunction with this document

2. Project Understanding and Strategy

As part of ongoing rehabilitation works at the site bulk earthworks are proposed in Zone 1 comprising the stockpiling of imported Fill Material and redistribution of existing stockpiled material.

The construction of stockpiles (pre-loading) is proposed as the engineered treatment of uncontrolled fill material in Zone 1.

From an environmental perspective the key concerns with the stockpiling works are:

- The potential for settlement or compression of buried landfill wastes in Zone 1 that may displace soil gas and have the potential to increase (temporarily) off-site gas migration; and/or
- The potential for stockpiling/compaction of less permeable materials across the Zone 1 surface to impact landfill gas migration in this area.

Whilst the likelihood of these concerns being realised due to proposed stockpiling in Zone 1 is low, due to the relative proximity of Zone 1 to the interface with sensitive (residential) land uses at the northwest site boundary, landfill gas contingency measures are proposed to be established in this area prior to stockpiling works occurring.

An outline of our understanding of these issues to be addressed is provided in the following section.

2.1. Proposed Stockpiling Design

Stockpiling works are proposed to be undertaken in accordance with the design outlined in Coffey Geotechnics Pty Ltd *Design of pre-load for Zone 1,2,3 and 5* (GEOTABTF09257AA-BI_Rev04, June 2016) and as varied in *Zone 1 Preload Design* (GEOTABTF09257AA-CQ Rev01).

The proposed importation and stockpiling of fill material will be undertaken by the appointed earthworks contractor in accordance with the CEMP (Coffey 2020) and associated supporting documentation including the *Site Backfilling Protocol* (Coffey, 2015).

The pre-load stockpile in Zone 1 has been designed to allow for the further development of the site, including roads, residential and commercial buildings as may form part of development plans. Ideally the pre-load would extend to the edge of the former quarry crest, however as a minimum the crest of the pre-load should extend over any potential roads. It is likely that future roads may be located about 20 m from the boundary. In order to reduce the amount of differential settlement between the road and adjacent buildings it was recommended to extend the crest of the pre-load to 18 m from the site boundary.

The results of trial embankment monitoring indicate that a 2 m high pre-load stockpile is the minimum needed to treat the site in Zone 1.

The current surface of Zone 1 comprises soil mounds and stockpiles with surface elevations ranging from RL 59 m to over RL 66 m. These existing stockpiles have provided an uneven pre-load over the underlying uncontrolled fill, and it will be necessary to fill in the low-lying areas between the stockpiles to achieve adequate pre-loading over Zone 1.

Given the presence of existing fill over large areas of Zone 1 and the heavy traffic over the site, it is expected that the ground will not undergo significant ground displacement during and post construction of the pre-load stockpiles. However, in areas of Zone 1 that have not previously been subject to fill mounds some primary settlement would be expected.

An outline of the proposed stockpiling extent in Zone 1 is provided in Figure A1 (**Attachment A**).

2.2. Landfill Gas Migration in Zone 1

Detailed discussion of the potential fate and transport of landfill gas in Zone 1 is provided in the ESA (Coffey 2020). The current landfill gas situation can be summarised as follows:

- With regards to the potential landfill gas migration in Zone 1 (under current site conditions), no detectable methane concentrations were recorded for the boundary delineation bores during the current phase of assessment and gas concentrations dropped relatively quickly with distance from the waste mass.
- Flow and pressure measurements taken at the site suggest that significant pressure differentials created through rapid methane generation are not present. We interpret this to mean that the majority of migration is occurring due to diffusion (which would be expected based on the age of the landfill); i.e. pressure differences between inside and outside of the closed landfill are not great and are not causing landfill gas to be transported away from the landfill in a manner that would result in high gas flows in nearby residential properties.
- The variability of the methane concentrations during continuous monitoring and the correlation of gas concentrations with atmospheric pressure changes indicates that barometric pumping is having a significant effect on gas migration in these locations. However, this is likely to be limited to land that may have a connection to wastes or areas of low permeability soil.
- In the sites current condition vertical gas migration and subsequent discharge at the surface (maximum methane surface emissions of 19,400 ppm reported in August 2016) was considered to be the dominant methane migration pathway, as opposed to lateral migration. Diffusion and barometric pumping were likely to be the key drivers of gas migration.

As outlined above, based on our understanding of the gas migration regime in Zone 1, the preferential gas migration pathway is vertical migration through the current surface. The concern is whether the proposed stockpiling exercise could both increase the potential for gas migration and reduce the preference for gas to move vertically.

The time periods with the greatest likelihood of the stockpiling works altering landfill gas transport mechanisms would be during any primary settlement (i.e. settlement/compaction of wastes) and at the completion of stockpiling works and as conditions return to steady state.

Considering the above, boundary venting is proposed as a conservative measure to provide a level of contingency in the case that stockpiling activities have an impact on gas migration in Zone 1.

3. Temporary Boundary Venting Design

The temporary boundary venting measures are proposed to be present for the duration of the pre-load or until permanent boundary venting is installed (whichever occurs first). This is expected to be a 12 to 24 month duration. Details on the proposed trench design is outlined in the following Sections.

3.1. Location of Temporary Boundary Venting

The temporary boundary venting is proposed to comprise a vertical trench backfilled with a high permeability material installed along the length of the northwest site boundary between the edge of the buried waste and the sensitive site boundary. Landfill wastes have been encountered as close as 14 m from the north western boundary at test pit TP29.

The 1970 aerial photograph shown in Plate 1 was taken during quarrying which shows the footprint of the Zone 1 pit (Zone 1 was filled with refuse in 1972-1975). The offset distance from the crest of the pit batter to the western boundary has been estimated from the aerial photograph to be approximately 10 m – 15 m. The northern boundary appears to have only a narrow crest to boundary off-set.



Plate 1 - Aerial photograph of Zone 1 from October 1970

The position of the trench will also largely be determined by the preload extent (i.e. the trench will be boundary side of the pre-load, refer Figure A1). To minimise potential amenity impact to the neighbours the trench will be installed as far from the site boundary as practicable without needing to excavate into the residual buried wastes (excavated spoil would largely be expected to comprise natural or reworked natural material).

Based on the preload design and estimated waste extent in Zone 1 the trench will be installed approximately 10 m from the site boundary for the northern portion of the trench and 5 m from the boundary for the western portion of the trench (refer Figure A1-A12 in **Attachment A** for further detail).

A tree protection zone of 6 m applies to the trees in the north west corner of the site (Tree Logic Pty Ltd, 2014). As such, the proposed location of the trench deviates around this zone, and also around the adjacent existing soil mounds near the trees to minimise the excavation works required for the trench. In this area of the site, to minimise the impact of the trench on the preload stockpile design, the stockpile will overlap a 30 m section the trench.

3.2. Trench Design

The trench will be installed to intercept as much of the vadose zone as practicable (i.e. maximum of 1.0 m above the water table and limited by factors such as area and subsurface conditions) which will result in a trench depth of between 4.0 and 5.0 m below the current ground surface. There would be some variation along the length of the trench based on undulations of the current surface level and the change in groundwater depth across Zone 1. Expected groundwater RL in this area ranges from 56 m AHD at the northern boundary to approximately 55 m AHD at the southern extent of the trench.

In terms of the width of the trench the aim is for it to be as narrow as possible without collapse, and for practicality the width of an excavator bucket to be used. The geometry of the trench has been based on using a 50-tonne excavator.

Prior to excavating the trench, a 4 m wide strip would be levelled, with a 1:1 batter formed in the side of the existing soil mounds along the length of the trench. The 50-tonne excavator has a 1.3 m wide bucket, and the trench has been modelled at 1.4 m wide to match this. The total estimated length of the trench is 196 m.

The trench would be constructed with a lip to mitigate water inflow from run-off and surface drainage would link in with that proposed for the preload design. Other than a slight lip to assist with drainage the trench would effectively finish flush with the ground surface and as such would not be expected to pose any amenity impacts to the neighbours following installation.

Given the significant length of the trench, historical monitoring of gas conditions, typical wind flow direction and the presence of oxygen within the trench (to potentially facilitate rapid oxidation of odorous compounds), it is considered unlikely that the installation of the trench will pose any olfactory amenity impacts. However as a contingency measure a 0.5 m thick layer of mulch topping is proposed for the length of the trench to mitigate any potential odour impact.

Due to structural concerns and to avoid the potential for trench collapse the trench would be dug in maximum 10.0 m sections and then backfilled sequentially.

The trench design is outlined in Figures A1-A12, 2 and 3 in **Attachment A**.

3.3. Backfill Design

The trench is proposed to be backfilled utilising recycled bricks (half and full bricks) coupled with a high density polyethylene (HDPE) geomembrane and geotextile liner to be installed on the boundary side of the trench. Geofabric would be installed over the trench to further reduce the potential for sedimentation.

Where the preload overlaps a section of the trench in the northwest corner of Zone 1, as an additional level of control in this area risers would be installed through the preload (from the trench to the preload surface) to ensure that a preferential pathway for potential gas migration remains.

A summary of the specification for the trench backfill design is outlined in Table 1. Further details are provided in Figures 2 and 3 in **Attachment A**.

Table 1 – Trench Backfill Specification

Backfill Component	Specification / Comment
HDPE Geomembrane	<p>Double sided smooth HDPE geomembrane (minimum thickness 1.5 mm)</p> <p>Manufacturer to provide MQA certificates to demonstrate HDPE roll provided meet the requirements of Geosynthetic Research Institute Standard GR1-GM13</p> <p>HDPE geomembrane and geotextile liner joins are to be avoided where practicable. Joins shall be approved by the on-site Coffey representative prior to installation. Liner to be installed with minimum 1000 mm overlap at joins</p> <p>Manufacturer to provide MQA certificates for rolls delivered to site</p>
Geotextile Cushion for puncture protection	<p>Geotextile liner to be a non-woven polyester or polypropylene with a Geotextile Strength Rating "G" ≥ 3000 in accordance with VicRoads Standard RC381.01</p> <p>Where preload stockpile will overlap boundary venting trench geofabric protection layer to be installed overlying trench to prevent sedimentation</p> <p>Manufacturer to provide MQA certificates for rolls delivered to site</p>
Bricks	<p>Recycled bricks to comprise half and full bricks only with minimal fines component (<2%)</p> <p>Geotextile/fabric to be installed over final trench to assist with preventing sedimentation.</p>
Vent riser	<p>Where preload stockpile will overlap boundary venting trench 100 mm PVC vent risers are to be installed at a minimum spacing of 5.0 m, extending from the trench to preload surface with goose neck vent fitting at least 300 mm from final stockpile surface</p> <p>Risers to extend to base of trench trench comprising 100 mm slotted PVC</p> <p>The riser construction would comprise 2 distinct stages:</p> <ol style="list-style-type: none"> 1. Initial slotted (in trench) section to be installed with 1.0 m of solid PVC riser extending out of the trench; 2. During stockpiling works in this area additional riser section to be installed to height of stockpile and backfilled. <p>This staging would reduce the potential for the riser sections to be damaged during construction.</p> <p>Caution will be required during construction of the preload stockpile in these locations to ensure integrity of risers is maintained</p>

4. Construction Quality Assurance

Whilst the boundary venting is only proposed as a temporary measure (required to be effective for the duration of the pre-load or until the permanent boundary venting system is installed) a robust construction quality assurance (CQA) process will be required to validate the boundary venting construction.

The proposed CQA process would incorporate the following:

- The alignment and depth of the trench will be surveyed by a licensed surveyor during construction (MGA and AHD) to ensure the position and depth is consistent with the approved design.
- Coffey staff would retain a site presence for the duration of the initial trench construction (at least three 10 m sections to be constructed) and undertake periodic inspections for the remainder of the trench construction to document the installation process and verify that works have been carried out to the agreed standards.
 - A specific inspection would be undertaken for the installation and subsequent backfilling of the vent risers.
- MQA certificates to be retained by the contractor and provided to Coffey for review.
- Designated hold points to be enforced where construction as per the agreed specification is not practicable to enable discussion and endorsement of the proposed design change from the auditor.
- Where any earthworks in the vicinity of the trench are proposed by the contractor approval would be required from the works Superintendent.
- Preparation of CQA report documenting the boundary venting construction for review by the auditor.

5. Landfill Gas Monitoring

To confirm the effectiveness of the temporary boundary protection measures and assess the potential effect of the stockpiling works on landfill gas transport in Zone 1 further monitoring is proposed during the stockpiling works.

Where stockpiling will include existing gas bore and monitoring well locations the bores would be extended through the pre-load so as to remain accessible for sampling for the duration of the stockpiling works.

5.1. Monitoring Frequency

LFG monitoring will include all gas bores and surface emission surveys in Zone 1 as follows:

- Landfill gas monitoring to be conducted in general accordance with EPA Victoria Publication 1684 (February 2018).
 - Extractive monitoring to be undertaken utilising a GFM430 landfill gas meter. Monitoring would include:
 - Atmospheric pressure at the time of monitoring;

- Gas flow and differential borehole differential pressure;
- Methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide concentrations for a minimum of three minutes or until steady state is reached. Where elevated methane concentrations (> 1% v/v) are recorded, gas concentrations would be measured for a 10-minute interval prior to sampling.
- Surface emission surveys (including trench surface) to be conducted utilising a laser diode methane detector (Ispectra Laser).
- Full round of LFG monitoring (baseline) for Zone 1 to be undertaken immediately prior to any stockpiling works occurring.
- One round of LFG monitoring to be undertaken per week during initial stockpiling works (as stockpiling works are occurring) and pending review of results 1 event per month for primary settlement period following completion of stockpiling works.
 - At this stage it has been assumed that stockpiling works would be completed over a 2-month period with primary settlement occurring over a further 3-month period (11 events total). The frequency of the monitoring events would need to be coordinated with the stockpiling works.
 - Settlement monitoring data will be reviewed by Coffey Geotechnics during the stockpiling works to assess settlement rates. In conjunction with the landfill gas data collected during the stockpiling this would inform the requirements for on-going monitoring.
- Minimum of five landfill gas sampling events in first 3 months following stockpiling with further LFG sampling events provisionally at 3 monthly intervals for duration of stockpiling period. The requirement for weekly monitoring during primary settlement and this additional 3 monthly monitoring would be assessed based on the results of the initial monitoring and continuous monitoring data.

Where practicable monitoring should be undertaken during periods of falling atmospheric pressure.

An outline of proposed LFG sampling locations is provided in Figure 4 (**Attachment A**).

5.2. Continuous Monitoring

To provide an additional level of contingency during the Zone 1 stockpiling works installation of five continuous logging landfill gas monitors (AmbiSense GasFlux measuring gas and flow rates) with telemetry is proposed at GB17, GB47, GB53, GB67 and GB71 for the duration of stockpiling works (monitors to be installed immediately prior to works) and for the duration of the primary settlement period (or until the data supports that the continuous monitoring is not required as a contingency measure during the stockpiling).

5.3. Trigger Levels

In accordance with best practice, contingency measures have been developed to outline actions to be implemented if performance goals are exceeded and/or conditions at and around the site change.

A summary of the scenarios that could potentially warrant modification of the adopted approach is outlined in Table 2 below.

Table 2 – Triggers and Contingency Measures

Activity / Trigger	Contingency
Elevated methane concentrations recorded at boundary bores (during either extractive or continuous monitoring) result in a GSV with a Characteristic Situation of >1 (>1% v/v methane)	Stockpiling works must cease pending further review of the data and adequacy of the gas protection measures.
Increasing trend of LFG concentrations recorded at boundary bores (during either extractive or continuous monitoring)	

6. Reporting

The proposed deliverables for the works would comprise a CQA report for the construction of temporary boundary venting measures and a landfill gas assessment report outlining the findings of the monitoring works during stockpiling.

Should significant changes in gas migration occur such as gas concentrations are detected beyond the trench or as emissions from the surface, interim reporting is to be provided to inform the environmental auditor.

7. Closure

This workplan has been prepared in support of Stage 1 Construction Works to be completed at the site, as outlined in the CEMP (Coffey 2020).

Where the proposed pre-load design and/or temporary boundary venting trench design varies from that outlined in this document the design and associated monitoring program should be reviewed and verified by the appointed Environmental Auditor.

It is recognised that further LFG monitoring will be required for future development phases and/or where the scope of Stage 1 works varies from that outlined within the CEMP, in this case a revised LFG monitoring plan should be prepared and verified by the appointed Environmental Auditor.

This monitoring plan should be read in conjunction with the CEMP (Coffey 2020) and the attached Important Information About your Coffey Environmental Report.

Attachment A - Figures



FIGURE A12:
SCOUT HALL
CROSS SECTION

FIGURE A2: 412 HUNTINGDALE ROAD CROSS SECTION

FIGURE A3: 414 HUNTINGDALE ROAD CROSS SECTION

FIGURE A4: 416 HUNTINGDALE ROAD CROSS SECTION

FIGURE A5: 418 HUNTINGDALE ROAD CROSS SECTION

FIGURE A6: 420 HUNTINGDALE ROAD CROSS SECTION

FIGURE A7: 422 HUNTINGDALE ROAD CROSS SECTION

FIGURE A8: 424 HUNTINGDALE ROAD CROSS SECTION

FIGURE A9: 426 HUNTINGDALE ROAD CROSS SECTION

FIGURE A10: SUPER LOT HUNTINGDALE ROAD CROSS SECTION


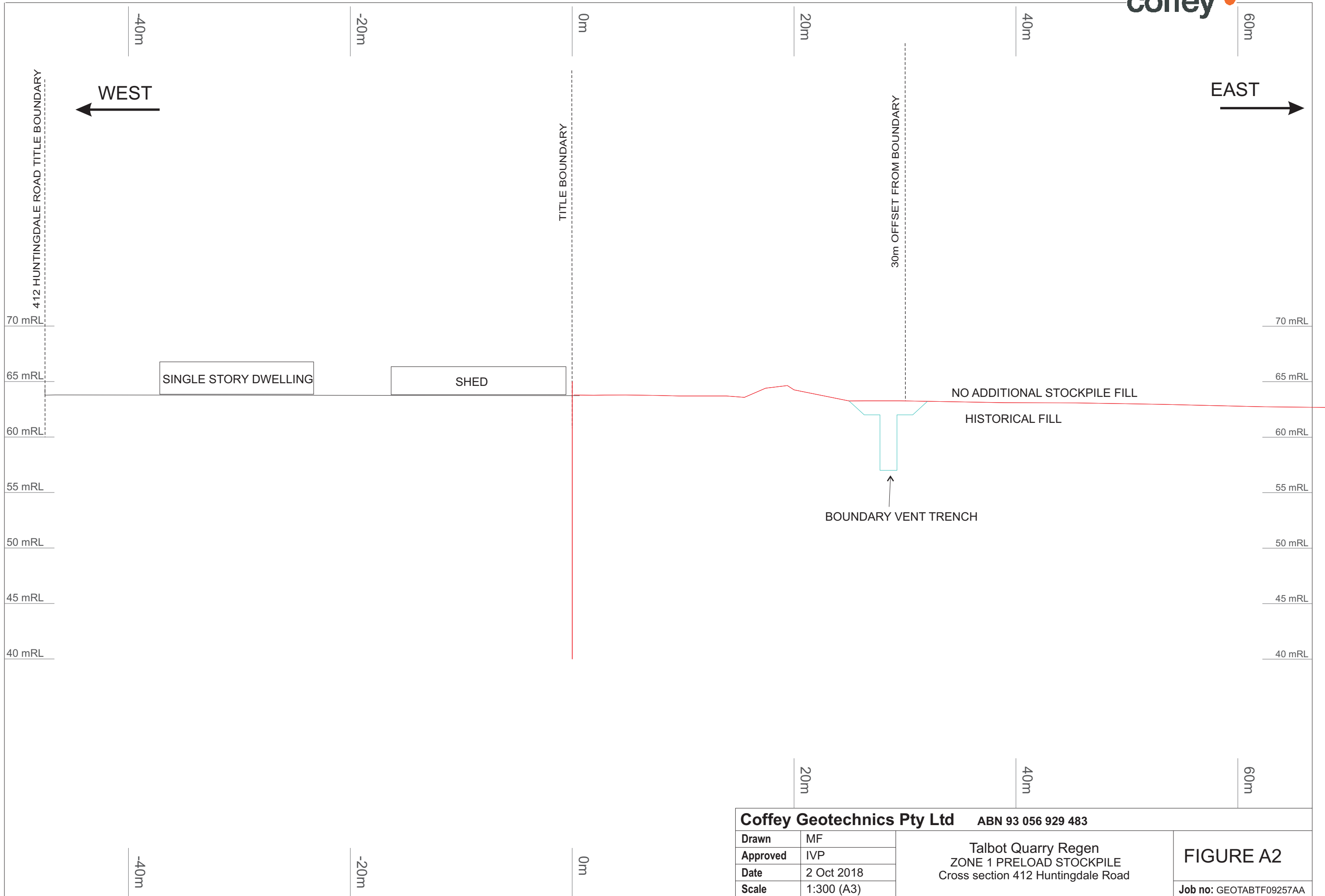
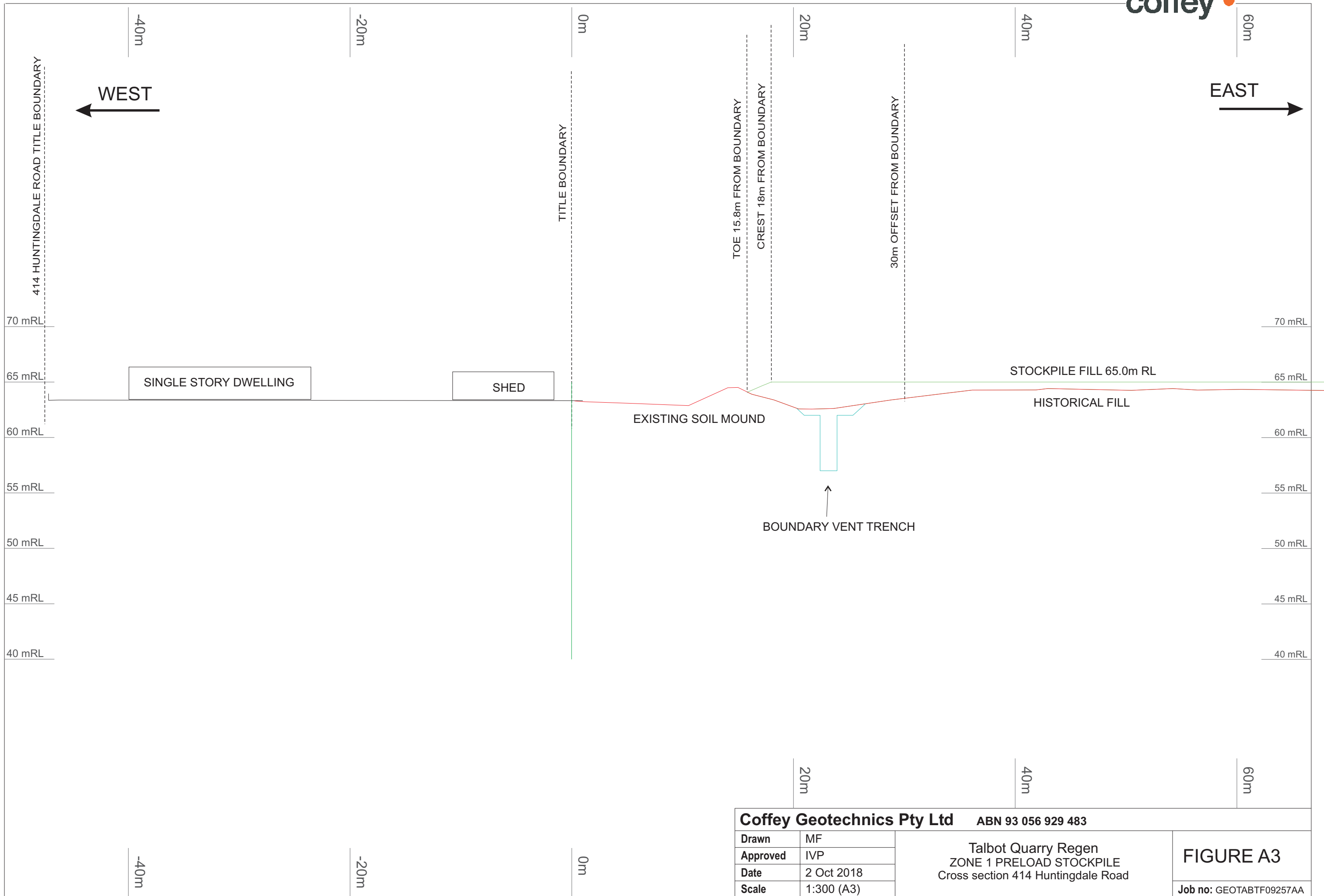
Legend
 Vent riser location (minimum spacing of 1 riser every 5.0 m where pre-load overlaps boundary venting trench)

FIGURE A11:
2/426 HUNTINGDALE ROAD
CROSS SECTION

Coffey Geotechnics Pty Ltd		ABN 93 056 929 483	
Drawn	MF	Talbot Quarry Regen ZONE 1 PRELOAD STOCKPILE Cross section locality plan	FIGURE A1
Approved	IVP		
Date	2 Oct 2018		
Scale	NTS		
			Job no: GEOTABTF09257AA



Coffey Geotechnics Pty Ltd		ABN 93 056 929 483	
Drawn	MF	Talbot Quarry Regen ZONE 1 PRELOAD STOCKPILE Cross section 412 Huntingdale Road	FIGURE A2
Approved	IVP		
Date	2 Oct 2018		
Scale	1:300 (A3)		
			Job no: GEOTABTF09257AA



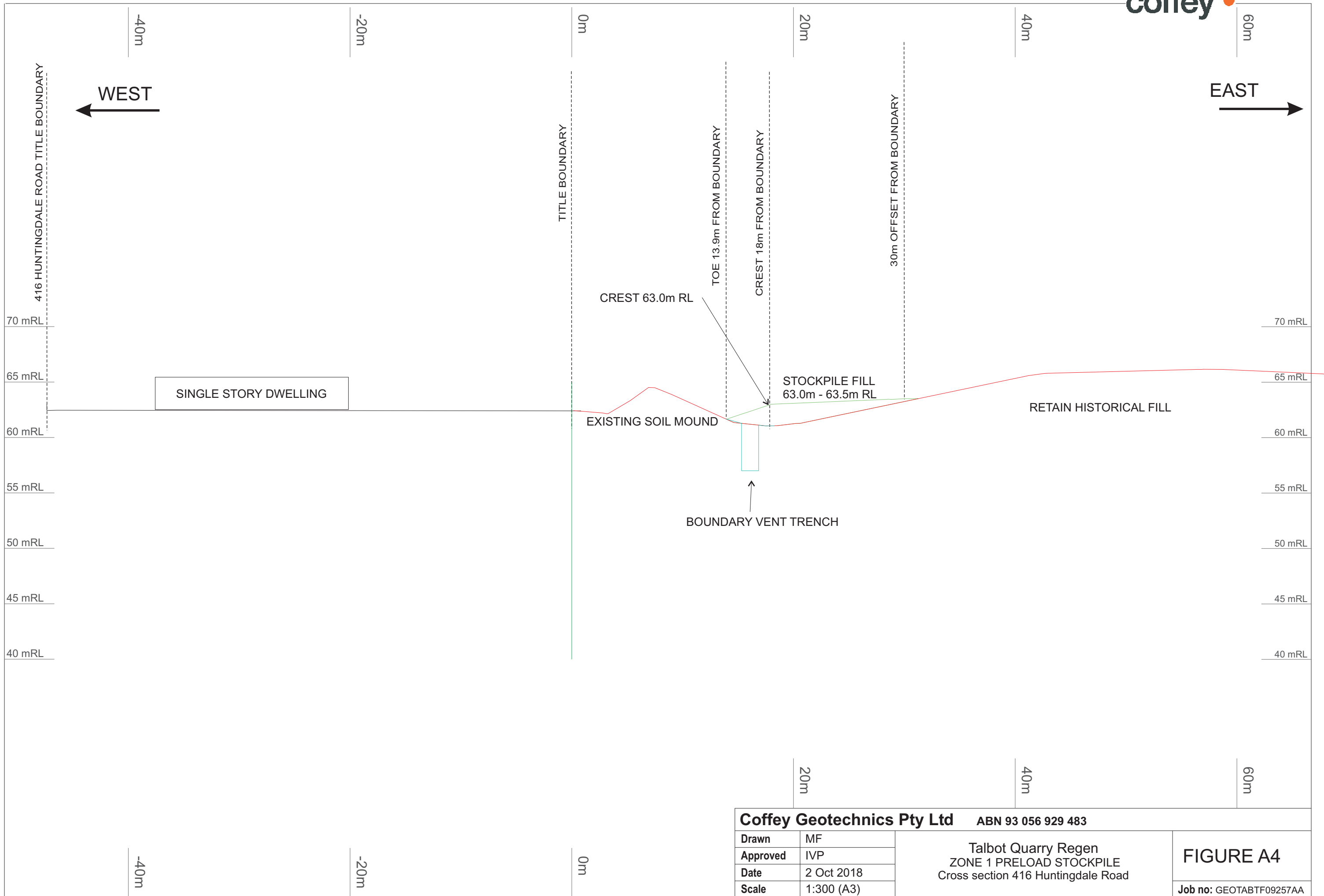
Coffey Geotechnics Pty Ltd ABN 93 056 929 483

Drawn	MF
Approved	IVP
Date	2 Oct 2018
Scale	1:300 (A3)

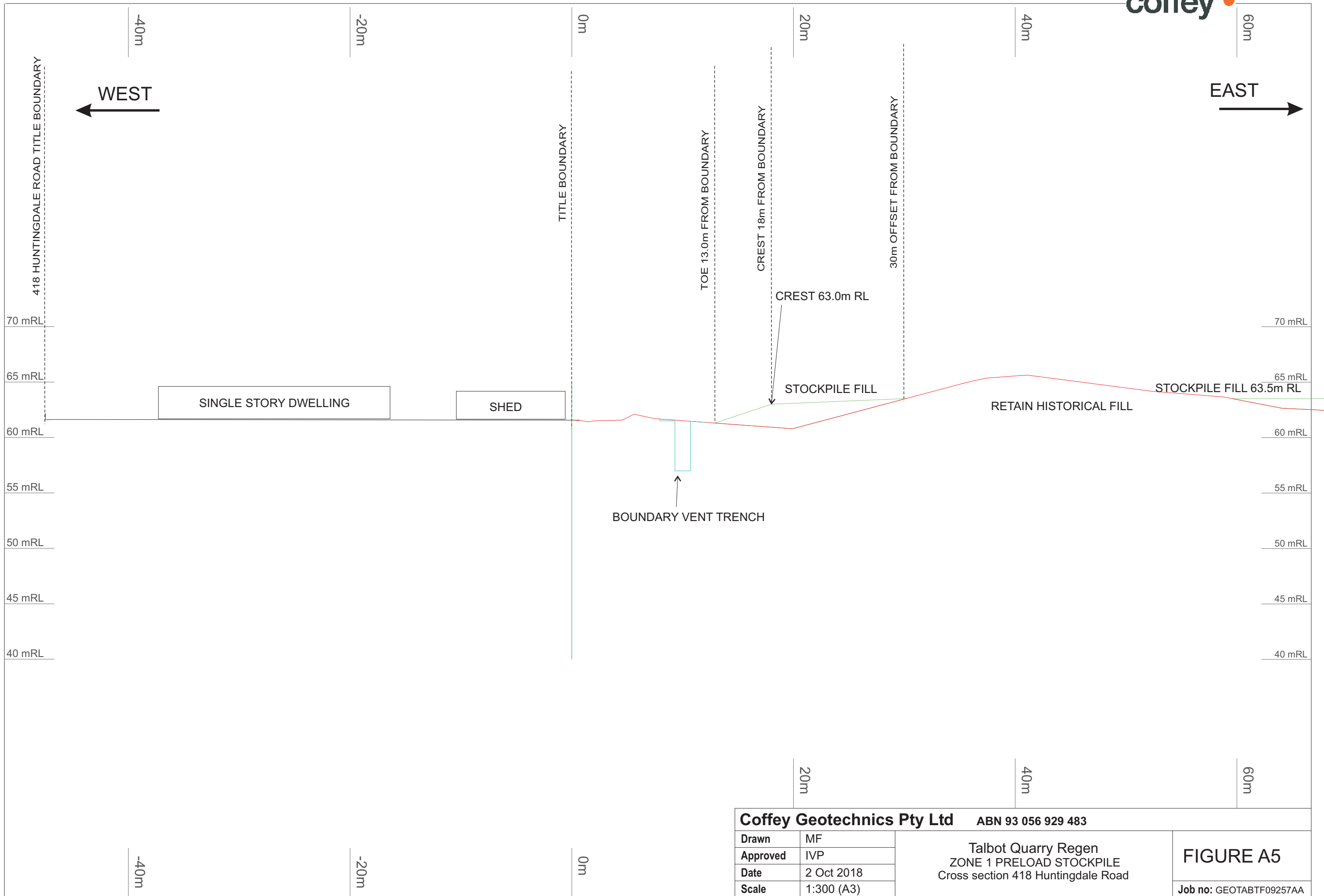
Talbot Quarry Regen
 ZONE 1 PRELOAD STOCKPILE
 Cross section 414 Huntingdale Road

FIGURE A3

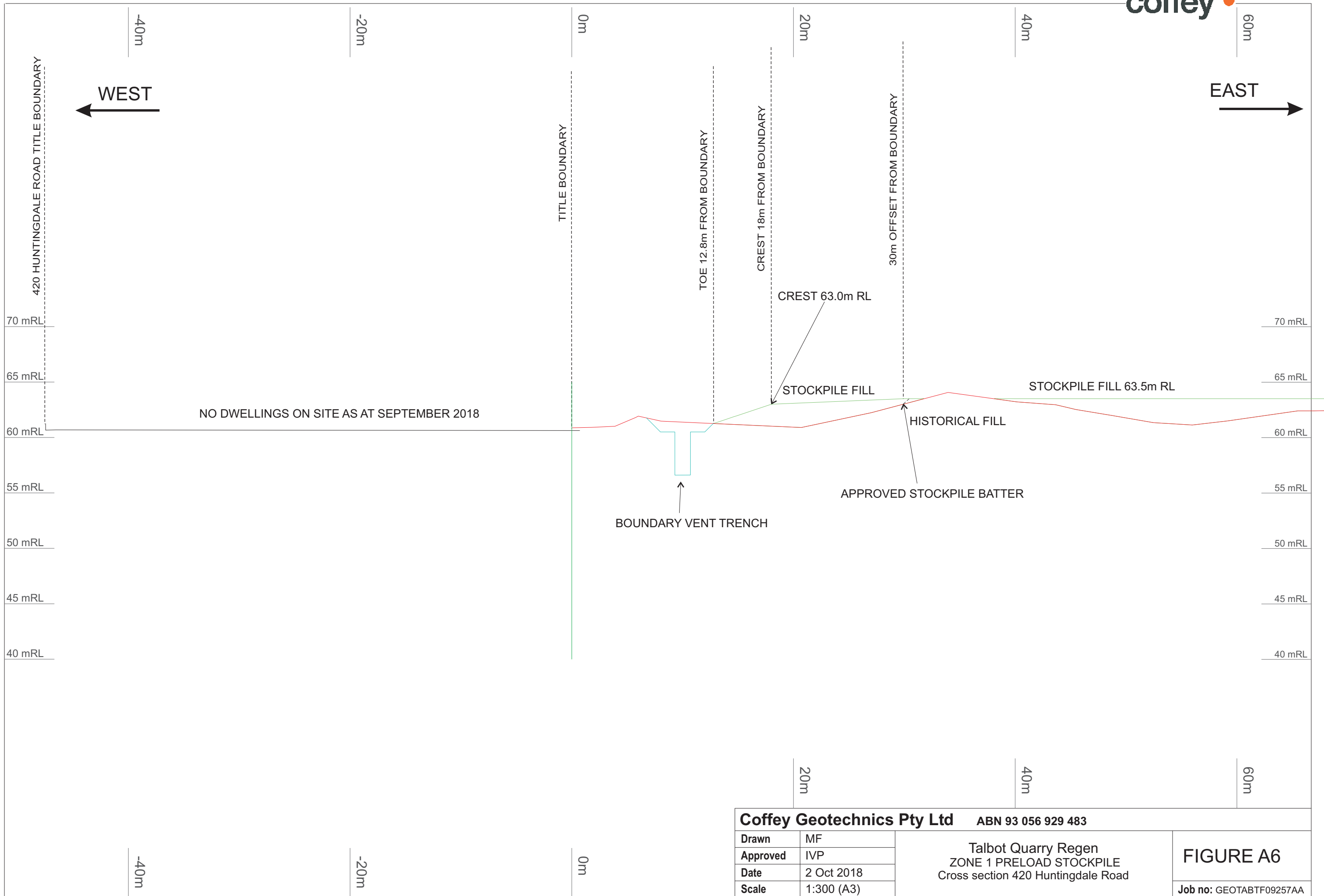
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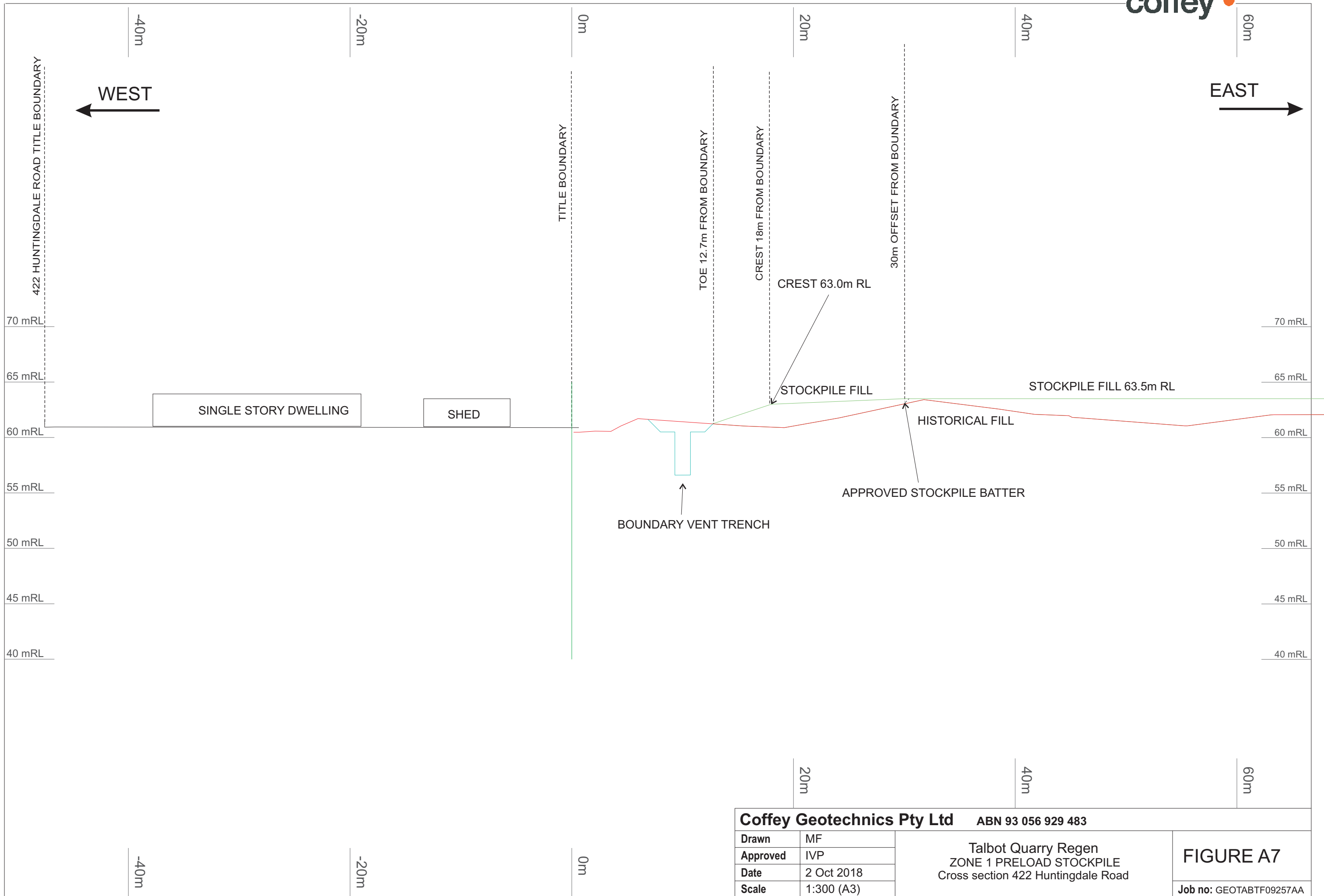


Coffey Geotechnics Pty Ltd		ABN 93 056 929 483	Talbot Quarry Regen ZONE 1 PRELOAD STOCKPILE Cross section 416 Huntingdale Road	FIGURE A4 Job no: GEOTABTF09257AA
Drawn	MF			
Approved	IVP			
Date	2 Oct 2018			
Scale	1:300 (A3)			



Coffey Geotechnics Pty Ltd		ABN 93 056 929 483	
Drawn	MF	Talbot Quarry Regen ZONE 1 PRELOAD STOCKPILE Cross section 418 Huntingdale Road	FIGURE A5
Approved	IVP		
Date	2 Oct 2018		
Scale	1:300 (A3)		
			Job no: GEOTABTF09257AA





422 HUNTINGDALE ROAD TITLE BOUNDARY

WEST ←

→ EAST

-40m

-20m

0m

20m

40m

60m

TITLE BOUNDARY

TOE 12.7m FROM BOUNDARY

CREST 18m FROM BOUNDARY

30m OFFSET FROM BOUNDARY

CREST 63.0m RL

STOCKPILE FILL

STOCKPILE FILL 63.5m RL

HISTORICAL FILL

APPROVED STOCKPILE BATTER

BOUNDARY VENT TRENCH

SINGLE STORY DWELLING

SHED

70 mRL

65 mRL

60 mRL

55 mRL

50 mRL

45 mRL

40 mRL

70 mRL

65 mRL

60 mRL

55 mRL

50 mRL

45 mRL

40 mRL

20m

40m

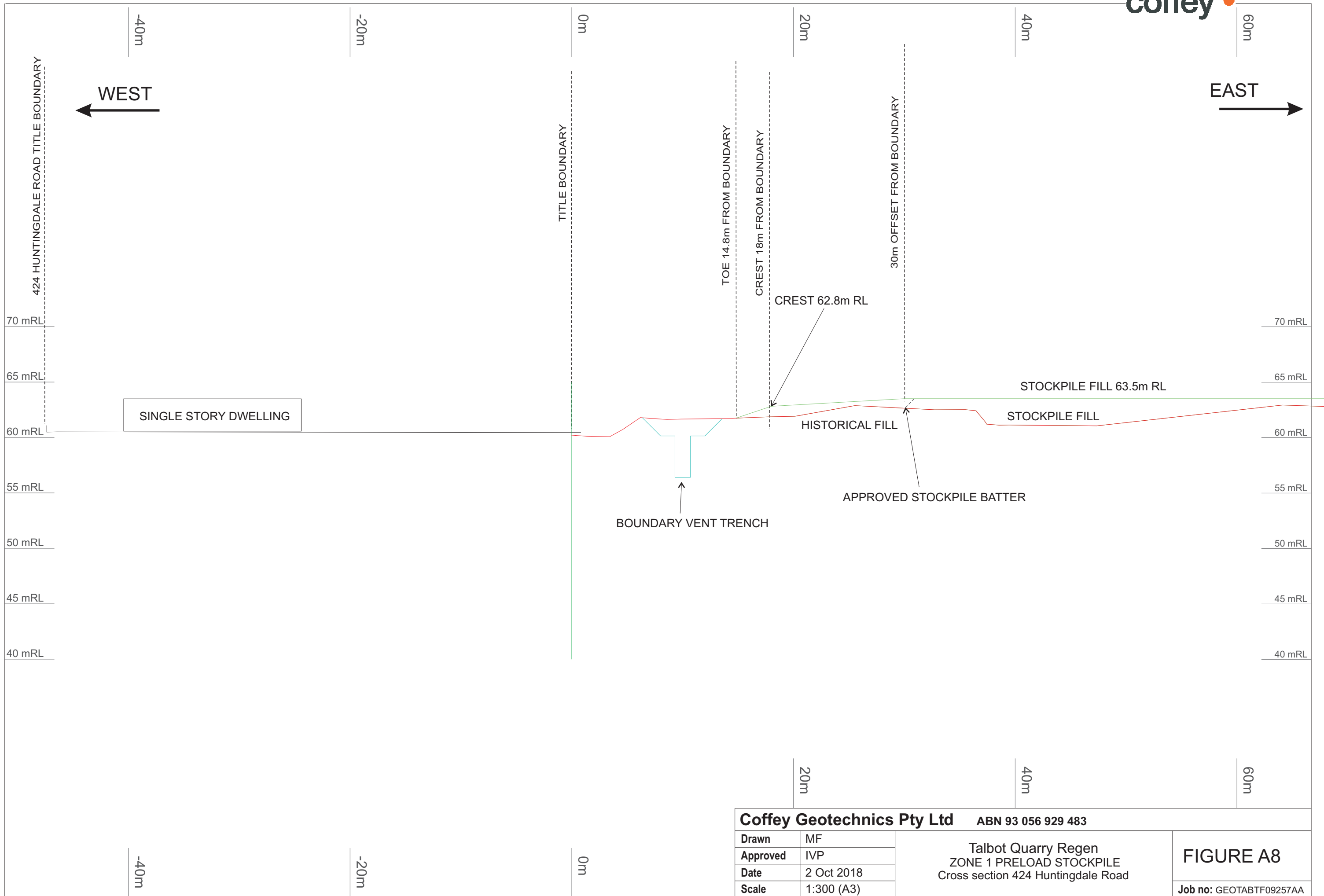
60m

-40m

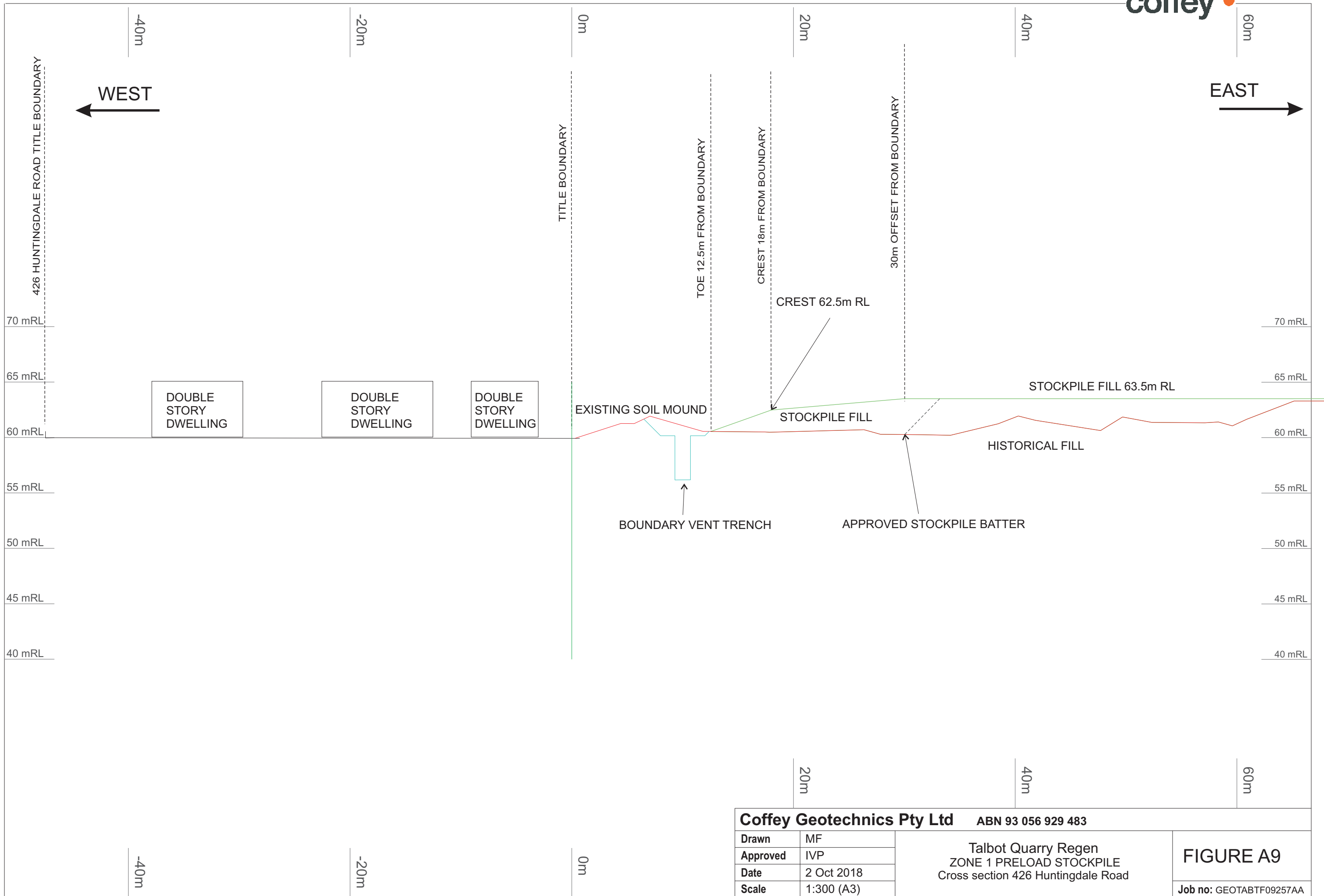
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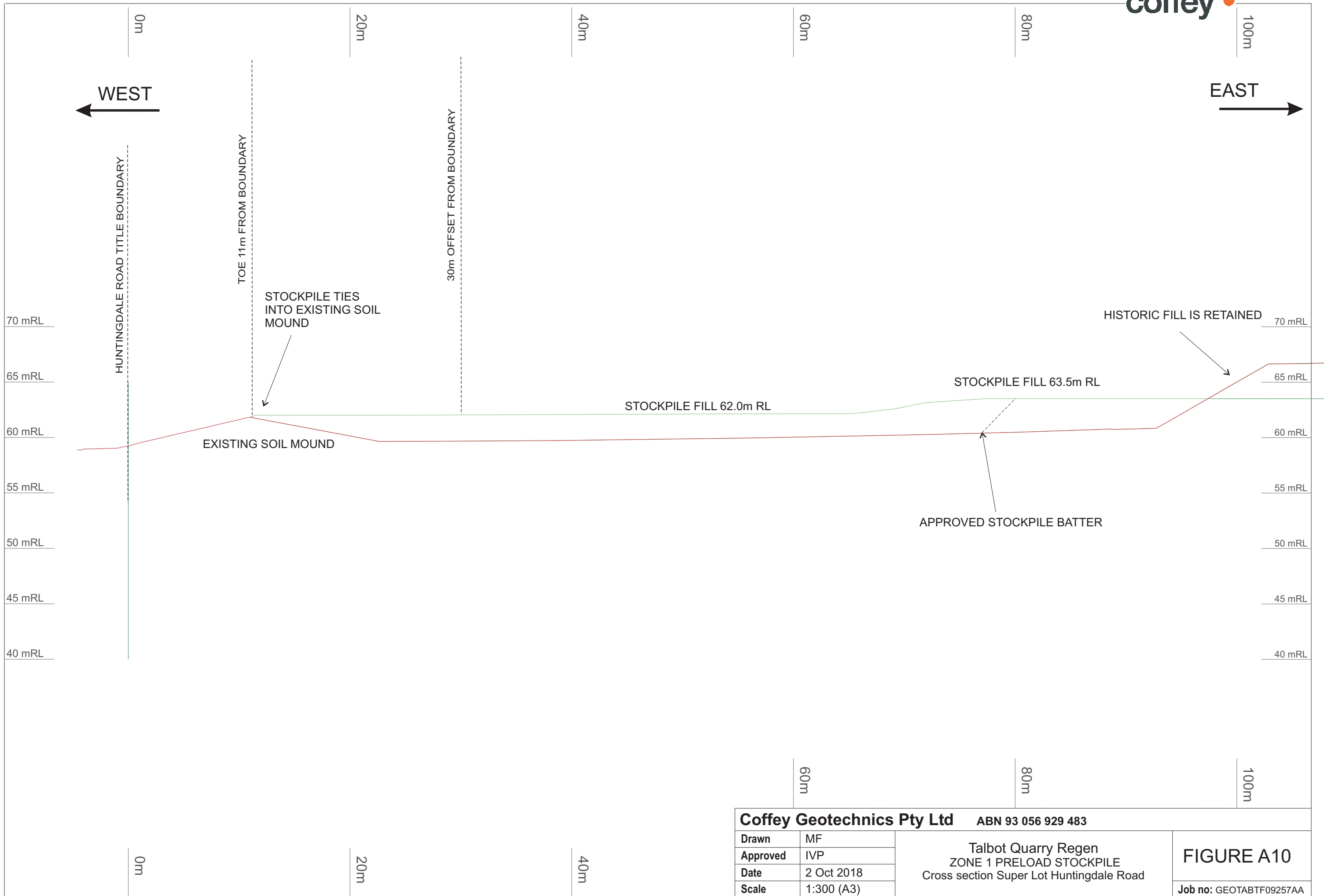
Coffey Geotechnics Pty Ltd		ABN 93 056 929 483	
Drawn	MF	Talbot Quarry Regen ZONE 1 PRELOAD STOCKPILE Cross section 422 Huntingdale Road	FIGURE A7
Approved	IVP		
Date	2 Oct 2018		
Scale	1:300 (A3)		
			Job no: GEOTABTF09257AA

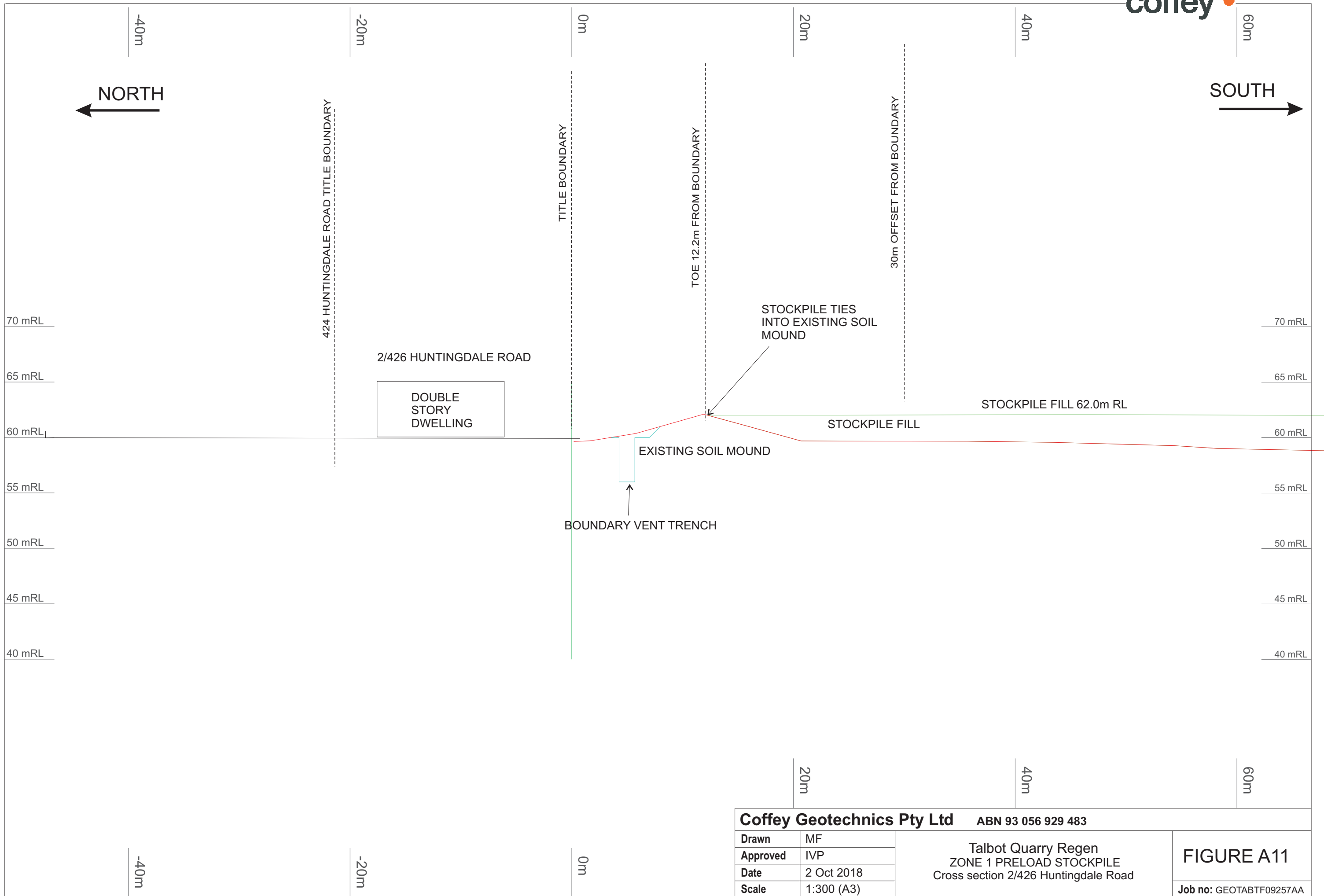


Coffey Geotechnics Pty Ltd		ABN 93 056 929 483	
Drawn	MF	Talbot Quarry Regen ZONE 1 PRELOAD STOCKPILE Cross section 424 Huntingdale Road	FIGURE A8
Approved	IVP		
Date	2 Oct 2018		
Scale	1:300 (A3)		
			Job no: GEOTABTF09257AA

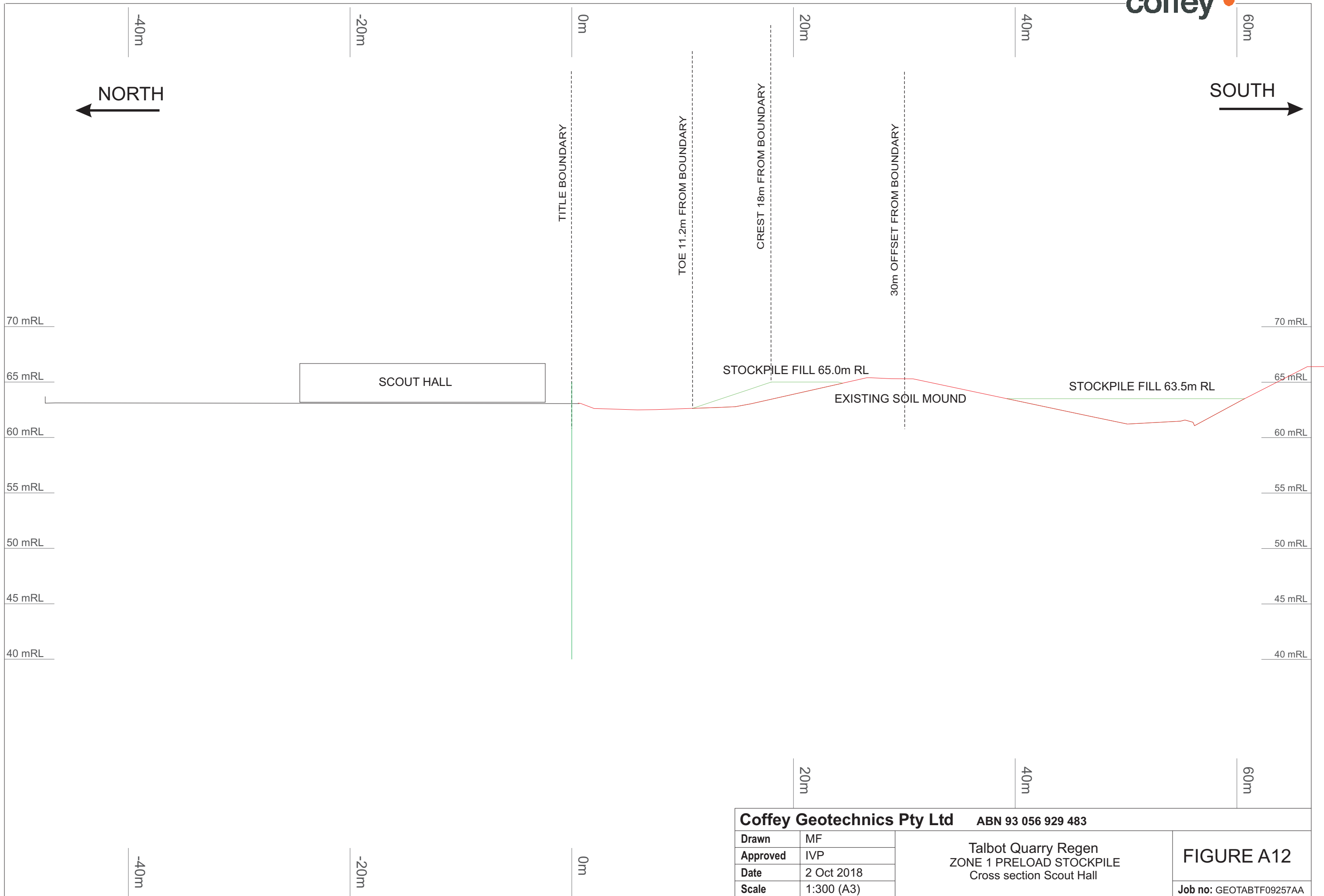


Coffey Geotechnics Pty Ltd		ABN 93 056 929 483	
Drawn	MF	Talbot Quarry Regen ZONE 1 PRELOAD STOCKPILE Cross section 426 Huntingdale Road	FIGURE A9
Approved	IVP		
Date	2 Oct 2018		
Scale	1:300 (A3)		
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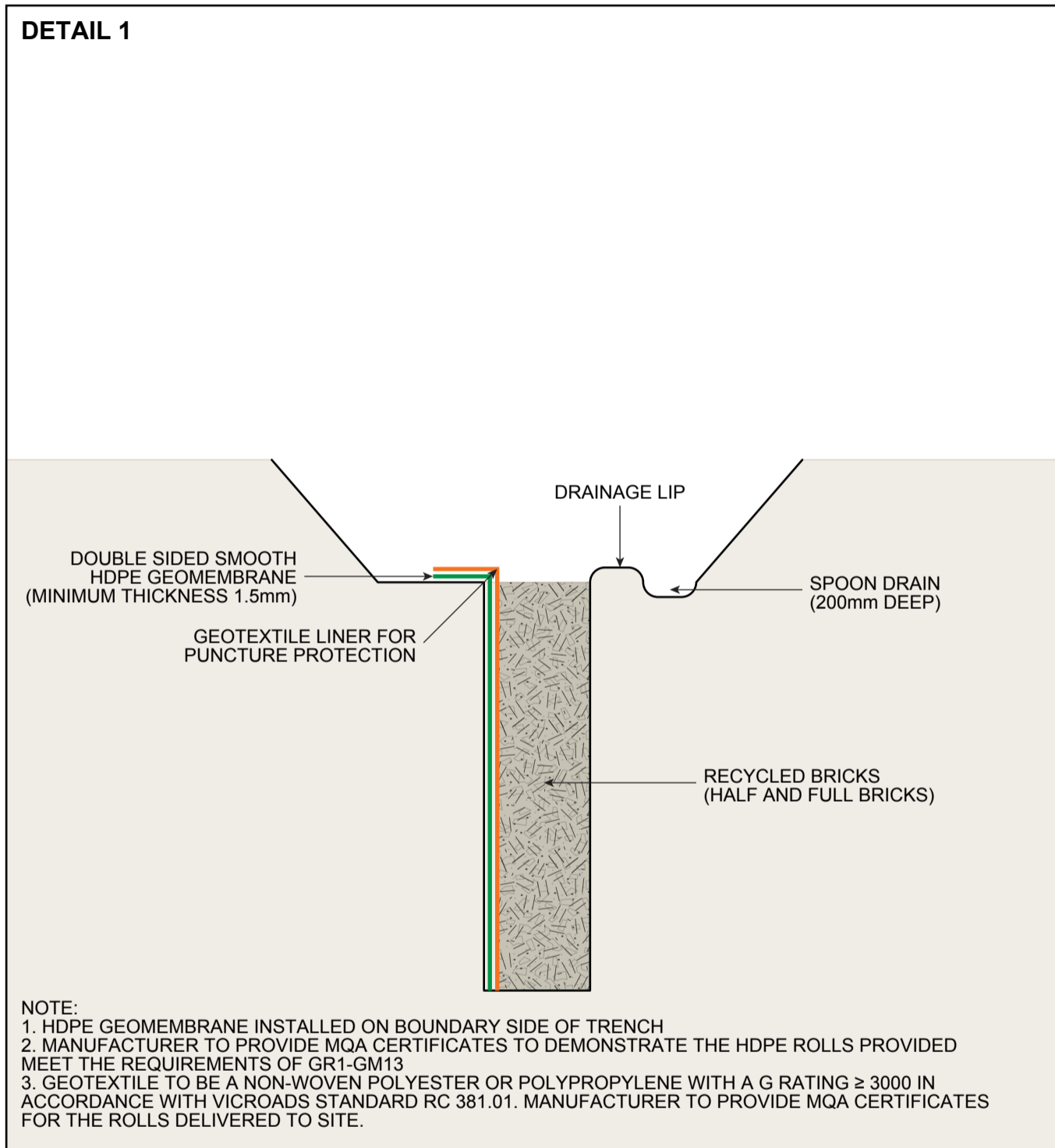




Coffey Geotechnics Pty Ltd		ABN 93 056 929 483	
Drawn	MF	Talbot Quarry Regen ZONE 1 PRELOAD STOCKPILE Cross section 2/426 Huntingdale Road	FIGURE A11
Approved	IVP		
Date	2 Oct 2018		
Scale	1:300 (A3)		
			Job no: GEOTABTF09257AA



Coffey Geotechnics Pty Ltd		ABN 93 056 929 483	
Drawn	MF	Talbot Quarry Regen ZONE 1 PRELOAD STOCKPILE Cross section Scout Hall	FIGURE A12
Approved	IVP		
Date	2 Oct 2018		
Scale	1:300 (A3)		
			Job no: GEOTABTF09257AA



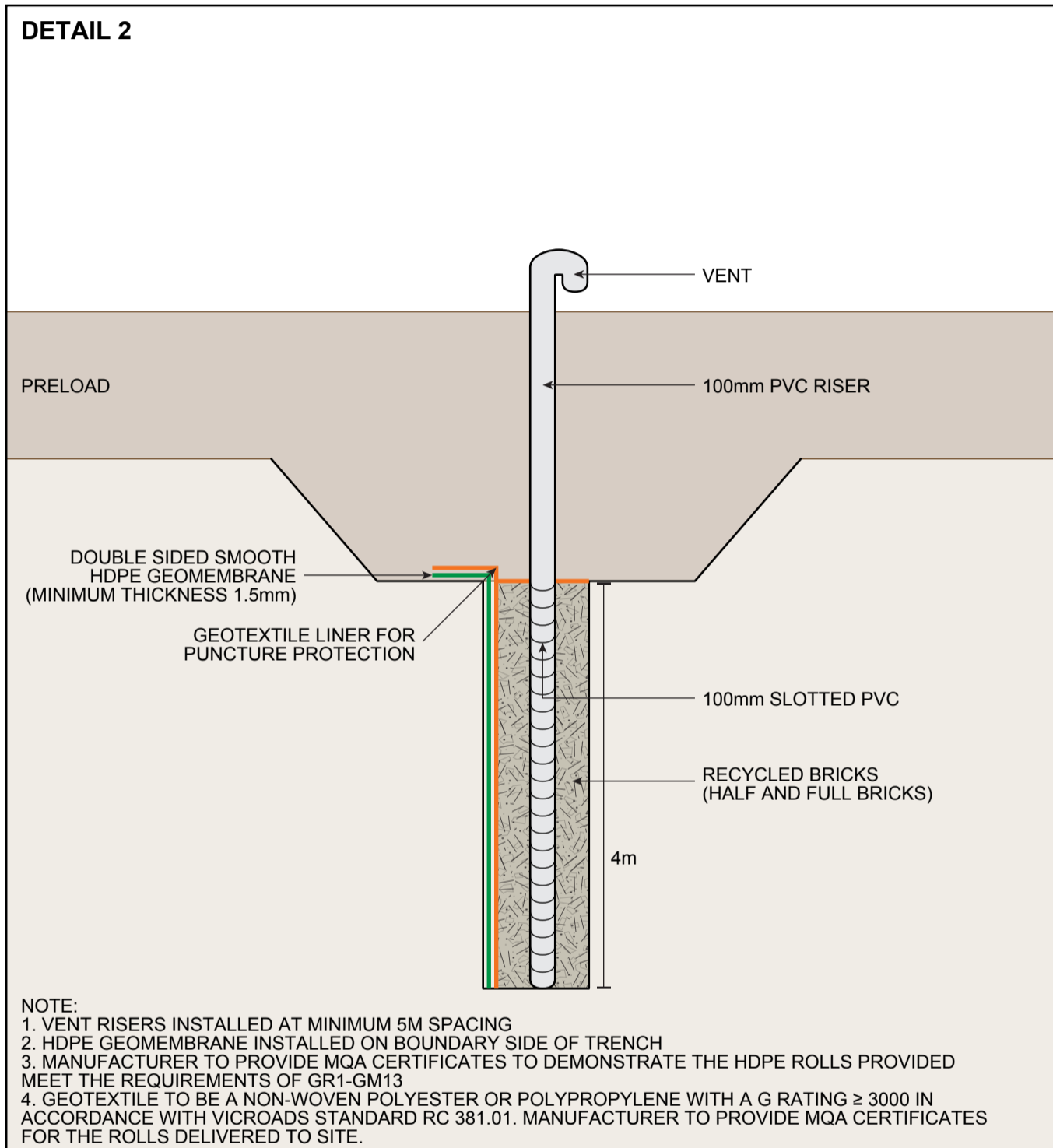
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no.	description	drawn	approved	date
A	ORIGINAL ISSUE	JO	RG	13/12/18

drawn	JO
approved	RG
date	13/12/18
scale	NOT TO SCALE
original size	A3



client:	TALBOT ROAD FINANCE PTY LTD		
project:	ENVIRONMENTAL SITE ASSESSMENT 1221-1249 CENTRE ROAD & 22 TALBOT AVENUE OAKLEIGH SOUTH, VICTORIA		
title:	ZONE 1 - TEMPORARY BOUNDARY VENTING DESIGN - DETAIL 1		
project no:	ENAUABTF00751AB-R11	figure no:	FIGURE 2
		rev:	A



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no.	description	drawn	approved	date
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drawn	JO
approved	RG
date	13/12/18
scale	NOT TO SCALE
original size	A3



client:	TALBOT ROAD FINANCE PTY LTD		
project:	ENVIRONMENTAL SITE ASSESSMENT 1221-1249 CENTRE ROAD & 22 TALBOT AVENUE OAKLEIGH SOUTH, VICTORIA		
title:	ZONE 1 - TEMPORARY BOUNDARY VENTING DESIGN - DETAIL 2		
project no:	ENAUABTF00751AB-R11	figure no:	FIGURE 3
		rev:	A



no.	description	drawn	approved	date
A	ORIGINAL ISSUE	GH	RG	13.12.18

LEGEND	
	Gas bore
	Continuous monitoring location
	Gas bore to be sampled during stockpiling works
	Fence
	Site boundary
	Zone boundary
	Cadastre

SCALE 1:2,250 (A3) METRES

Projection: GDA 1994 MGA Zone 55

drawn	GH
approved	RG
date	13.12.2018
scale	1:2,250
original size	A3

A TETRA TECH COMPANY

client:	TALBOT ROAD FINANCE PTY LTD
project:	ENVIRONMENTAL SITE ASSESSMENT 1221-1249 CENTRE ROAD & 22 TALBOT AVENUE OAKLEIGH SOUTH, VICTORIA
title:	LANDFILL GAS MONITORING LOCATIONS
project no:	ENAUABTF00751AB-R11
figure no:	FIGURE 4
rev:	A

MDO Template Reference: ENAUABTF00751AB_R11_GBS001_v0.3

IMAGERY SOURCE: Nearmap, March 2018

**Attachment B - Important Information About Your
Coffey Environmental Report**

Important information about your **Coffey** Environmental Report

Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice.

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept apprised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and

Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

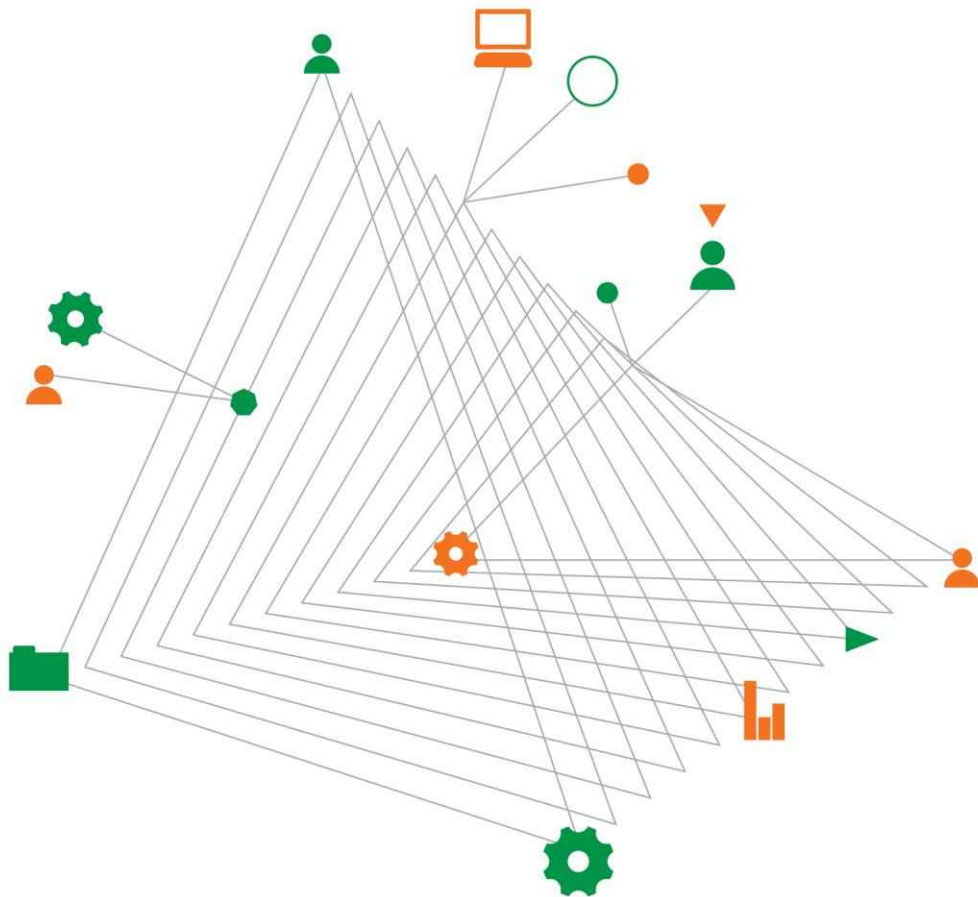
**Appendix C – Zone 4 Backfilling Works LFG
Monitoring Plan**

Huntingdale Estate Nominees Pty Ltd

**Huntingdale Estate: 1221 – 1249 Centre Road
& 22 Talbot Avenue, Oakleigh South, Victoria**

Stage 1 – Landfill Gas Monitoring Plan

1 May 2020



Experience
comes to life
when it is
powered by
expertise

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Huntingdale Estate: 1221 – 1249 Centre Road & 22 Talbot Avenue, Oakleigh South, Victoria

Prepared for
Huntingdale Estate Nominees Pty Ltd

Prepared by
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1 May 2020

ENAUABTF00751AB

Quality information

Revision History

Revision	Description	Date	Originator	Reviewer	Approver
1	Draft Issue	8 October 2019	Roger Gibbs	Phil Sinclair	Phil Sinclair
2	Draft Issue	18 November 2019	Roger Gibbs	Phil Sinclair	Phil Sinclair
3	Draft Issue	4 December 2019	Roger Gibbs	Phil Sinclair	Phil Sinclair
4	Final	1 May 2020	Roger Gibbs	Phil Sinclair	Phil Sinclair

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Draft	1	PDF	Huntingdale Estate Nominees Pty Ltd	8 October 2019
Draft	1	PDF	Huntingdale Estate Nominees Pty Ltd	18 November 2019
Draft	1	PDF	Ken Mival (Environmental Auditor) – EHS Support Pty Ltd	18 November 2019
Draft	1	PDF	Huntingdale Estate Nominees Pty Ltd	4 December 2019
Draft	1	PDF	Ken Mival (Environmental Auditor) – EHS Support Pty Ltd	4 December 2019
Final	1	PDF	Huntingdale Estate Nominees Pty Ltd	4 May 2020
Final	1	PDF	Ken Mival (Environmental Auditor) – EHS Support Pty Ltd	4 May 2020

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2.2.1. Continuous LFG Monitoring	3
2.3. LFG Monitoring Methodology.....	3
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Attachment A – Figures

Attachment B - LFG Monitoring Network Details

Attachment C – Important Information About Your Coffey Environmental Report

List of Figures

Figure 1: Landfill Gas Monitoring Network

Figure 2: Underground Service Inspection Pit Monitoring Locations

Figure 3: Indicative Targeted LFG Monitoring Locations During Filling

Abbreviations:

CEMP	Construction Environmental Management Plan
EPA	Environment Protection Authority (Victoria)
ESA	Environmental Site Assessment
GSV	Gas Screening Value
LFG	Landfill gas

1. Introduction

Huntingdale Estate Nominees Pty Ltd (Huntingdale Estate) engaged Coffey Environments Australia Pty Ltd (Coffey) to undertake an Environmental Site Assessment (ESA) at 1221 to 1249 Centre Road and 22 Talbot Avenue, Oakleigh South, Victoria (the site).

The site comprises a former sand quarry and municipal landfill and is proposed to be redeveloped for a range of residential land uses including designated areas of open space and commercial land use.

The site is subject to an Environmental Audit Overlay under the City of Monash Planning Scheme which requires that:

“Before a sensitive use (residential use, child care centre, pre-school centre or primary school) commences or before the construction or carrying out of buildings and works in association with a sensitive use commences, either:

- *A certificate of environmental audit must be issued for the land in accordance with Part IXD of the Environment Protection Act 1970, or*
- *An environmental auditor appointed under the Environment Protection Act 1970 must make a statement in accordance with Part IXD of that Act that the environmental conditions of the land are suitable for the sensitive use”.*

The works undertaken as part of the ESA form part of the staged assessment in support of the environmental audit for the site. Ken Mival of EHS Support Pty Ltd (EHS) was engaged by Huntingdale Estate to act as the EPA accredited environmental auditor for the project.

At the time of preparing this landfill gas (LFG) monitoring plan, Mr Mival has indicated that he will not be available to be engaged to undertake post audit verification works at the site, including review of LFG monitoring data for works under this plan. Another environmental auditor will need to be engaged to undertake these works.

Coffey prepared a Construction Environmental Management Plan (CEMP) in May 2020 (Coffey ref: 754-ENAUABTF00751AB_R17_CEMP) in support of the environmental audit. This landfill gas (LFG) monitoring plan has been prepared as a component of the CEMP (Coffey 2020) and should be read in conjunction with this document.

1.1. Reason for LFG Monitoring Plan

Specific LFG monitoring requirements are applicable for preload activities in Zone 1, as outlined in Appendix B of the Coffey CEMP (2020) and **are not included in this monitoring plan.**

This LFG monitoring plan has been prepared to address on-going monitoring requirements for landfill gas during Stage 1 (Site Rehabilitation) construction works, as outlined in the Coffey CEMP (2020). Specifically, this plan outlines landfill gas monitoring requirements at the site prior to the commencement of Stage 3 Construction (Civil) Works and during filling of the Zone 4 quarry void.

1.2. Objectives

The objectives of the landfill gas monitoring for Stage 1 construction works include:

- Provide on-going landfill gas monitoring across the site prior to commencement of pre-loading in Zone 1, during filling of the Zone 4 quarry void and/or prior to commencement of detailed design (Stage 2) and Stage 3 (Civil) construction works.

- The monitoring will provide ongoing information with regards to the characteristics of landfill gas under current site conditions and any changes that may occur (i.e. as a result of temporal or climatic conditions).
- Provide on-going monitoring during the filling of the Zone 4 quarry void to assess any changes in landfill gas conditions in Zone 4 or the surrounding area associated with the filling works.
 - This monitoring would primarily assist with informing detailed design (Stage 2) in terms of identifying any changes in landfill gas risks at the site and the gas protection measures required.

2. Stage 1 - Landfill Gas Monitoring

An outline of the proposed landfill gas monitoring regime for Stage 1 construction works is provided in the following section.

2.1. Monitoring Frequency Prior to Zone 4 Backfilling Works

The results of assessment works to date indicate that, under current site conditions, vertical gas migration and subsequent discharge at the surface was likely to be the dominant LFG migration pathway, as opposed to lateral migration. Diffusion and barometric pumping are likely to be the key drivers of gas migration. As such, the risks posed by LFG migration to neighbouring sensitive land uses were considered to be low and acceptable.

Whilst the risks posed by LFG migration from the site to neighboring sensitive land uses under current site conditions are low, ongoing monitoring is required to confirm that this continues to be the case and to assess any changes in ground gas conditions over time.

Prior to backfilling works, LFG monitoring for the existing monitoring network and surface emission surveys are to be undertaken on a biannual basis (~every 6 months).

Where LFG monitoring occurs associated with the Zone 1 preloading works (refer Appendix B of the Coffey CEMP) this does not replace the above monitoring requirements for the rest of the site as is confined to Zone 1 and surrounds only. However, the works could be undertaken concurrently.

2.2. Monitoring Frequency During Zone 4 Backfilling Works

There is potential that the filling of the Zone 4 quarry void may alter ground gas conditions at the site. Landfill gas monitoring during filling is proposed to provide information regarding landfill gas conditions to inform the final development design (LFG protection measures), for Zone 4 but will also be required to ensure that any changes in landfill gas conditions do not lead to an unacceptable gas risk to on-site or off-site receptors during construction works.

Landfill gas monitoring during filling is to be undertaken at the following frequency:

- Biannual LFG monitoring (~every 6 months) of the existing monitoring network and completion of surface emission surveys (assumed 4 events will be required over an estimated 24 months of backfilling works).
- Additional 4 targeted LFG sampling events and surface emission surveys to be completed over the duration of the backfilling works.

- Whilst the LFG sampling events during filling are nominally to be undertaken on a biannual basis, it is important to consider site activities in selecting the sampling period. For example, it would be beneficial to schedule the sampling event immediately following any significant filling works in a given area (i.e. following placement of large volumes of fill at the northern and eastern boundaries of the pit). For this reason, additional targeted events are required. The Environmental Consultant should liaise with the Site Manager with regards to the scheduling for the filling works to establish optimal conditions for sampling.

2.2.1. Continuous LFG Monitoring

To provide more detailed information on the potential effects of the filling process on LFG conditions, continuous LFG monitoring is to be undertaken utilising AmbiSense GasFlux units (or equivalent unit measuring both gas concentrations and flow) in at least 2 locations for a period of at least one month during initial backfilling works and for at least one month near the completion of backfilling works.

The monitoring periods selected should be coordinated with filling works so far as practicable (i.e. during or immediately following a significant period of filling), with locations for the continuous monitoring selected by the Environmental Consultant and approved by the appointed Environmental Auditor.

2.3. LFG Monitoring Methodology

Landfill gas monitoring is to be conducted in general accordance with EPA Victoria Publication 1684 *Landfill gas fugitive emissions monitoring guideline* (February 2018) and include the following:

- Extractive monitoring to be undertaken utilising a calibrated GFM430 (or equivalent) landfill gas meter. Monitoring should include:
 - Recording of atmospheric pressure at the time of monitoring;
 - Measurement of gas flow and differential borehole differential pressure;
 - Measurement of Methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide concentrations should be recorded for a minimum of three minutes or until steady state is reached.
 - Where elevated methane concentrations (> 1% v/v) are recorded, gas concentrations should be measured for a 10-minute interval prior to sampling.
- Completion of surface emission surveys (where practicable including the quarry void surface) to be conducted utilising a laser diode methane detector (Inspectra Laser).
 - For targeted LFG monitoring events during filling the surface emission surveys should be confined to the pit surface (where practicable, once filling is sufficiently progressed) and adjacent areas in Zones 1, 2 and 5.
- Conduct of LFG monitoring in underground service inspection pits in the vicinity of the site to be undertaken in conjunction with surface emission surveys using a low-level laser diode methane detector (e.g. Inspectra Laser) and landfill gas meter.
 - For targeted LFG monitoring events, assessment of underground service pits confined to the west and south of Zone 4 only.
- Completion of a full round of LFG monitoring (baseline) to be undertaken immediately prior to filling works occurring.

- Wherever practicable all monitoring should be undertaken during periods of falling atmospheric pressure.
- Wherever practicable surface emission surveys should not be conducted following periods of heavy rainfall.

2.4. LFG Monitoring Network

The current LFG monitoring network at the site is outlined in Figure 1 (**Attachment A**).

Underground service inspection pit monitoring locations are outlined in Figure 2 (**Attachment A**).

Details of the LFG monitoring network are provided in Table 1 (**Attachment B**).

Biannual monitoring events should include the entire monitoring network as outlined in Figure 1. As specified in Section 2.1, where biannual LFG monitoring coincides with monitoring for Zone 1 pre-loading activities monitoring can be undertaken concurrently (i.e. there is no requirement to re-sample Zone 1 bores if that has occurred as part of the Zone 1 pre-loading activities).

Targeted LFG monitoring should consider the filling activities being undertaken at the time (i.e. target areas of filling) and be confined to LFG bores in the vicinity of Zone 4, the southern extent of Zone 1 and in proximity to Talbot Park (i.e. locations where ground gas conditions may be affected by Zone 4 backfilling works).

Whilst the location of targeted monitoring should be at the discretion of the Environmental Consultant, an outline of indicative targeted monitoring locations is provided in Figure 3 (**Attachment A**).

2.4.1. Additional LFG Bore

An additional LFG monitoring bore (GB85) is proposed to be installed to compliment the existing network for ongoing LFG monitoring at the site. The purpose of the LFG bore is to provide additional coverage at the eastern site boundary in Zone 5.

The location of the proposed bore is outlined in Figure 1 (**Attachment A**).

The proposed LFG bore should be constructed in accordance with the requirements of:

- EPA Victoria ((2015) Landfill BPEM (gas bores); and
- NEPM (1999 as amended 2013).

Following installation, the bore location and measuring point level (top of casing and standpipe height if relevant) should be surveyed by a licensed surveyor.

The bore should be installed prior to the first LFG monitoring event to be undertaken under this plan.

Information from the drilling, installation and survey works should be incorporated into the annual reporting (year 1) to be reviewed by the appointed Environmental Auditor (refer **Section 3**).

2.5. Trigger Levels for LFG Monitoring

In accordance with best practice, contingency measures have been developed to outline actions to be implemented if LFG trigger levels are exceeded prior to or during backfilling works and/or conditions at and around the site change.

A summary of the trigger levels to be adopted and associated contingency actions is outlined in Table 1 below.

Table 1 – LFG Monitoring Triggers and Contingency Measures

Activity / Trigger	Contingency
Elevated methane concentrations recorded at boundary bores (during either extractive or continuous monitoring) result in a GSV with a Characteristic Situation of >1 (>1% v/v methane)	Filling works should cease pending further review of the data and assessment of the requirement for, or adequacy of gas protection measures.
Increasing trend of LFG concentrations recorded at boundary bores (during either extractive or continuous monitoring)	
Methane concentrations within subsurface services exceeding 10,000 ppm	

Where the trigger conditions are exceeded this occurrence should be notified to the appointed Environmental Auditor by the Principal or delegated responsible party.

3. LFG Monitoring Review and Verification

As outlined in Section 1.1 and in more detail within the Coffey CEMP (2020) this monitoring plan has been prepared to address LFG monitoring requirements for Stage 1 construction works only. Specific LFG monitoring requirements for future construction phases will be established during Stage 2 (Design phase).

During Stage 1, it is proposed to annually review the adequacy of the LFG monitoring plan. The review should consider the adequacy of the monitoring network, frequency of monitoring, trigger conditions, and assess any changes in site condition and relevant legislation for example.

The annual review will include an assessment of LFG bores that warrant either addition to or removal from the network to inform risks to current and/or future receptors.

The review and associated reporting should be initially be verified by the appointed Environmental Auditor on an annual basis. The subsequent frequency required for auditor verification should be discussed in consultation with the appointed environmental auditor as part of the annual review process.

Where trigger conditions are exceeded (Section 2.5), interim reporting is to be provided to the appointed Environmental Auditor.

4. Closing

This LFG monitoring plan has been prepared in support of Stage 1 Construction Works to be completed at the site, as outlined in the CEMP (Coffey 2020).

It is recognised that further LFG monitoring will be required for future development phases and/or where the scope of Stage 1 works varies from that outlined within the CEMP. In this case, a revised LFG monitoring plan should be prepared and verified by the appointed Environmental Auditor.

This monitoring plan should be read in conjunction with the CEMP (Coffey 2020) and the attached Important Information About your Coffey Environmental Report.

Attachment A - Figures



no.	description	drawn	approved	date
A	ORIGINAL ISSUE	GH	RG	08.10.19

LEGEND	
	Gas bore
	Zone boundary
	Fence
	Cadastral
	Site boundary

IMAGERY SOURCE: Nearmap (11-09-2019)

	SCALE 1:2,250 (A3) METRES
	Projection: GDA 1994 MGA Zone 55
	drawn: GH
	approved: RG
date: 08.10.2019	
scale: 1:2,250	
original size: A3	

client:	TALBOT ROAD FINANCE PTY LTD
project:	ENVIRONMENTAL SITE ASSESSMENT 1221-1249 CENTRE ROAD & 22 TALBOT AVENUE OAKLEIGH SOUTH, VICTORIA
title:	LANDFILL GAS MONITORING NETWORK
project no:	ENAUABTF00751AB-R17
figure no:	FIGURE 1
rev:	A

M:\D_Templates\Reference\ENAUABTF00751AB_R17\Fig1.dwg, G:\S01\10_1



no.	description	drawn	approved	date
A	ORIGINAL ISSUE	GH	RG	08.10.19

LEGEND

- ✕ Stormwater pit
- ✕ Electrical pit
- Fence
- Cadastre
- ✕ Telstra pit
- ✕ Fire hydrant
- Site boundary
- - - Zone boundary
- ✕ Optus pit
- ✕ Unknown

0 22.5 45 67.5 90

SCALE 1:2,250 (A3) METRES

Projection: GDA 1994 MGA Zone 55

client: TALBOT ROAD FINANCE PTY LTD

project: ENVIRONMENTAL SITE ASSESSMENT
1221-1249 CENTRE ROAD & 22 TALBOT AVENUE
OAKLEIGH SOUTH, VICTORIA

title: UNDERGROUND SERVICE INSPECTION PIT
MONITORING LOCATIONS

project no: ENAUABTF00751AB-R17 **figure no:** FIGURE 2 **rev:** A

MWD Template Reference: ENAUABTF00751AB_R17A94C_GIS002_V0.1



no.	description	drawn	approved	date
A	ORIGINAL ISSUE	GH	RG	08.10.19

drawn	GH
approved	RG
date	08.10.2019
scale	1:2,250
original size	A3

LEGEND

- Gas bore
- Targeted LFG location
- Stormwater pit
- Telstra pit
- Optus pit
- Electrical pit
- Fire hydrant
- Fence
- Site boundary
- Zone boundary
- Cadastre

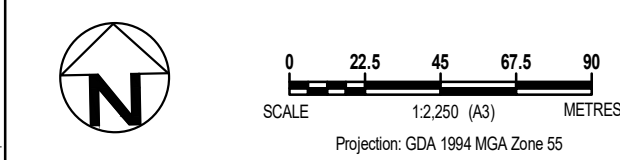
IMAGERY SOURCE: Nearmap (11-09-2019)

client: TALBOT ROAD FINANCE PTY LTD

project: ENVIRONMENTAL SITE ASSESSMENT
1221-1249 CENTRE ROAD & 22 TALBOT AVENUE
OAKLEIGH SOUTH, VICTORIA

title: TARGETED LFG MONITORING LOCATIONS DURING FILLING

project no: ENAUABTF00751AB-R17 figure no: FIGURE 3 rev: A



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Attachment B - LFG Monitoring Network Details

Table 1:
Historical Gas Bore Monitoring

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Characteristic Situation ¹	Comments				
GB01	1.0-8.0	8	HLA - 19/12/2003	31-Aug-16	8:33	1005	0.00	0.0	0.0	0.0	0.1	21.1	1	1	NA	NA	1	Good condition				
				21-Mar-17	11:48	1004	0.00	0.0	0.0	0.0	0.0	8.0	12.6	0	0	NA	NA	1	Good condition			
				13-Dec-17	9:05	1000	0.00	0.0	0.0	0.0	0.0	7.4	12.3	0	0	NA	NA	1	Good condition			
				15-Mar-18	14:29	1007	0.30	5.2	0.0	0.0	0.5	20.0	3	2	0.00	0.03	1	Good condition				
				24-Apr-18	11:45	1009	0.03	0.1	0.1	0.0	0.4	21.5	0	0	0.00	0.00	1	Good condition				
				11-Jun-19	10:39	1013	-0.01	-0.1	0.0	0.0	0.0	20.8	0	0	NA	NA	1	Good condition				
GB01A				17-May-18	15:30	1014	0.31	5.4	0.0	0.0	8.8	-	0	0.00	0.48	2						
GB02	1.0-8.0	8	HLA - 19/12/2003	25-Mar-09	-	1010	0.06	-	0.2	0.0	0.2	20.7	-	-	NA	NA	1					
				02-Apr-09	-	1014	-0.6	-	0.0	0.0	0.4	20.0	-	-	-	NA	1					
				09-Apr-09	-	1017	1.27	-	0.0	0.0	0.2	20.3	-	-	-	NA	1					
				14-Apr-09	-	999	-0.28	-	0.0	0.0	2.8	16.7	-	-	-	NA	1					
				22-Apr-09	-	1018	0	-	0.0	0.0	0.5	20.9	-	-	-	NA	1					
				29-Apr-09	-	1018	0	-	0.0	0.0	0.1	20.8	-	-	-	NA	1					
				09-Jun-09	-	1001	0	-	0.0	0.0	1.7	19.0	-	-	-	NA	1					
				18-Jun-09	-	1023	0	-	0.0	0.0	2.1	19.5	-	-	-	NA	1					
				22-Jun-09	-	1008	0	-	0.0	0.0	2.0	19.5	-	-	-	NA	1					
				01-Jul-09	-	990	0	-	0.0	0.0	1.0	19.3	-	-	-	NA	1					
				03-Jul-13	11:10	1022	0.00	0.0	0.0	0.0	1.9	19.3	0	0	NA	NA	1					
				16-Apr-14	9:51	1011	0.01	0.0	0.1	0.0	1.7	18.8	0	0	NA	NA	1					
				31-Aug-16	8:56	1003	0.00	0.0	0.0	0.0	0.0	21.1	0	0	NA	NA	1	Good condition. Tape around top casing				
				21-Mar-17	11:42	1004	0.00	0.0	0.0	0.0	0.9	19.8	0	0	NA	NA	1					
				13-Dec-17	9:17	998	0.00	0.0	0.0	0.0	8.8	11.2	0	0	NA	NA	1					
				15-Mar-18	14:16	1007	0.30	5.2	0.0	0.0	1.0	19.8	1	2	0.00	0.05	1	Good condition				
				24-Apr-18	11:51	1009	0.02	0.2	0.1	0.1	1.0	21.0	0	0	0.00	0.00	1	Good condition				
				17-May-18	9:52	1018	-	0.0	0.0	0.0	1.4	19.2	-1	0	NA	NA	1					
				11-Jun-19	10:51	1013	0.02	0.2	0.0	0.0	1.4	19.3	0	0	0.00	0.00	1					
				GB03	1.0-7.0	7	HLA - 19/12/2003	25-Mar-09	-	1010	0.1	-	0.2	0.0	5.1	14.4	-	-	NA	NA	1	
				03-Apr-09				-	1008	-0.08	-	0.0	0.0	5.9	13.9	-	-	-	NA	1		
08-Apr-09	-	1017	0.01	-				0.0	0.0	5.5	14.0	-	-	-	NA	1						
14-Apr-09	-	1006	1.74	-				0.0	0.0	6.7	12.4	-	-	-	NA	1						
21-Apr-09	-	1018	0.01	-				0.0	0.0	5.5	13.8	-	-	-	NA	1						
29-Apr-09	-	1018	0.01	-				0.0	0.0	4.4	16.0	-	-	-	NA	1						
09-Jun-09	-	1001	0	-				0.0	0.0	4.2	14.9	-	-	-	NA	1						
18-Jun-09	-	1023	0	-				0.0	0.0	2.7	18.0	-	-	-	NA	1						
22-Jun-09	-	1008	0	-				0.0	0.0	2.0	19.5	-	-	-	NA	1						
01-Jul-09	-	989	0.04	-				0.0	0.0	1.9	18.0	-	-	-	NA	1						
03-Jul-13	11:15	1022	0.00	0.0				1.0	1.0	2.9	17.7	0	0	NA	NA	1						
31-Aug-16	9:01	1004	0.00	0.0				0.0	0.0	8.4	9.1	1	0	NA	NA	1	No cover. Bore has been repaired at ground level					
21-Mar-17	10:31	1004	0.00	0.0				0.0	0.0	5.3	15.5	0	0	NA	NA	1	Good condition					
GB03A	1.0 - 7.0	7	Coffey 15/5/2018	17-May-18				10:10	1014	0.30	5.2	0.0	0.0	5.8	-	0	0.00	0.30	2			
				17-May-18				10:55	1014	0.00	0.0	0.0	0.0	5.7	13.2	0	0	NA	NA	1		
				25-Mar-09				-	1010	-0.04	-	0.2	0.0	3.9	14.9	-	-	NA	NA	1		
GB04	0.5-2.5	4	HLA - 06/01/2004	03-Apr-09				-	1007	0.01	-	0.0	0.0	8.7	11.6	-	-	NA	NA	1		
				09-Apr-09				-	1015	-0.01	-	0.0	0.0	1.4	18.5	-	-	-	NA	1		
				14-Apr-09				-	1006	-0.01	-	0.0	0.0	0.5	19.9	-	-	-	NA	1		
				22-Apr-09	-	1018	0	-	0.0	0.0	2.9	17.9	-	-	-	NA	1					
				28-Apr-09	-	1014	0	-	0.0	0.0	0.8	17.9	-	-	-	NA	1					
				09-Jun-09	-	1000	0	-	0.0	0.0	0.7	20.6	-	-	-	NA	1					
				21-Oct-10	-	1008	0	-	0.0	0.0	0.9	18.9	-	-	-	NA	1					
				03-Jul-13	11:20	1021	0.00	0.0	0.0	0.0	0.0	20.8	0	0	NA	NA	1					
				16-Apr-14	10:17	1013	0.01	0.0	0.1	0.1	1.1	19.2	0	0	NA	NA	1					
				31-Aug-16	9:07	1004	0.00	0.0	0.0	0.0	0.5	20.7	1	1	NA	NA	1	Gas bore is full of ants				
				21-Mar-17	10:26	1004	0.00	0.0	0.0	0.0	0.7	19.9	0	0	NA	NA	1	Difficult to ensure the well cap is sealed				
				30-Aug-16	15:32	1004	0.11	1.8	78.0	77.8	11.2	0.0	5	1	1.40	0.20	3	Grass growing in stickup				
				21-Mar-17	9:59	1004	0.00	0.0	32.9	32.8	15.3	0.0	0	0	NA	NA	2	Good condition				
				13-Dec-17	7:30	1002	0.00	0.0	73.1	70.6	12.8	0.0	0	1	NA	NA	2	After sampling flow=0.1				
14-Mar-18	17:17	1007	0.28	4.8	27.7	24.6	14.7	0.0	4	1	1.33	0.71	3	Good condition								
16-May-18	16:30	1018	-	0.0	13.9	11.5	15.0	0.0	-1	0	NA	NA	2									
11-Jun-19	11:50	1012	0.05	1.2	30.8	30.7	14.5	0.0	3	2	0.37	0.17	2	Moisture at base of bore								
GB05	0.5-2.5	4	HLA - 06/01/2004	24-Mar-09	-	1006	-0.03	-	0.2	0.0	2.2	18.6	-	-	NA	NA	1					
				03-Apr-09	-	1008	0.49	-	0.0	0.0	3.1	18.1	-	-	-	NA	1					
				09-Apr-09	-	1013	0.42	-	0.0	0.0	2.5	17.1	-	-	-	NA	1					
				14-Apr-09	-	1003	-0.19	-	0.0	0.0	1.9	18.0	-	-	-	NA	1					
				21-Apr-09	-	1018	0.01	-	0.1	0.0	1.5	18.3	-	-	-	NA	1					
				28-Apr-09	-	1014	0.01	-	0.0	0.0	2.2	18.7	-	-	-	NA	1					
				09-Jun-09	-	999	0	-	0.0	0.0	1.3	19.1	-	-	-	NA	1					
				18-Jun-09	-	1023	0	-	0.0	0.0	3.4	18.0	-	-	-	NA	1					
				22-Jun-09	-	1009	0	-	0.0	0.0	2.0	18.5	-	-	-	NA	1					
				01-Jul-09	-	989	0	-	0.0	0.0	0.7	20.4	-	-	-	NA	1					
				07-Jul-09	-	1020	0	-	0.0	0.0	2.1	17.9	-	-	-	NA	1					
				05-Aug-09	-	1016	0	-	0.0	0.0	2.2	18.8	-	-	-	NA	1					
				11-Aug-09	-	1002	0	-	0.0	0.0	3.1	17.6	-	-	-	NA	1					
				18-Aug-09	-	1017	0	-	0.0	0.0	1.8	19.3	-	-	-	NA	1					
				01-Sep-09	-	1011	0	-	0.0	0.0	1.6	19.1	-	-	-	NA	1					
				07-Sep-09	-	994	0.01	-	0.0	0.0	2.2	19.1	-	-	-	NA	1					
				15-Sep-09	-	1017	0.03	-	0.0	0.0	2.3	18.8	-	-	-	NA	1					
				23-Sep-09	-	989	0	-	0.0	0.0	2.1	17.7	-	-	-	NA	1					
				06-Oct-09	-	1004	0	-	0.0	0.0	3.1	17.0	-	-	-	NA	1					
				15-Oct-09	-	996	0	-	0.0	0.0	2.7	18.6	-	-	-	NA	1					
				20-Oct-09	-	1009	0.04	-	0.0	0.0	3.2	16.8	-	-	-	NA	1					
				17-Nov-09	-	1003	0	-	0.0	0.0	2.5	18.5	-	-	-	NA	1					
				01-Dec-09	-	1014	0	-	0.0	0.0	4.8	15.3	-	-	-	NA	1					
				14-Dec-09	-	1012	0	-	0.0	0.0	3.5	16.6	-	-	-	NA	1					
				04-Jan-10	-	1008	0	-	0.0	0.0	3.2	17.8	-	-	-	NA	1					
				18-Jan-10	-	1002	0.1	-	0.0	0.0	2.2	18.3	-	-	-	NA	1					
				21-Oct-10	-	1008	0	-	0.0	0.0	2.6	15.5	-	-	-	NA	1					
				03-Jul-13	11:35	1021	-0.01	0.1	1.0	0.0	1.3	20.2	0	0	0.00	0.00	1					
				16-Apr-14	10:35	1013	0.01	0.0	0.5	0.5	2.8	19.5	1	0	NA	NA	1	Unknown odour in ambient air around bore. Ants.				
				30-Aug-16	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA	Insect nest. Not sampled		
				21-Mar-17	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA	Not sampled	
				13-Dec-17	7:20	996	0.00	0.0	0.0	0.0	0.0	3.4	16.8	0	1	NA	NA	NA	1			
				14-Mar-18	17:07	1004	0.30	5.4	0.0	0.0	2.1	19.2	1	1	0.00	0.11	2	Good condition				
				24-Apr-18	7:55	1007	-0.60	-0.6	0.1	0.0	2.8	18.5	0	0	NA	NA	1	Good condition				
16-May-18	16:07	1020	0.30	5.2	0.0	0.0	2.3	23.1	0	0	0.00	0.12	2									
11-Jun-19	12:05	1011	0.04	1.8	6.0	0.0	3.1	17.3	0	0	0.11	0.06	2									

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments			
GB07	1.0-5.0	6	HLA - 06/01/2004	04-Nov-09	-		0	-	0.0	0.0	2.6	18.3	-	-	-	NA	1				
				24-Mar-09	-	1006	-0.22	-	0.2	0.0	0.0	2.2	18.8	-	-	-	-	NA	1		
				03-Apr-09	-	1008	0.11	-	0.0	0.0	0.0	0.0	2.3	19.1	-	-	-	-	NA	1	
				09-Apr-09	-	1013	0.32	-	0.0	0.0	0.0	0.0	2.2	17.8	-	-	-	-	NA	1	
				14-Apr-09	-	1003	0.01	-	0.0	0.0	0.0	0.0	2.4	17.8	-	-	-	-	NA	1	
				21-Apr-09	-	1018	-0.02	-	0.1	0.0	0.0	0.0	0.7	19.5	-	-	-	-	NA	1	
				28-Apr-09	-	1014	-0.02	-	0.0	0.0	0.0	0.0	0.7	20.2	-	-	-	-	NA	1	
				09-Jun-09	-	999	0.02	-	0.0	0.0	0.0	0.0	0.8	20.3	-	-	-	-	NA	1	
				18-Jun-09	-	1023	0	-	0.0	0.0	0.0	0.0	2.3	19.3	-	-	-	-	NA	1	
				22-Jun-09	-	1009	0	-	0.0	0.0	0.0	0.0	1.1	20.0	-	-	-	-	NA	1	
				01-Jul-09	-	989	0	-	0.0	0.0	0.0	0.0	1.3	19.4	-	-	-	-	NA	1	
				07-Jul-09	-	1020	0	-	0.0	0.0	0.0	0.0	1.6	19.0	-	-	-	-	NA	1	
				05-Aug-09	-	1016	-0.17	-	0.0	0.0	0.0	0.0	2.2	19.1	-	-	-	-	NA	1	
				11-Aug-09	-	1002	0.24	-	0.0	0.0	0.0	0.0	2.3	18.7	-	-	-	-	NA	1	
				18-Aug-09	-	1017	0	-	0.0	0.0	0.0	0.0	2.0	19.1	-	-	-	-	NA	1	
				01-Sep-09	-	1011	-0.02	-	0.0	0.0	0.0	0.0	1.9	18.7	-	-	-	-	NA	1	
				07-Sep-09	-	994	0	-	0.0	0.0	0.0	0.0	1.8	19.9	-	-	-	-	NA	1	
				15-Sep-09	-	1017	0	-	0.0	0.0	0.0	0.0	2.3	18.8	-	-	-	-	NA	1	
				23-Sep-09	-	987	0	-	0.0	0.0	0.0	0.0	2.1	18.5	-	-	-	-	NA	1	
				06-Oct-09	-	1004	0	-	0.0	0.0	0.0	0.0	2.7	18.0	-	-	-	-	NA	1	
				15-Oct-09	-	996	-0.01	-	0.0	0.0	0.0	0.0	2.9	17.8	-	-	-	-	NA	1	
				20-Oct-09	-	1009	0	-	0.0	0.0	0.0	0.0	3.0	18.4	-	-	-	-	NA	1	
				04-Nov-09	-	1012	0	-	0.0	0.0	0.0	0.0	2.9	18.2	-	-	-	-	NA	1	
				17-Nov-09	-	1003	0	-	0.0	0.0	0.0	0.0	2.5	18.6	-	-	-	-	NA	1	
				01-Dec-09	-	1014	0.03	-	0.0	0.0	0.0	0.0	4.0	16.9	-	-	-	-	NA	1	
				14-Dec-09	-	1012	0	-	0.0	0.0	0.0	0.0	3.9	16.2	-	-	-	-	NA	1	
				04-Jan-10	-	1008	-0.01	-	0.0	0.0	0.0	0.0	3.7	16.5	-	-	-	-	NA	1	
18-Jan-10	-	1002	0	-	0.0	0.0	0.0	0.0	2.7	18.5	-	-	-	-	NA	1					
21-Oct-10	-	1008	0	-	0.0	0.0	0.0	0.0	2.8	16.4	-	-	-	-	NA	1					
16-Apr-14	11:01	1013	0.01	0.1	0.4	0.0	0.4	3.4	17.3	0	0	0.00	0.00	NA	NA	1	Good condition				
30-Aug-16	14:56	1005	0.00	0.0	0.0	0.0	0.0	3.0	17.7	0	0	0	0	NA	NA	1	Good condition				
21-Mar-17	9:38	1004	0.00	0.0	0.0	0.0	0.0	3.2	17.6	0	0	0	0	NA	NA	1	Good condition				
13-Dec-17	7:44	1001	0.00	0.0	0.0	0.0	0.0	4.2	16.5	0	0	0	0	NA	NA	1					
14-Mar-18	16:49	1004	0.30	5.4	0.0	0.0	0.0	2.6	18.6	1	1	0.00	0.14	NA	NA	2	Good condition				
24-Apr-18	8:16	1007	-0.24	-0.1	0.1	0.0	0.0	2.6	18.4	0	0	0	0	NA	NA	1	Good condition				
16-May-18	16:33	1020	0.30	5.2	0.0	0.0	0.0	2.4	22.9	0	0	0.00	0.12	NA	NA	2					
11-Jun-19	12:27	1010	0.00	0.0	0.0	0.0	0.0	2.4	18.2	0	0	0	0	NA	NA	1					
GB08	1.0-6.0	6.5	HLA - 07/01/2003	24-Mar-09	-	1006	0.48	-	0.4	0.0	2.1	18.6	-	-	-	NA	1				
				03-Apr-09	-	1008	0.08	-	0.0	0.0	2.3	19.0	-	-	-	-	NA	1			
				09-Apr-09	-	1013	-0.09	-	0.0	0.0	2.0	17.2	-	-	-	-	NA	1			
				14-Apr-09	-	1003	-0.28	-	0.0	0.0	2.0	17.4	-	-	-	-	NA	1			
				21-Apr-09	-	1012	-0.03	-	0.0	0.0	0.9	19.3	-	-	-	-	NA	1			
				28-Apr-09	-	1012	-0.03	-	0.0	0.0	0.1	20.8	-	-	-	-	NA	1			
				09-Jun-09	-	1000	0	-	0.0	0.0	0.1	20.8	-	-	-	-	NA	1			
				18-Jun-09	-	1023	0	-	0.0	0.0	1.8	19.5	-	-	-	-	NA	1			
				22-Jun-09	-	1009	0	-	0.0	0.0	1.1	20.1	-	-	-	-	NA	1			
				01-Jul-09	-	990	0	-	0.0	0.0	1.8	18.4	-	-	-	-	NA	1			
				07-Jul-09	-	1020	0	-	0.0	0.0	1.9	18.5	-	-	-	-	NA	1			
				05-Aug-09	-	1013	0	-	0.0	0.0	2.8	18.5	-	-	-	-	NA	1			
				11-Aug-09	-	1002	0.2	-	0.0	0.0	2.9	18.0	-	-	-	-	NA	1			
				18-Aug-09	-	1017	0.02	-	0.0	0.0	2.7	18.2	-	-	-	-	NA	1			
				01-Sep-09	-	1011	-0.02	-	0.0	0.0	2.2	18.7	-	-	-	-	NA	1			
				07-Sep-09	-	994	0.01	-	0.0	0.0	2.5	18.8	-	-	-	-	NA	1			
				15-Sep-09	-	1013	0	-	0.0	0.0	2.4	18.8	-	-	-	-	NA	1			
				23-Sep-09	-	987	0	-	0.0	0.0	2.6	17.1	-	-	-	-	NA	1			
				06-Oct-09	-	1004	0	-	0.0	0.0	2.6	18.0	-	-	-	-	NA	1			
				15-Oct-09	-	996	0	-	0.0	0.0	2.4	18.8	-	-	-	-	NA	1			
				20-Oct-09	-	1009	0	-	0.0	0.0	2.5	19.0	-	-	-	-	NA	1			
04-Nov-09	-	1012	0	-	0.0	0.0	3.0	17.9	-	-	-	-	NA	1							
17-Nov-09	-	1003	0	-	0.0	0.0	2.5	18.3	-	-	-	-	NA	1							
01-Dec-09	-	1014	0.08	-	0.0	0.0	3.8	16.6	-	-	-	-	NA	1							
14-Dec-09	-	1012	0	-	0.0	0.0	2.8	16.6	-	-	-	-	NA	1							
04-Jan-10	-	1008	0	-	0.0	0.0	2.7	16.8	-	-	-	-	NA	1							
18-Jan-10	-	1002	0.07	-	0.0	0.0	2.0	19.3	-	-	-	-	NA	1							
21-Oct-10	-	1008	0	-	0.0	0.0	3.4	15.8	-	-	-	-	NA	1							
16-Apr-14	12:43	1014	0.01	0.0	0.0	0.0	3.5	16.4	0	0	0	0	NA	NA	1	Good condition.					
30-Aug-16	14:39	1006	0.00	0.0	0.0	0.0	4.8	15.1	0	0	0	0	NA	NA	1	Good condition.					
21-Mar-17	9:08	1004	0.00	0.0	0.0	0.0	3.0	17.7	0	0	0	0	NA	NA	1	Good condition.					
13-Dec-17	8:00	1001	0.00	0.0	0.0	0.0	4.3	15.8	0	0	0	0	NA	NA	1						
14-Mar-18	16:36	1004	0.31	5.4	0.0	0.0	2.2	18.9	1	1	0.00	0.12	NA	NA	2	Good condition					
24-Apr-18	8:27	1007	-0.24	-0.2	0.1	0.0	2.7	18.2	0	0	0	0	NA	NA	1	Good condition					
16-May-18	16:57	1019	0.30	5.2	0.0	0.0	2.4	23.0	0	0	0	0.00	0.12	NA	NA	2					
11-Jun-19	-	1009	0.02	0.6	0.0	0.0	3.7	16.3	0	0	0	0	0.00	0.02	NA	NA	1				
GB09	1.0-6.0	6	HLA - 07/01/2004	24-Mar-09	-	1006	0.11	-	0.1	0.0	1.8	18.7	-	-	-	NA	1				
				03-Apr-09	-	1006	-0.03	-	0.0	0.0	0.6	20.3	-	-	-	-	NA	1			
				09-Apr-09	-	1013	0.01	-	0.0	0.0	1.9	17.7	-	-	-	-	NA	1			
				14-Apr-09	-	1003	-0.14	-	0.0	0.0	1.9	18.1	-	-	-	-	NA	1			
				21-Apr-09	-	1012	0	-	0.0	0.0	1.1	19.9	-	-	-	-	NA	1			
				28-Apr-09	-	1012	0	-	0.0	0.0	0.8	19.9	-	-	-	-	NA	1			
				09-Jun-09	-	1000	0	-	0.0	0.0	0.7	20.6	-	-	-	-	NA	1			
				18-Jun-09	-	1023	0	-	0.0	0.0	1.9	19.6	-	-	-	-	NA	1			
				22-Jun-09	-	1009	0	-	0.0	0.0	1.3	20.0	-	-	-	-	NA	1			
				01-Jul-09	-	990	0	-	0.0	0.0	1.3	19.4	-	-	-	-	NA	1			
				07-Jul-09	-	1020	0	-	0.0	0.0	1.7	18.8	-	-	-	-	NA	1			
				05-Aug-09	-	1013	0	-	0.0	0.0	2.3	19.2	-	-	-	-	NA	1			
				11-Aug-09	-	1001	0	-	0.0	0.0	2.4	18.6	-	-	-	-	NA	1			
				18-Aug-09	-	1017	0.02	-	0.0	0.0	2.0	18.7	-	-	-	-	NA	1			
				01-Sep-09	-	1011	0	-	0.0	0.0	1.8	19.0	-	-	-	-	NA	1			
				07-Sep-09	-	994	0	-	0.0	0.0	1.9	19.7	-	-	-	-	NA	1			
				15-Sep-09	-	1013	0	-	0.0	0.0	2.2	18.8	-	-	-	-	NA	1			
				23-Sep-09	-	987	0	-	0.0	0.0	2.3	17.9	-	-	-	-	NA	1			
				06-Oct-09	-	1004	0	-	0.0	0.0	3.0	17.4	-	-	-	-	NA	1			
				15-Oct-09	-	996	0.01	-	0.0	0.0	2.8	17.7	-	-	-	-	NA	1			
				20-Oct-09	-	1008	0	-	0.0	0.0	3.8	17.0	-	-	-	-	NA	1			
				04-Nov-09	-	1012	0	-	0.0	0.0	7.1	12.9	-	-	-	-	NA	1			
				17-Nov-09	-	1003	0	-	0.0	0.0	7.1	13.9	-	-	-	-	NA	1			
				01-Dec-09	-	1011	0	-	0.0	0.0	7.6	12.7	-	-	-	-	NA	1			
				14-Dec-09	-	1012	0	-	0.1	0.0	6.8	13.0	-	-	-	-	NA	1			
				04-Jan-10	-	1008	0	-	0.0	0.0	8.4	11.7	-	-	-	-	NA	1			
				18-Jan-10	-	1002	-0.02	-	0.0	0.0	3.1	17.6	-	-							

Table 1:
Historical Gas Bore Monitoring

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments				
GB10	1.0-5.0	6	HLA - 07/01/2004	24-Mar-09	-	1007	0.1	-	0.1	0.0	3.2	17.9	-	-	-	#VALUE!	#VALUE!					
				02-Apr-09	-	1007	-0.35	-	0.0	0.0	0.0	5.1	13.0	-	-	-	-	#VALUE!	#VALUE!			
				09-Apr-09	-	1013	-0.24	-	0.0	0.0	0.0	2.5	17.1	-	-	-	-	-	#VALUE!	#VALUE!		
				14-Apr-09	-	999	0.02	-	0.0	0.0	0.0	0.0	3.3	17.1	-	-	-	-	#VALUE!	#VALUE!		
				21-Apr-09	-	1012	0	-	0.0	0.0	0.0	0.0	2.4	18.6	-	-	-	-	#VALUE!	#VALUE!		
				28-Apr-09	-	1012	0	-	0.0	0.0	0.0	0.0	2.1	18.9	-	-	-	-	#VALUE!	#VALUE!		
				09-Jun-09	-	999	0	-	0.0	0.0	0.0	0.0	1.8	18.7	-	-	-	-	#VALUE!	#VALUE!		
				18-Jun-09	-	1023	0	-	0.0	0.0	0.0	0.0	3.5	18.1	-	-	-	-	#VALUE!	#VALUE!		
				22-Jun-09	-	1009	0	-	0.0	0.0	0.0	0.0	1.7	18.7	-	-	-	-	#VALUE!	#VALUE!		
				01-Jul-09	-	990	0	-	0.0	0.0	0.0	0.0	2.6	18.0	-	-	-	-	#VALUE!	#VALUE!		
				07-Jul-09	-	1020	0	-	0.0	0.0	0.0	0.0	2.8	17.5	-	-	-	-	#VALUE!	#VALUE!		
				05-Aug-09	-	1013	-0.07	-	0.0	0.0	0.0	0.0	4.8	15.5	-	-	-	-	#VALUE!	#VALUE!		
				11-Aug-09	-	1001	0	-	0.0	0.0	0.0	0.0	4.9	15.1	-	-	-	-	#VALUE!	#VALUE!		
				18-Aug-09	-	1017	0	-	0.0	0.0	0.0	0.0	5.1	14.9	-	-	-	-	#VALUE!	#VALUE!		
				01-Sep-09	-	1012	0	-	0.0	0.0	0.0	0.0	5.6	14.3	-	-	-	-	#VALUE!	#VALUE!		
				07-Sep-09	-	994	0.02	-	0.0	0.0	0.0	0.0	5.9	14.6	-	-	-	-	#VALUE!	#VALUE!		
				15-Sep-09	-	1013	0	-	0.0	0.0	0.0	0.0	6.0	13.8	-	-	-	-	#VALUE!	#VALUE!		
				23-Sep-09	-	987	-	-	0.0	0.0	0.0	0.0	5.8	12.7	-	-	-	-	#VALUE!	#VALUE!		
				06-Oct-09	-	1004	0	-	0.0	0.0	0.0	0.0	7.6	12.0	-	-	-	-	#VALUE!	#VALUE!		
				15-Oct-09	-	996	0	-	0.0	0.0	0.0	0.0	6.9	12.2	-	-	-	-	#VALUE!	#VALUE!		
				20-Oct-09	-	1008	-0.02	-	0.0	0.0	0.0	0.0	7.0	13.5	-	-	-	-	#VALUE!	#VALUE!		
				04-Nov-09	-	1012	0	-	0.0	0.0	0.0	0.0	7.3	14.0	-	-	-	-	#VALUE!	#VALUE!		
				17-Nov-09	-	1003	0	-	0.0	0.0	0.0	0.0	5.2	16.7	-	-	-	-	#VALUE!	#VALUE!		
				01-Dec-09	-	1011	0	-	0.0	0.0	0.0	0.0	7.5	13.1	-	-	-	-	#VALUE!	#VALUE!		
				14-Dec-09	-	1012	0	-	0.0	0.0	0.0	0.0	7.8	12.1	-	-	-	-	#VALUE!	#VALUE!		
				04-Jan-10	-	1008	0	-	0.0	0.0	0.0	0.0	6.4	14.2	-	-	-	-	#VALUE!	#VALUE!		
				18-Jan-10	-	1001	0	-	0.0	0.0	0.0	0.0	3.0	18.3	-	-	-	-	#VALUE!	#VALUE!		
				21-Oct-10	-	1017	0	-	0.0	0.0	0.0	0.0	7.8	9.9	-	-	-	-	#VALUE!	#VALUE!		
				03-Jul-13	13:25	1019	0.00	0.0	0.0	0.0	0.0	0.0	4.5	14.9	0	0	0	0	NA	NA	1	
				16-Apr-14	13:01	1014	0.01	0.1	0.0	0.0	0.0	2.8	17.3	0	0	0	0	0.00	0.00	1	Good condition.	
				30-Aug-16	14:17	1006	0.00	0.0	0.0	0.0	0.0	0.0	6.8	12.1	0	0	0	NA	NA	1	Good condition.	
				20-Mar-17	15:10	1003	0.00	0.0	0.0	0.0	0.0	0.0	3.7	17.4	0	0	0	NA	NA	1	Good condition.	
				13-Dec-17	12:38	997	0.00	0.0	0.0	0.0	0.0	0.0	5.7	13.4	0	0	0	NA	NA	1		
14-Mar-18	16:16	1004	0.31	5.4	0.0	0.0	0.0	2.9	18.5	1	1	0.00	0.16	2	2	2	Good condition					
24-Apr-18	8:45	1007	-0.07	-0.1	0.1	0.1	0.1	2.5	18.8	0	0	NA	NA	1	1	1	Good condition					
17-May-18	14:52	1014	0.30	5.2	0.0	0.0	0.0	2.7	23.2	0	0	0.00	0.14	2	2	2						
11-Jun-19	14:14	1009	0.03	0.5	0.0	0.0	0.0	2.4	18.0	0	0	0.00	0.01	1	1	1	LEL = 0.0%					
22-Jun-09	-	1009	0	-	0.0	0.0	0.0	0.0	0.9	20.9	-	-	-	-	NA	NA	1					
01-Jul-09	-	992	0	-	0.0	0.0	0.0	0.0	1.2	19.6	-	-	-	-	NA	NA	1					
07-Jul-09	-	1020	-	-	0.0	0.0	0.0	0.0	4.3	15.5	-	-	-	-	NA	NA	1					
05-Aug-09	-	1013	0	-	0.0	0.0	0.0	0.0	2.9	17.6	-	-	-	-	NA	NA	1					
11-Aug-09	-	1001	0	-	0.0	0.0	0.0	0.0	3.9	16.2	-	-	-	-	NA	NA	1					
18-Aug-09	-	1017	0	-	0.0	0.0	0.0	0.0	2.5	18.3	-	-	-	-	NA	NA	1					
01-Sep-09	-	1012	0.02	-	0.0	0.0	0.0	0.0	2.5	17.2	-	-	-	-	NA	NA	1					
07-Sep-09	-	994	0	-	0.0	0.0	0.0	0.0	0.0	21.8	-	-	-	-	NA	NA	1					
15-Sep-09	-	1013	0	-	0.0	0.0	0.0	0.0	3.6	16.5	-	-	-	-	NA	NA	1					
23-Sep-09	-	988	-	-	0.0	0.0	0.0	0.0	3.7	16.1	-	-	-	-	NA	NA	1					
06-Oct-09	-	1004	0	-	0.0	0.0	0.0	0.0	5.6	14.2	-	-	-	-	NA	NA	1					
15-Oct-09	-	996	0	-	0.0	0.0	0.0	0.0	3.1	17.9	-	-	-	-	NA	NA	1					
20-Oct-09	-	1008	0	-	0.0	0.0	0.0	0.0	5.2	15.4	-	-	-	-	NA	NA	1					
04-Nov-09	-	1011	0	-	0.0	0.0	0.0	0.0	4.5	16.6	-	-	-	-	NA	NA	1					
17-Nov-09	-	1001	0	-	0.0	0.0	0.0	0.0	5.0	16.2	-	-	-	-	NA	NA	1					
01-Dec-09	-	1011	0	-	0.0	0.0	0.0	0.0	6.9	12.8	-	-	-	-	NA	NA	1					
14-Dec-09	-	1012	-0.01	-	0.0	0.0	0.0	0.0	5.5	13.7	-	-	-	-	NA	NA	1					
04-Jan-10	-	1008	0	-	0.0	0.0	0.0	0.0	7.1	11.9	-	-	-	-	NA	NA	1					
18-Jan-10	-	1001	0	-	0.0	0.0	0.0	0.0	4.4	16.7	-	-	-	-	NA	NA	1					
21-Oct-10	-	1008	0	-	0.0	0.0	0.0	0.0	6.7	11.4	-	-	-	-	NA	NA	1					
16-Apr-14	13:19	1014	0.01	0.0	0.0	0.0	0.0	6.3	13.5	0	0	NA	NA	1	1	1	Good condition.					
30-Aug-16	14:06	1006	0.00	0.0	0.0	0.0	0.0	4.5	15.3	0	0	NA	NA	1	1	1	Good condition.					
20-Mar-17	15:01	1003	0.00	0.0	0.0	0.0	0.0	6.9	14.5	1	0	NA	NA	1	1	1	Good condition.					
13-Dec-17	12:48	998	0.00	0.0	0.0	0.0	0.0	8.4	11.5	0	0	NA	NA	1	1	1						
14-Mar-18	16:01	1006	0.30	5.4	0.0	0.0	0.0	5.9	15.8	1	1	0.00	0.32	2	2	2	Good condition					
24-Apr-18	8:56	1007	-0.12	-0.2	0.1	0.1	0.1	6.0	15.9	0	0	NA	NA	1	1	1	Good condition					
16-May-18	17:29	1017	-	0.0	0.0	0.0	0.0	3.1	16.3	-1	0	NA	NA	1	1	1						
17-May-18	15:03	1015	0.30	5.3	0.0	0.0	0.0	6.4	-	0	0	0.00	0.34	2	2	2						
11-Jun-19	14:30	1009	0.00	0.0	0.0	0.0	0.0	4.5	16.2	0	0	NA	NA	1	1	1	LEL = 0.0%					
25-Mar-09	-	1009	-0.04	-	0.1	0.0	0.0	4.1	15.7	-	-	-	-	NA	NA	1						
02-Apr-09	-	1007	-0.45	-	0.0	0.0	0.0	3.9	15.0	-	-	-	-	NA	NA	1						
08-Apr-09	-	1017	0.05	-	0.0	0.0	0.0	4.0	16.3	-	-	-	-	NA	NA	1						
14-Apr-09	-	999	-0.3	-	0.0	0.0	0.0	4.1	14.6	-	-	-	-	NA	NA	1						
21-Apr-09	-	1010	0	-	0.0	0.0	0.0	4.2	15.7	-	-	-	-	NA	NA	1						
29-Apr-09	-	1018	0	-	0.0	0.0	0.0	5.1	15.5	-	-	-	-	NA	NA	1						
09-Jun-09	-	999	0	-	0.0	0.0	0.0	4.0	15.8	-	-	-	-	NA	NA	1						
09-Jun-09	-	999	0	-	0.0	0.0	0.0	4.0	15.8	-	-	-	-	NA	NA	1						
18-Jun-09	-	1023	0	-	0.0	0.0	0.0	5.0	15.2	-	-	-	-	NA	NA	1						
22-Jun-09	-	1009	0	-	0.0	0.0	0.0	3.5	14.9	-	-	-	-	NA	NA	1						
01-Jul-09	-	992	0	-	0.0	0.0	0.0	3.4	16.4	-	-	-	-	NA	NA	1						
07-Jul-09	-	1020	0	-	0.0	0.0	0.0	4.1	16.4	-	-	-	-	NA	NA	1						
05-Aug-09	-	1013	0	-	0.0	0.0	0.0	4.7	15.8	-	-	-	-	NA	NA	1						
11-Aug-09	-	1001	0	-	0.0	0.0	0.0	4.5	15.8	-	-	-	-	NA	NA	1						
18-Aug-09	-	1017	0	-	0.0	0.0	0.0	4.5	16.6	-	-	-	-	NA	NA	1						
01-Sep-09	-	1012	0	-	0.0	0.0	0.0	3.8	16.7	-	-	-	-	NA	NA	1						
07-Sep-09	-	994	0.01	-	0.0	0.0	0.0	3.5	17.6	-	-	-	-	NA	NA	1						
15-Sep-09	-	1012	0	-	0.0	0.0	0.0	3.9	17.0	-	-	-	-	NA	NA	1						
23-Sep-09	-	987	-	-	0.0	0.0	0.0	4.0	15.1	-	-	-	-	NA	NA	1						
06-Oct-09	-	1004	0.01	-	0.0	0.0	0.0	3.4	15.7	-	-	-	-	NA	NA	1						
15-Oct-09	-	996	-0.01	-	0.0	0.0	0.0	4.1	17.0	-	-	-	-	NA	NA	1						
20-Oct-09	-	1008	0	-	0.0	0.0	0.0	5.0	15.4	-	-	-	-	NA	NA	1						
04-Nov-09	-	1011	0	-	0.0	0.0	0.0	5.3	15.0	-	-	-	-	NA	NA	1						
17-Nov-09	-	1001	0	-	0.0	0.0	0.0	4.8	16.2	-	-	-	-	NA	NA	1						
01-Dec-09	-	1011	0.02	-	0.0	0.0	0.0	5.6	12.3	-	-	-	-	NA	NA	1						
14-Dec-09	-	1012	0	-	0.0	0.0																

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments			
GB13	0.7-2.7	3	HLA 23/12/2003	25-Mar-09	-	1009	0.09	-	0.1	0.0	3.0	10.5	-	-	-	NA	1				
				02-Apr-09	-	1007	-0.5	-	0.8	0.0	2.8	5.2	-	-	-	-	-	NA	1		
				08-Apr-09	-	1017	0.38	-	0.0	0.0	0.0	2.8	10.2	-	-	-	-	-	NA	1	
				14-Apr-09	-	999	0.18	-	0.0	0.0	0.0	3.0	8.9	-	-	-	-	-	NA	1	
				22-Apr-09	-	1018	0	-	0.0	0.0	0.0	2.6	10.9	-	-	-	-	-	NA	1	
				29-Apr-09	-	1018	0	-	0.0	0.0	0.0	2.8	11.0	-	-	-	-	-	NA	1	
				09-Jun-09	-	999	0	-	0.0	0.0	0.0	2.0	10.9	-	-	-	-	-	NA	1	
				09-Jun-09	-	999	0	-	0.0	0.0	0.0	2.0	10.9	-	-	-	-	-	NA	1	
				18-Jun-09	-	1023	0	-	0.0	0.0	0.0	3.2	10.9	-	-	-	-	-	NA	1	
				22-Jun-09	-	1011	0	-	0.0	0.0	0.0	1.8	11.3	-	-	-	-	-	NA	1	
				01-Jul-09	-	992	0	-	0.0	0.0	0.0	1.7	10.4	-	-	-	-	-	NA	1	
				07-Jul-09	-	1020	0	-	0.0	0.0	0.0	1.9	10.8	-	-	-	-	-	NA	1	
				05-Aug-09	-	1013	0	-	0.0	0.0	0.0	2.8	9.5	-	-	-	-	-	NA	1	
				11-Aug-09	-	1001	0	-	0.0	0.0	0.0	2.8	9.5	-	-	-	-	-	NA	1	
				18-Aug-09	-	1017	0.02	-	0.0	0.0	0.0	2.4	10.8	-	-	-	-	-	NA	1	
				01-Sep-09	-	1012	0	-	0.0	0.0	0.0	2.4	10.5	-	-	-	-	-	NA	1	
				07-Sep-09	-	993	-0.02	-	0.0	0.0	0.0	2.3	12.1	-	-	-	-	-	NA	1	
				15-Sep-09	-	1012	0	-	0.0	0.0	0.0	2.5	10.9	-	-	-	-	-	NA	1	
				23-Sep-09	-	987	0	-	0.0	0.0	0.0	2.4	8.5	-	-	-	-	-	NA	1	
				06-Oct-09	-	1004	-0.03	-	0.0	0.0	0.0	2.7	6.8	-	-	-	-	-	NA	1	
				15-Oct-09	-	996	0	-	0.0	0.0	0.0	2.6	9.2	-	-	-	-	-	NA	1	
				20-Oct-09	-	1008	0	-	0.0	0.0	0.0	2.7	8.6	-	-	-	-	-	NA	1	
				04-Nov-09	-	1011	0	-	0.0	0.0	0.0	3.0	9.4	-	-	-	-	-	NA	1	
				17-Nov-09	-	1001	0	-	0.0	0.0	0.0	2.9	10.9	-	-	-	-	-	NA	1	
				01-Dec-09	-	1011	0	-	0.0	0.0	0.0	3.6	4.3	-	-	-	-	-	NA	1	
				14-Dec-09	-	1012	0	-	0.1	0.0	0.0	3.4	5.6	-	-	-	-	-	NA	1	
				04-Jan-10	-	1008	0	-	0.0	0.0	0.0	3.9	4.9	-	-	-	-	-	NA	1	
				18-Jan-10	-	1001	0.03	-	0.0	0.0	0.0	3.3	11.0	-	-	-	-	-	NA	1	
				21-Oct-10	-	1017	0	-	0.0	0.0	0.0	2.8	6.7	-	-	-	-	-	NA	1	
				16-Apr-14	13:41	1013	0.02	0.2	0.0	0.0	0.0	10.5	6.5	0	0	0.00	0.02	-	NA	1	Good condition
				30-Aug-16	13:39	1007	0.00	0.0	0.0	0.0	0.0	4.6	5.1	0	0	0.00	0.00	-	NA	1	Good condition
				20-Mar-17	14:50	1006	0.00	0.0	0.0	0.0	0.0	4.7	13.1	0	0	0.00	0.00	-	NA	1	Good condition
				13-Dec-17	11:35	997	0.00	0.0	0.0	0.0	0.0	5.7	5.2	0	0	0.00	0.00	-	NA	1	Good condition
				14-Mar-18	15:47	1007	0.30	5.2	0.0	0.0	0.0	4.4	13.2	1	1	0.00	0.23	-	NA	2	Good condition
				24-Apr-18	9:09	1007	-0.17	0.0	0.1	0.0	0.0	4.6	12.6	0	0	0.00	0.24	-	NA	1	Good condition
17-May-18	15:18	1015	0.30	5.3	0.0	0.0	0.0	4.6	-	0	0	0.00	0.24	-	NA	2	Good condition				
11-Jun-19	14:47	1008	0.06	1.2	0.0	0.0	0.0	4.6	6.5	0	0	0.00	0.06	-	NA	1					
24-Mar-09	-	1006	-0.15	-	0.2	-	-	8.3	9.7	-	-	-	-	-	NA	1					
02-Apr-09	-	1014	-0.44	-	33.7	-	-	14.8	4.0	-	-	-	-	-	NA	1					
08-Apr-09	-	1022	0.13	-	0.0	0.0	0.0	7.9	10.9	-	-	-	-	-	NA	1					
15-Apr-09	-	1001	0	-	0.0	0.0	0.0	5.8	13.9	-	-	-	-	-	NA	1					
22-Apr-09	-	1015	0.1	-	0.0	0.0	0.0	7.7	11.5	-	-	-	-	-	NA	1					
29-Apr-09	-	1018	0.1	-	0.0	0.0	0.0	7.1	12.7	-	-	-	-	-	NA	1					
09-Jun-09	-	998	0	-	0.0	0.0	0.0	7.1	11.8	-	-	-	-	-	NA	1					
09-Jun-09	-	998	0	-	0.0	0.0	0.0	7.1	11.8	-	-	-	-	-	NA	1					
18-Jun-09	-	1023	0	-	0.0	0.0	0.0	6.3	13.2	-	-	-	-	-	NA	1					
22-Jun-09	-	1011	0.01	-	0.0	0.0	0.0	6.4	13.0	-	-	-	-	-	NA	1					
01-Jul-09	-	992	-0.01	-	0.0	0.0	0.0	5.8	14.4	-	-	-	-	-	NA	1					
07-Jul-09	-	1017	0	-	0.0	0.0	0.0	5.8	12.5	-	-	-	-	-	NA	1					
05-Aug-09	-	1012	0	-	0.0	0.0	0.0	7.5	11.2	-	-	-	-	-	NA	1					
11-Aug-09	-	1001	0	-	0.0	0.0	0.0	7.3	11.9	-	-	-	-	-	NA	1					
18-Aug-09	-	1017	0	-	0.0	0.0	0.0	6.6	13.9	-	-	-	-	-	NA	1					
01-Sep-09	-	1012	0	-	0.0	0.0	0.0	7.1	11.5	-	-	-	-	-	NA	1					
07-Sep-09	-	993	0	-	0.0	0.0	0.0	6.8	13.7	-	-	-	-	-	NA	1					
15-Sep-09	-	1012	0	-	0.0	0.0	0.0	7.2	12.2	-	-	-	-	-	NA	1					
23-Sep-09	-	987	-	-	0.0	0.0	0.0	7.2	9.5	-	-	-	-	-	NA	1					
06-Oct-09	-	1004	-0.07	-	0.4	-	-	1.8	17.1	-	-	-	-	-	NA	1					
15-Oct-09	-	996	-0.01	-	0.1	-	-	4.9	12.2	-	-	-	-	-	NA	1					
20-Oct-09	-	1008	0.02	-	4.1	-	-	14.1	0.7	-	-	-	-	-	NA	1					
04-Nov-09	-	1011	0	-	2.1	-	-	15.4	0.9	-	-	-	-	-	NA	1					
17-Nov-09	-	1001	0	-	1.6	-	-	17.1	0.5	-	-	-	-	-	NA	1					
01-Dec-09	-	1011	0	-	2.4	-	-	17.6	0.7	-	-	-	-	-	NA	1					
14-Dec-09	-	1012	0	-	4.1	-	-	18.2	0.0	-	-	-	-	-	NA	1					
04-Jan-10	-	1008	0.01	-	3.8	-	-	16.8	1.9	-	-	-	-	-	NA	1					
18-Jan-10	-	1001	-0.02	-	0.0	0.0	0.0	15.5	5.3	-	-	-	-	-	NA	1					
21-Oct-10	-	1011	0	-	7.5	-	-	14.5	2.0	-	-	-	-	-	NA	1					
16-Apr-14	13:50	1014	0.01	0.1	0.1	0.1	0.1	5.0	8.4	0	0	0.00	0.01	-	NA	1	Good condition.				
30-Aug-16	13:29	1007	0.04	0.7	13.9	13.9	13.9	1.3	1	1	0.10	0.10	2	-	NA	2	Good condition				
20-Mar-17	13:05	1006	0.00	0.0	1.4	0.8	17.9	0.1	0	1	NA	NA	2	-	NA	2	Good condition				
12-Dec-17	8:54	1010	0.00	0.0	8.8	7.9	17.0	0.0	15	0	NA	NA	2	-	NA	2	Good condition				
14-Mar-18	13:38	1006	0.00	0.0	0.0	0.0	13.2	3.1	9	0	NA	NA	1	-	NA	1	Standpipe lid is broken				
03-May-18	8:20	1004	0.29	0.2	0.3	0.0	10.1	9.2	0	0	0.00	0.02	-	NA	1	Good condition					
13-Jun-19	13:07	1004	0.00	0.1	0.4	0.0	10.2	0.3	1	0	0.00	0.01	-	NA	1	Good condition					
24-Mar-09	-	1006	-0.2	-	0.2	-	-	12.8	7.9	-	-	-	-	-	NA	1					
02-Apr-09	-	1014	1.65	-	0.0	0	0	13.4	6.8	-	-	-	-	-	NA	1					
08-Apr-09	-	1022	0.04	-	0.0	0	0	11.5	8.9	-	-	-	-	-	NA	1					
15-Apr-09	-	1003	-0.03	-	0.4	-	-	11.9	7.6	-	-	-	-	-	NA	1					
22-Apr-09	-	1015	0	-	0.0	0	0	10.6	9.9	-	-	-	-	-	NA	1					
29-Apr-09	-	1018	-0.02	-	0.0	0	0	9.3	11.1	-	-	-	-	-	NA	1					
09-Jun-09	-	998	0	-	0.4	-	-	14.9	3.1	-	-	-	-	-	NA	1					
18-Jun-09	-	1023	0	-	0.0	0	0	9.2	10.0	-	-	-	-	-	NA	1					
22-Jun-09	-	1011	0	-	0.1	-	-	12.5	4.5	-	-	-	-	-	NA	1					
01-Jul-09	-	992	0	-	5.2	-	-	15.4	2.3	-	-	-	-	-	NA	1					
07-Jul-09	-	1017	0	-	0.1	-	-	9.9	8.8	-	-	-	-	-	NA	1					
05-Aug-09	-	1012	0	-	8.7	-	-	15.5	1.2	-	-	-	-	-	NA	1					
11-Aug-09	-	1001	0	-	16.5	-	-	16.3	0.5	-	-	-	-	-	NA	1					
18-Aug-09	-	1017	-0.01	-	4.8	-	-	13.7	4.4	-	-	-	-	-	NA	1					
01-Sep-09	-	1012	0	-	6.7	-	-	16.3	0.1	-	-	-	-	-	NA	1					
07-Sep-09	-	993	0	-	22.8	-	-	16.6	1.3	-	-	-	-	-	NA	1					
15-Sep-09	-	1012	0	-	12.1	-	-	16.4	0.0	-	-	-	-	-	NA	1					
23-Sep-09	-	988	-	-	30.3	-	-	16.6	0.0	-	-	-	-	-	NA	1					
06-Oct-09	-	1004	-0.01	-	23.3	-	-	16.5	0.5	-	-	-	-	-	NA	1					
15-Oct-09	-	996	-0.02	-	29.7	-	-	12.9	0.2	-	-	-	-	-	NA	1					
20-Oct-09	-	1008	0.02	-	25.8	-	-	16.9	0.3	-	-	-	-	-	NA	1					
04-Nov-09	-	1011	0.01	-	22.5	-	-	16.9	0.0	-	-	-	-	-	NA	1					
17-Nov-09	-	1001	0.01	-	22.3	-	-	17.0	0.0	-	-	-									

**Table 1:
Historical Gas Bore Monitoring**

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Characteristic Situation ¹	Comments				
GB16	1.0-6.5	7	HLA - 22/12/2003	24-Mar-09	-	1006	-0.17	-	0.2	0.0	1.1	20.4	-	-	-	NA	1					
				02-Apr-09	-	1014	-	-	0.0	0.0	0.0	2.5	17.8	-	-	-	NA	1				
				08-Apr-09	-	1022	0.05	-	0.0	0.0	0.0	0.9	20.0	-	-	-	NA	1				
				15-Apr-09	-	1003	-0.04	-	0.0	0.0	0.4	20.5	-	-	-	-	NA	1				
				22-Apr-09	-	1015	0	-	0.0	0.0	0.6	20.6	-	-	-	-	NA	1				
				29-Apr-09	-	1018	0	-	0.0	0.0	0.9	20.0	-	-	-	-	NA	1				
				09-Jun-09	-	999	0	-	0.0	0.0	0.2	20.2	-	-	-	-	NA	1				
				18-Jun-09	-	1023	0	-	0.0	0.0	1.2	20.2	-	-	-	-	NA	1				
				22-Jun-09	-	1011	-0.02	-	0.0	0.0	0.7	20.7	-	-	-	-	NA	1				
				01-Jul-09	-	992	0	-	0.0	0.0	0.6	20.2	-	-	-	-	NA	1				
				07-Jul-09	-	1017	0	-	0.0	0.0	0.7	20.2	-	-	-	-	NA	1				
				05-Aug-09	-	1012	0	-	0.0	0.0	1.0	20.3	-	-	-	-	NA	1				
				11-Aug-09	-	1001	0	-	0.0	0.0	1.1	20.2	-	-	-	-	NA	1				
				18-Aug-09	-	1017	0	-	0.0	0.0	1.0	20.0	-	-	-	-	NA	1				
				01-Sep-09	-	1012	-0.04	-	0.0	0.0	0.9	20.2	-	-	-	-	NA	1				
				07-Sep-09	-	993	-0.01	-	0.0	0.0	0.9	21.3	-	-	-	-	NA	1				
				15-Sep-09	-	1012	0.03	-	0.0	0.0	0.9	20.1	-	-	-	-	NA	1				
				23-Sep-09	-	988	-	-	0.0	0.0	1.0	19.9	-	-	-	-	NA	1				
				06-Oct-09	-	1004	0	-	0.0	0.0	0.8	20.0	-	-	-	-	NA	1				
				15-Oct-09	-	996	0.03	-	0.0	0.0	1.8	18.6	-	-	-	-	NA	1				
				20-Oct-09	-	1008	0	-	0.0	0.0	1.2	20.3	-	-	-	-	NA	1				
				04-Nov-09	-	1011	0	-	0.0	0.0	1.2	19.5	-	-	-	-	NA	1				
				17-Nov-09	-	1001	0	-	0.0	0.0	1.0	19.9	-	-	-	-	NA	1				
				01-Dec-09	-	1009	0	-	0.0	0.0	1.9	18.9	-	-	-	-	NA	1				
				14-Dec-09	-	1012	0	-	0.0	0.0	1.5	19.0	-	-	-	-	NA	1				
				04-Jan-10	-	1008	0	-	0.0	0.0	1.1	19.6	-	-	-	-	NA	1				
				18-Jan-10	-	1001	0.02	-	0.0	0.0	1.2	19.7	-	-	-	-	NA	1				
				21-Oct-10	-	1011	0	-	0.0	0.0	2.0	18.2	-	-	-	-	NA	1				
				16-Apr-14	15:11	1012	0.01	0.2	0.5	0.5	2.1	17.9	0	0	0.00	0.00	1		Good condition. Water filtered by moisture trap			
				30-Aug-16	10:11	1009	0.00	0.0	0.0	0.0	2.7	18.6	0	0	NA	NA	1		PVC bore is loose in the standpipe cover			
				20-Mar-17	12:35	1005	0.00	0.0	0.0	0.0	1.1	19.8	0	0	NA	NA	1		Good condition			
				13-Dec-17	13:00	995	0.00	0.0	0.0	0.0	2.1	19.1	0	0	NA	NA	1					
				14-Mar-18	12:42	1009	0.30	5.3	0.0	0.0	0.9	20.2	1	1	0.00	0.05	1		Good condition			
				03-May-18	7:30	1004	-0.19	0.3	0.0	0.0	1.6	19.8	0	0	0.00	0.00	1		Good condition			
				17-May-18	15:49	1010	-	0.0	0.0	0.0	1.5	19.3	-1	0	NA	NA	1					
				13-Jun-19	11:38	1003	0.02	0.4	0.0	0.0	1.7	19.3	0	0	0.00	0.01	1					
				GB17	1.0-5.5	6.5	HLA - 22/12/2003	24-Mar-09	-	1006	-0.16	-	0.2	0.0	2.6	18.8	-	-	-	NA	1	
02-Apr-09	-	1014	-0.43					-	0.0	0.0	2.9	17.8	-	-	-	NA	1					
08-Apr-09	-	1022	0.05					-	0.0	0.0	2.6	18.4	-	-	-	NA	1					
15-Apr-09	-	1003	0.01					-	0.0	0.0	2.8	18.1	-	-	-	NA	1					
22-Apr-09	-	1015	0					-	0.0	0.0	2.5	18.7	-	-	-	NA	1					
29-Apr-09	-	1016	0					-	0.0	0.0	2.6	18.5	-	-	-	NA	1					
09-Jun-09	-	999	0					-	0.0	0.0	1.7	19.1	-	-	-	NA	1					
18-Jun-09	-	1023	0					-	0.0	0.0	3.0	18.8	-	-	-	NA	1					
22-Jun-09	-	1011	0					-	0.0	0.0	1.9	19.2	-	-	-	NA	1					
01-Jul-09	-	992	0					-	0.0	0.0	1.4	19.2	-	-	-	NA	1					
07-Jul-09	-	1017	0					-	0.0	0.0	1.4	18.7	-	-	-	NA	1					
05-Aug-09	-	1012	0.04					-	0.0	0.0	3.1	17.3	-	-	-	NA	1					
11-Aug-09	-	1000	0					-	0.0	0.0	3.9	16.1	-	-	-	NA	1					
18-Aug-09	-	1017	0					-	0.0	0.0	2.0	17.9	-	-	-	NA	1					
01-Sep-09	-	1012	0					-	0.0	0.0	3.5	15.9	-	-	-	NA	1					
07-Sep-09	-	993	0					-	0.0	0.0	4.1	16.7	-	-	-	NA	1					
15-Sep-09	-	1011	0.04					-	0.0	0.0	6.2	12.4	-	-	-	NA	1					
23-Sep-09	-	989	-					-	0.0	0.0	3.8	15.8	-	-	-	NA	1					
06-Oct-09	-	1004	-0.01					-	0.0	0.0	7.3	10.9	-	-	-	NA	1					
15-Oct-09	-	996	0					-	0.0	0.0	5.7	15.9	-	-	-	NA	1					
20-Oct-09	-	1008	0.02					-	0.0	0.0	10.3	8.0	-	-	-	NA	1					
04-Nov-09	-	1010	0					-	0.0	0.0	7.7	12.2	-	-	-	NA	1					
17-Nov-09	-	1000	0					-	0.0	0.0	7.2	14.1	-	-	-	NA	1					
01-Dec-09	-	1009	0					-	0.0	0.0	6.9	13.3	-	-	-	NA	1					
14-Dec-09	-	1012	0.01					-	0.0	0.0	9.7	11.0	-	-	-	NA	1					
04-Jan-10	-	1009	0					-	0.0	0.0	6.9	14.0	-	-	-	NA	1					
18-Jan-10	-	1001	0					-	0.0	0.0	4.2	17.9	-	-	-	NA	1					
21-Oct-10	-	1011	0					-	0.0	0.0	9.9	6.5	-	-	-	NA	1					
03-Jul-13	15:20	1018	0.00					0.0	0.0	0.0	14.6	1.8	0	0	NA	NA	1					
16-Apr-14	15:50	1012	0.04					0.2	0.0	0.0	11.2	7.4	0	0	0.00	0.02	1		Good condition.			
30-Aug-16	9:52	1010	0.00					0.0	5.5	5.3	13.4	5.2	0	0	NA	NA	2		Good condition.			
20-Mar-17																						Not sampled; well destroyed
13-Dec-17	13:08	996	0.00					0.0	0.0	0.0	13.6	3.9	0	0	NA	NA	1				Good condition	
14-Mar-18	12:20	1010	0.30					5.4	0.0	0.0	8.5	11.6	2	3	0.00	0.46	2				Well cap broken	
24-Apr-18	15:23	1009	0.03					0.2	0.1	0.0	5.9	15.4	0	0	0.00	0.01	1				Good condition	
17-May-18	15:24	1011	-					0.0	0.0	0.0	7.0	11.4	-1	0	NA	NA	1					
13-Jun-19	10:50	1005	0.00					0.0	0.0	0.0	8.3	9.9	0	1	NA	NA	1				No Lid (guard)	
GB18	1.0-5.0	6	HLA - 22/12/2003	25-Mar-09	-	1010	-0.12	-	0.2	-	2.7	18.0	-	-	-	NA	1					
				02-Apr-09	-	1014	-0.22	-	0.0	0.0	2.4	17.9	-	-	-	NA	1					
				08-Apr-09	-	1022	1.16	-	0.0	0.0	2.1	18.3	-	-	-	NA	1					
				15-Apr-09	-	1003	0.05	-	0.0	0.0	1.8	18.8	-	-	-	NA	1					
				22-Apr-09	-	1013	0	-	0.0	0.0	1.4	19.3	-	-	-	NA	1					
				29-Apr-09	-	1016	0	-	0.0	0.0	2.7	17.9	-	-	-	NA	1					
				09-Jun-09	-	999	0	-	0.0	0.0	1.8	18.7	-	-	-	NA	1					
				18-Jun-09	-	1023	0	-	0.0	0.0	1.1	19.7	-	-	-	NA	1					
				22-Jun-09	-	1011	0	-	0.0	0.0	1.4	18.1	-	-	-	NA	1					
				01-Jul-09	-	992	0	-	0.0	0.0	2.6	17.0	-	-	-	NA	1					
				07-Jul-09	-	1012	0	-	0.0	0.0	5.3	11.7	-	-	-	NA	1					
				07-Sep-09	-	993	-0.01	-	0.0	0.0	4.3	14.7	-	-	-	NA	1					
				15-Sep-09	-	1010	0	-	0.0	0.0	5.9	11.7	-	-	-	NA	1					
				23-Sep-09	-	989	-	-	0.0	0.0	6.2	10.5	-	-	-	NA	1					
				06-Oct-09	-	1004	0.0	-	0.0	0.0	7.0	9.4	-	-	-	NA	1					
				15-Oct-09	-	998	0.01	-	0.0	0.0	5.7	12.9	-	-	-	NA	1					
				20-Oct-09	-	1008	0	-	0.0	0.0	7.7	6.5	-	-	-	NA	1					
				04-Nov-09	-	1010	0.02	-	0.0	0.0	9.1	6.1	-	-	-	NA	1					
				17-Nov-09	-	1000	-0.03	-	0.0	0.0	9.2	9.6	-	-	-	NA	1					
				01-Dec-09	-	1009	0	-	0.0	0.0	9.6	16.4	-	-	-	NA	1					
				14-Dec-09	-	1012	0	-	0.0	0.0	10.0	6.3	-	-	-	NA	1					
				04-Jan-10	-	1009	-0.01	-	0.0	0.0	11.1	5.7	-	-	-	NA	1					
				18-Jan-10	-	1001	0	-	0.0	0.0	6.2	15.7	-	-	-	NA	1					
				21-Oct-10	-	1011	0	-	0.0	0.0	11.8	0.7	-	-	-	NA	1					
				17-Apr-14	9:58	1012	0.01	0.1	0.0	0.0	17.5	0.8	0	0	0.00	0.02	1		Good condition.			
				30-Aug-16																		Not sampled
				20-Mar-17	11:46	1006	0.00	0.0	0.0	0.0	8.6	9.6	0	0	NA	NA	1				Good condition.	
				13-Dec-17	13:26	997	0.00	0.0	14.8	14.1	12.2	0.0	0	0	NA	NA	2					
				14-Mar-18	11:54	1012	0.30	5.2	0.0	0.0	10.2	6.0	1	1	0.00	0.53	2				Yellow casing broken at base	
				24-Apr-18	15:08	1009	0.20	0.1	0.1	0.0	7.1	11.9	0	0	0.00	0.01	1				Good condition	
				17-May-18	15:07	1011	-	0.1	0.0	0.0	6.7	9.4	0	0	0.00	0.01	1					
				13-Jun-19	13:55	1004	0.00	-0.1	0.0	0.0	7.0	7.3	0	1	NA							

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments			
GB19	0.5-6.5	7	HLA - 06/01/2004	25-Mar-09	-	1010	-0.16	-	0.2	-	0.8	20.4	-	-	-	NA	1				
				02-Apr-09	-	1014	-0.36	-	0.2	-	0.2	-	4.9	15.5	-	-	-	NA	1		
				08-Apr-09	-	1022	0.11	-	0.0	-	0.0	0.0	1.0	19.6	-	-	-	NA	1		
				15-Apr-09	-	1003	0.06	-	0.0	-	0.0	0.0	0.9	20.2	-	-	-	NA	1		
				22-Apr-09	-	1013	0.02	-	0.0	-	0.0	0.0	0.5	19.9	-	-	-	NA	1		
				29-Apr-09	-	1016	0.02	-	0.0	-	0.0	0.0	0.7	20.0	-	-	-	NA	1		
				09-Jun-09	-	999	0	-	0.0	-	0.0	0.0	0.7	20.3	-	-	-	NA	1		
				18-Jun-09	-	1023	0	-	0.0	-	0.0	0.0	1.6	20.1	-	-	-	NA	1		
				22-Jun-09	-	1011	0	-	0.0	-	0.0	0.0	0.8	20.3	-	-	-	NA	1		
				01-Jul-09	-	992	0	-	0.0	-	0.0	0.0	0.6	20.5	-	-	-	NA	1		
				07-Jul-09	-	1017	0	-	0.0	-	0.0	0.0	0.9	20.0	-	-	-	NA	1		
				05-Aug-09	-	1008	0.08	-	0.0	-	0.0	0.0	0.7	20.2	-	-	-	NA	1		
				11-Aug-09	-	1000	0	-	0.0	-	0.0	0.0	1.1	19.8	-	-	-	NA	1		
				18-Aug-09	-	1017	0	-	0.0	-	0.0	0.0	0.5	20.3	-	-	-	NA	1		
				01-Sep-09	-	1012	0.03	-	0.0	-	0.0	0.0	0.5	20.4	-	-	-	NA	1		
				07-Sep-09	-	993	0	-	0.0	-	0.0	0.0	0.8	21.2	-	-	-	NA	1		
				15-Sep-09	-	1010	0	-	0.0	-	0.0	0.0	0.7	20.0	-	-	-	NA	1		
				23-Sep-09	-	989	0	-	0.0	-	0.0	0.0	0.8	20.0	-	-	-	NA	1		
				06-Oct-09	-	1004	-0.01	-	0.0	-	0.0	0.0	1.5	19.1	-	-	-	NA	1		
				15-Oct-09	-	998	0	-	0.0	-	0.0	0.0	1.0	20.3	-	-	-	NA	1		
				20-Oct-09	-	1008	0	-	0.0	-	0.0	0.0	1.3	20.0	-	-	-	NA	1		
				04-Nov-09	-	1010	0.02	-	0.1	-	0.1	-	0.7	20.0	-	-	-	NA	1		
				17-Nov-09	-	1000	0	-	0.0	-	0.0	0.0	1.0	19.4	-	-	-	NA	1		
				01-Dec-09	-	1009	0.01	-	0.0	-	0.0	0.0	1.5	5.9	-	-	-	NA	1		
				14-Dec-09	-	1012	0	-	0.0	-	0.0	0.0	1.4	18.8	-	-	-	NA	1		
				04-Jan-10	-	1009	0.02	-	0.0	-	0.0	0.0	0.8	19.6	-	-	-	NA	1		
				18-Jan-10	-	1001	0	-	0.0	-	0.0	0.0	1.0	19.6	-	-	-	NA	1		
				21-Oct-10	-	1011	0	-	0.0	-	0.0	0.0	2.4	16.9	-	-	-	NA	1		
				17-Apr-14	9:58	1012	0.01	0.1	0.0	0.0	0.0	0.0	1.0	19.4	0	0	0.00	0.00	NA	1	Good condition.
				30-Aug-16	9:13	1010	0.00	0.0	0.0	0.0	0.0	0.0	3.0	18.0	1	1	NA	NA	NA	1	Good condition.
20-Mar-17	11:30	1006	0.00	0.0	0.0	0.0	0.0	0.0	0.8	20.0	0	0	NA	NA	NA	1	Good condition.				
13-Dec-17	13:40	998	0.00	0.0	0.0	0.0	0.0	0.0	2.4	17.8	0	0	NA	NA	NA	1	Good condition.				
14-Mar-18	11:37	1011	0.29	5.2	0.0	0.0	0.0	0.0	2.8	17.7	1	1	0.00	0.15	2	Good condition.					
24-Apr-18	13:56	1008	-0.05	0.0	0.0	0.0	0.0	0.0	2.7	18.6	0	0	NA	NA	NA	1	Good condition.				
17-May-18	11:42	1014	0.01	0.3	0.0	0.0	0.0	0.0	3.2	17.2	-1	0	0.00	0.01	1						
13-Jun-19	10:02	1005	0.02	0.2	0.0	0.0	0.0	0.0	3.4	17.5	0	0	0.00	0.01	1						
GB20	1.0-6.5	6.5	HLA - 06/01/2004	25-Mar-09	-	1010	-0.12	-	0.2	-	5.0	14.3	-	-	-	NA	1				
				03-Apr-09	-	1007	-0.02	-	0.0	0.0	4.3	17.3	-	-	-	NA	1				
				08-Apr-09	-	1022	0.28	-	0.0	0.0	4.4	14.1	-	-	-	NA	1				
				15-Apr-09	-	1003	0.08	-	0.0	0.0	4.7	16.0	-	-	-	NA	1				
				22-Apr-09	-	1013	0	-	0.0	0.0	3.8	17.2	-	-	-	NA	1				
				28-Apr-09	-	1016	0	-	0.0	0.0	3.7	17.2	-	-	-	NA	1				
				09-Jun-09	-	999	0	-	0.0	0.0	3.0	18.0	-	-	-	NA	1				
				18-Jun-09	-	1023	0	-	0.0	0.0	3.3	18.6	-	-	-	NA	1				
				22-Jun-09	-	1011	0	-	0.0	0.0	1.6	19.0	-	-	-	NA	1				
				01-Jul-09	-	992	0	-	0.0	0.0	2.5	18.0	-	-	-	NA	1				
				07-Jul-09	-	1017	0	-	0.0	0.0	2.1	17.8	-	-	-	NA	1				
				05-Aug-09	-	1008	0.17	-	0.0	0.0	3.3	18.0	-	-	-	NA	1				
				11-Aug-09	-	1000	0	-	0.0	0.0	3.4	18.1	-	-	-	NA	1				
				18-Aug-09	-	1017	0.02	-	0.0	0.0	2.4	19.0	-	-	-	NA	1				
				01-Sep-09	-	1012	0	-	0.0	0.0	2.8	18.5	-	-	-	NA	1				
				07-Sep-09	-	993	0	-	0.0	0.0	3.5	19.0	-	-	-	NA	1				
				15-Sep-09	-	1010	0	-	0.0	0.0	3.0	18.5	-	-	-	NA	1				
				23-Sep-09	-	989	0	-	0.0	0.0	3.3	17.4	-	-	-	NA	1				
				06-Oct-09	-	1004	0	-	0.0	0.0	3.6	14.9	-	-	-	NA	1				
				15-Oct-09	-	998	0	-	0.0	0.0	3.8	16.7	-	-	-	NA	1				
				20-Oct-09	-	1008	0.01	-	0.0	0.0	4.2	16.5	-	-	-	NA	1				
				04-Nov-09	-	1010	0	-	0.0	0.0	4.6	15.0	-	-	-	NA	1				
				17-Nov-09	-	1000	0	-	0.0	0.0	4.4	17.4	-	-	-	NA	1				
				01-Dec-09	-	1009	0.01	-	0.0	0.0	5.7	0.5	-	-	-	NA	1				
				14-Dec-09	-	1012	0	-	0.0	0.0	2.8	17.6	-	-	-	NA	1				
				04-Jan-10	-	1009	0	-	0.0	0.0	6.1	17.2	-	-	-	NA	1				
				18-Jan-10	-	1001	0	-	0.0	0.0	4.8	16.2	-	-	-	NA	1				
				21-Oct-10	-	1011	0	-	0.0	0.0	4.3	11.4	-	-	-	NA	1				
				17-Apr-14	11:13	1015	0.01	0.0	0.0	0.0	4.0	14.3	0	0	NA	NA	NA	NA	1	Good condition.	
				30-Aug-16	9:02	1011	0.00	0.0	0.0	0.0	6.3	14.0	1	0	NA	NA	NA	NA	1	Good condition.	
20-Mar-17	11:08	1007	0.00	0.0	0.9	0.9	0.2	18.6	0	0	NA	NA	NA	NA	1	Good condition.					
13-Dec-17	13:55	997	0.00	0.0	0.0	0.0	7.6	8.3	0	0	NA	NA	NA	NA	1						
14-Mar-18	11:24	1011	0.31	5.5	0.1	0.0	8.7	12.6	1	1	0.01	0.48	2	Good condition.							
24-Apr-18	13:46	1008	-0.09	0.0	0.1	0.0	6.0	15.3	0	0	NA	NA	NA	NA	1	Good condition.					
17-May-18	11:25	1014	0.01	0.3	0.0	0.0	6.5	13.5	0	0	0.00	0.02	1								
13-Jun-19	9:41	1005	0.00	0.1	0.0	0.0	5.9	10.5	0	0	0.00	0.01	1								
GB21	0.5-2.0	7.5	HLA - 06/01/2004	25-Mar-09	-	1010	-0.5	-	57.7	-	1.0	0.2	-	-	-	NA	1				
				02-Apr-09	-	1014	1.29	-	54.2	-	1.0	0.6	-	-	-	NA	1				
				08-Apr-09	-	1022	0.2	-	60.4	-	0.7	0.0	-	-	-	NA	1				
				15-Apr-09	-	1003	0.1	-	0.0	0.0	0.4	20.4	-	-	-	NA	1				
				22-Apr-09	-	1013	0.13	-	53.9	-	0.7	0.0	-	-	-	NA	1				
				29-Apr-09	-	1016	0.07	-	53.4	-	1.2	0.0	-	-	-	NA	1				
				21-Oct-10	-	1011	0	-	50.2	-	1.3	0.0	-	-	-	NA	1				
				03-Jul-13	16:00	-	-	-	58.7	-	0.5	0.4	0	0	-	NA	1	No cap, covered only with tape.			
				30-Aug-16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not sampled.
				30-Aug-16	11:00	1010	0.30	5.8	49.9	49.9	0.6	0.0	1.0	1.0	2.89	0.03	3	Good condition.			
20-Mar-17	10:50	-	0.00	0.0	40.5	40.0	0.6	4.5	0.0	1.0	NA	NA	2	Good condition.							
13-Dec-17	9:50	1000	0.00	0.1	46.0	45.5	0.6	0.0	20.0	0.0	0.05	0.00	2								
14-Mar-18	11:09	1011	0.24	4.3	46.9	43.6	0.3	0.0	5.0	1.0	2.02	0.01	3	Good condition.							
24-Apr-18	6:00	1009	-0.03	0.1	17.6	0.7	1.3	18.7	0.0	0.0	0.02	0.00	2								
17-May-18	10:55	1015	-	-2.2	45.8	41.8	0.8	0.0	1.0	NA	NA	NA	2								
13-Jun-19	8:50	1006	0.00	0.0	39.9	39.9	1.3	0.0	62.0	3.0	NA	NA	2	LEL = >>>., well in good condition, GF and BP slight bounce							
GB23	1.0-3.5	3.8	HLA - 07/01/2004	24-Mar-09	-	1006	0.05	-	71.6	-	20.4	0.4	-	-	-	NA	1				
				02-Apr-09	-	1014	-0.17	-	62.1	-	19.9	0.0	-	-	-	NA	1				
				09-Apr-09	-	1017	0.17	-	65.4	-	20.5	0.0	-	-	-	NA	1				
				14-Apr-09	-	999	1.47	-	65.0	-	20.5	0.0	-	-	-	NA	1				
				22-Apr-09	-	1013	0.12	-	62.0	-	19.6	0.0	-	-	-	NA	1				
				28-Apr-09	-	1016	0.12	-	64.1	-	20.8	0.0	-	-	-	NA	1				
				21-Oct-10	-	1017	0	-	28.4	-	9.0	11.2	-	-	-	NA	1				
				03-Jul-13	15:30	-	-	-	81.6	-	18.4	0.0	0	7	-	NA	1				
				16-Apr-14	14:38	1012	0.01	0.6	74.0	74.0	17.1	0.4	3	0	0.44	0.10	2	H2S odour noted			
				31-Aug-16	12:12	1001	0.48	7.6	74.9	74.5	23.5	0.0	6	1	5.69	1.79	4	No standpipe cover			
20-Mar-17	14:17	1007	0.30	5.5	75.9	75.9	21.9	0.0	1	1	4.17	1.20	4	Good condition.							
12-Jun-19	15:40	999	0.74	11.2	66.4	66.4	23.0	0.0	4	5	7.44	2.58	4	LEL = >&							

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments				
GB25	1.0-4.0	4.5	HLA - 08/01/2004	24-Mar-09	-	1006	-0.24	-	0.1	-	9.6	7.1	-	-	-	NA	1					
				03-Apr-09	-	1007	1.32	-	0.0	0	10.7	6.9	-	-	-	-	-	NA	1			
				09-Apr-09	-	1013	0.35	-	0.3	-	-	11.1	5.0	-	-	-	-	-	NA	1		
				14-Apr-09	-	999	-0.05	-	0.0	0	10.3	6.4	-	-	-	-	-	-	NA	1		
				21-Apr-09	-	1012	0	-	0.0	0	9.2	8.2	-	-	-	-	-	-	NA	1		
				28-Apr-09	-	1018	0	-	0.0	0	9.0	8.8	-	-	-	-	-	-	-	NA	1	
				21-Oct-10	-	1008	0	-	3.0	-	-	-	7.3	2.1	-	-	-	-	-	NA	1	
30-Aug-16				Well Lost / Destroyed																		
GB25A	6.0-10.0	10	coffey - 21/06/2016	31-Aug-16	11:05	1002	0.20	3.9	24.4	24.4	7.5	0.5	1	0	0	0.95	0.29	3	Good condition			
				20-Mar-17	15:26	1002	0.24	5	19.1	19.1	8.8	0.0	0	0	0	0	0.96	0.44	3	Good condition		
				13-Dec-17	10:21	996	0.00	0	22.4	22.2	7.1	0.0	24	0	0	0	NA	NA	2	Good condition		
				14-Mar-18	16:33	1004	0.00	0	23.2	23.1	7.1	0.0	21	1	0	0	0.01	0.01	2	Good condition		
				24-Apr-18	9:58	1009	0.07	0.1	14.6	13.0	6.9	6.5	0	0	0	0	0.01	0.01	2	Good condition		
				17-May-18	14:35	1015	0.28	4.9	21.7	19.4	9.5	-	0	0	1.06	0.47	3	Good condition				
				12-Jun-19	9:35	1003	0.10	2.6	14.6	14.2	8.1	0.0	0	0	0.38	0.21	2	LEL = >>> Gas flow and BP fluctuating				
				27-Jun-19	12:40	1018	56.00	8.8	14.5	14.5	11.0	0.0	0	0	1.28	0.97	3	LEL = >>>> Jumping GF 75-10.0, 50 -60 BP				
				29-Jul-19	11:10	1011	0.18	3.3	15.8	15.8	10.5	0.0	0	1	0.52	0.35	2	LEL = >>>>				
				21-Oct-10				1017	0	-	0.0	-	5.3	11.5	-	-	-	-	-	NA	1	
30-Aug-16				Well Lost / Destroyed																		
GB26	1.0-2.5	4	HLA - 08/01/2004	24-Mar-09	-	1007	-0.06	-	0.1	-	7.8	11.0	-	-	-	NA	1					
				03-Apr-09	-	1006	0.01	-	0.0	0.0	7.8	11.6	-	-	-	-	NA	1				
				08-Apr-09	-	1018	0.04	-	0.0	0.0	8.2	10.3	-	-	-	-	-	NA	1			
				14-Apr-09	-	999	0.37	-	0.0	0.0	8.4	9.7	-	-	-	-	-	NA	1			
				21-Apr-09	-	1010	0.01	-	0.0	0.0	7.3	11.5	-	-	-	-	-	NA	1			
				29-Apr-09	-	1016	0.01	-	0.0	0.0	6.9	12.2	-	-	-	-	-	NA	1			
				21-Oct-10	-	1017	0	-	0.0	0.0	5.3	11.5	-	-	-	-	-	-	NA	1		
30-Aug-16				Well Lost / Destroyed																		
GB27	0.5-2.5	4	HLA - 08/01/2004	24-Mar-09	-	1007	-0.06	-	0.1	-	0.2	20.8	-	-	-	-	NA	1				
				03-Apr-09	-	1007	0.05	-	0.0	0.0	0.2	21.2	-	-	-	-	-	NA	1			
				09-Apr-09	-	1013	-0.34	-	0.4	-	1.1	19.2	-	-	-	-	-	NA	1			
				14-Apr-09	-	1000	3.66	-	3.2	-	16.2	2.4	-	-	-	-	-	-	NA	1		
				21-Apr-09	-	1014	0.01	-	0.0	0.0	8.8	9.6	-	-	-	-	-	-	NA	1		
				28-Apr-09	-	1012	0.01	-	0.0	0.0	0.0	20.8	-	-	-	-	-	-	NA	1		
				21-Oct-10	-	1017	0	-	4.1	-	-	13.4	1.1	-	-	-	-	-	NA	1		
30-Aug-16				Well Lost / Destroyed																		
GB27A	1.0-4.0	4.4	coffey - 21/06/2016	31-Aug-16	9:33	1002	0	0	0.4	0.4	13.9	0.0	1	0	0	NA	NA	1	Good condition			
				21-Mar-17	11:23	1004	0	0	0.0	0.0	11.1	10.1	0	0	0	0	NA	NA	1	Good condition		
				13-Dec-17	8:22	998	0	0	0.7	0.6	15.9	0.0	0	0	0	0	NA	NA	1			
				15-Mar-18	16:19	1005	0.31	5.4	0.0	0.0	11.6	9.0	1	1	0.00	0.63	2	Good condition				
				24-Apr-18	12:20	1009	-0.05	0.2	0.1	0.1	3.8	18.9	0	0	0.00	0.01	1	Good condition				
				16-May-18	17:34	1019	0.32	5.5	0.0	0.0	12.3	-	0	2	0.00	0.68	2	Good condition				
GB28	0.5-3.0	3.3	HLA - 08/01/2004	24-Mar-09	-	1006	0.04	-	9.1	-	22.0	0.5	-	-	-	NA	1					
				03-Apr-09	-	1008	0.1	-	7.4	-	22.2	0.4	-	-	-	-	-	NA	1			
				08-Apr-09	-	1020	0.04	-	7.7	-	21.4	0.0	-	-	-	-	-	NA	1			
				14-Apr-09	-	1003	-0.21	-	10.8	-	22.4	0.0	-	-	-	-	-	-	NA	1		
				21-Apr-09	-	1014	0.01	-	8.8	-	21.7	0.0	-	-	-	-	-	-	NA	1		
				28-Apr-09	-	1012	0.01	-	5.7	-	20.2	0.3	-	-	-	-	-	-	NA	1		
				09-Jun-09	-	1000	0.02	-	11.4	-	20.8	0.3	-	-	-	-	-	-	NA	1		
				21-Oct-10	-	1017	0	-	20.2	-	16.8	1.4	-	-	-	-	-	-	NA	1		
				04-Jul-13	11:00	1007	0.04	0.0	55.6	50.0	22.7	0.9	0	6	NA	NA	2	Readings did not stabilise after 5 minutes				
				16-Apr-14	12:30	1014	0.01	0.0	20.5	20.3	24.1	0.3	8	2	NA	NA	2	Good condition, no standpipe cover				
				31-Aug-16	10:54	1003	0.02	0.5	41.4	41.2	23.3	0.0	5	6	0.21	0.12	2	Cracks in bore sealed with tape				
				21-Mar-17	11:06	1004	0.00	0.0	12.9	12.9	24.2	0.0	1	1	NA	NA	2					
				13-Dec-17	8:29	1001	0.00	0.0	34.8	33.5	25.7	0.0	43	7	NA	NA	2					
				14-Mar-18	17:15	1005	0.00	0.0	18.9	12.2	25.0	0.0	43	2	NA	NA	2	Good condition				
				24-Apr-18	10:26	1009	0.30	0.1	0.2	0.1	1.6	20.3	0	0	0.00	0.00	1	Good condition				
				16-May-18	16:45	1020	0.29	5.2	22.8	18.2	25.7	-	0	0	1.19	1.34	3					
				12-Jun-19	11:00	1001	0.02	0.1	27.1	27.1	22.5	0.0	1	0	0.03	0.02	2	LEL = >>> GF fluctuating slightly -0.4 to 0.2 BP fluctuating from -0.8 to 0. Moisture at base of borehole				
				GB29A	1.1-2.2	2.2	coffey - 21/06/2016	31-Aug-16	9:14	1004	0.00	0.0	0.0	0.0	18.5	0.0	0	0	0	NA	NA	1
21-Mar-17	11:11	1004	0.00					0.0	0.1	0.0	14.7	8.6	0	0	0	0	NA	NA	1	Good condition		
GB30	0.5-2.0	3	HLA - 08/01/2004	24-Mar-09	-	1007	-0.12	-	0.1	-	7.6	9.5	-	-	-	NA	1					
				02-Apr-09	-	1007	-0.25	-	0.0	0.0	5.8	11.4	-	-	-	-	-	NA	1			
				09-Apr-09	-	1013	-0.11	-	0.0	0.0	7.0	7.5	-	-	-	-	-	NA	1			
				14-Apr-09	-	999	-0.32	-	0.0	0.0	5.9	10.9	-	-	-	-	-	NA	1			
				21-Apr-09	-	1012	0	-	0.0	0.0	6.4	11.9	-	-	-	-	-	NA	1			
				28-Apr-09	-	1012	0	-	0.0	0.0	5.2	11.6	-	-	-	-	-	NA	1			
				09-Jun-09	-	999	0	-	0.0	0.0	3.8	13.3	-	-	-	-	-	NA	1			
				18-Jun-09	-	1023	0	-	0.0	0.0	7.0	7.0	-	-	-	-	-	NA	1			
				22-Jun-09	-	1009	0	-	0.0	0.0	5.0	9.0	-	-	-	-	-	NA	1			
				01-Jul-09	-	990	0	-	0.0	0.0	7.2	8.2	-	-	-	-	-	NA	1			
				07-Jul-09	-	1020	0	-	0.0	0.0	8.2	4.2	-	-	-	-	-	NA	1			
				05-Aug-09	-	1013	-0.15	-	0.0	0.0	10.4	2.5	-	-	-	-	-	NA	1			
				11-Aug-09	-	1001	0	-	0.0	0.0	10.3	2.2	-	-	-	-	-	NA	1			
				18-Aug-09	-	1017	0	-	0.0	0.0	10.7	2.9	-	-	-	-	-	NA	1			
				01-Sep-09	-	1012	0	-	0.0	0.0	10.7	3.2	-	-	-	-	-	NA	1			
				07-Sep-09	-	994	0.01	-	0.0	0.0	9.7	4.7	-	-	-	-	-	NA	1			
				15-Sep-09	-	1013	0	-	0.0	0.0	10.6	2.8	-	-	-	-	-	NA	1			
				23-Sep-09	-	987	-	-	0.0	0.0	10.0	1.9	-	-	-	-	-	NA	1			
				06-Oct-09	-	1004	-0.01	-	0.0	0.0	11.4	1.3	-	-	-	-	-	NA	1			
				15-Oct-09	-	996	0	-	0.0	0.0	9.8	2.9	-	-	-	-	-	NA	1			
				20-Oct-09	-	1008	0	-	0.0	0.0	11.5	2.7	-	-	-	-	-	NA	1			
				04-Nov-09	-	1012	0	-	0.0	0.0	11.9	4.2	-	-	-	-	-	NA	1			
				17-Nov-09	-	1003	0	-	0.0	0.0	10.1	9.0	-	-	-	-	-	NA	1	2600		
				01-Dec-09	-	1011	0	-	0.0	0.0	12.2	0.5	-	-	-	-	-	NA	1			
				14-Dec-09	-	1012	0	-	0.0	0.0	12.8	1.7	-	-	-	-	-	NA	1			
				04-Jan-10	-	1008	0.01	-	0.0	0.0	11.4	1.9	-	-	-	-	-	NA	1			
				18-Jan-10	-	1001	-0.02	-	0.0	0.0	7.3	12.2	-	-	-	-	-	NA	1			
				21-Oct-10	-	1017	0	-	0.0	0.0	12.2	2.3	-	-	-	-	-	NA	1			
				16-Apr-14	13:06	1014	0.01	0.0	0.0	0.0	8.2	5.8	0	0	NA	NA	1	Good condition				
				30-Aug-16	14:11	1006	0.00	0.0	0.0	0.0	10.9	1.9	0	0	NA	NA	1	Good condition				
				20-Mar-17	15:06	1003	0.00	0.0	0.0	0.0	7.1	12.6	0	0	NA	NA	1	Good condition				
				13-Dec-17	12:44	998	0.00	0.0	0.0	0.0	7.3	0.6	9	0	NA	NA	1	Good condition				
				14-Mar-18	16:06	1004	0.30	5.3	0.0	0.0	4.3	16.3	5	3	0.00	0.23	2	Good condition				
				24-Apr-18	8:51	1007	-0.12	0.1	0.1	0.1	7.4	12.0	0	0	0.00	0.01	1	Good condition				
				17-May-18	14:58	1015	0.31	5.4	0.0	0.0	8.0	-	0	0	0.00	0.43	2	Good condition				
				11-Jun-19	14:21	1009	0.00	0.0	0.0	0.0	8.3	5.0	0	0	0.00	0.00	1					
GB31	3.0-4.0	4	HLA - 04/02/2004	24-Mar-09	-	1006	-	-	4.1	-	14.5	0.4	-	-	-	NA	1					
				03-Apr																		

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments		
GB32	4.6-6	6	BFP geotechnical engineers - 20/10/2004	24-Mar-09	-	1006	-	-	48.2	-	18.7	0.3	-	-	-	NA	1			
				02-Apr-09	-	1014	1.38	-	44.5	-	18.6	0.0	-	-	-	-	NA	1		
				08-Apr-09	-	1017	0.06	-	45.9	-	18.6	0.0	-	-	-	-	NA	1		
				15-Apr-09	-	1001	0.11	-	28.2	-	17.4	0.2	-	-	-	-	NA	1		
				22-Apr-09	-	1015	0.04	-	43.9	-	18.4	0.0	-	-	-	-	NA	1		
				28-Apr-09	-	1018	0.04	-	41.5	-	18.5	0.0	-	-	-	-	NA	1		
				09-Jun-09	-	998	0	-	44.1	-	18.2	1.2	-	-	-	-	NA	1		
				18-Jun-09	-	1023	0	-	46.5	-	18.5	0.0	-	-	-	-	NA	1		
				22-Jun-09	-	1011	0	-	47.9	-	17.9	0.0	-	-	-	-	NA	1		
				01-Jul-09	-	992	0	-	42.7	-	16.8	0.8	-	-	-	-	NA	1		
				07-Jul-09	-	1017	0	-	47.9	-	10.4	0.0	-	-	-	-	NA	1		
				05-Aug-09	-	1012	0	-	52.4	-	12.1	0.0	-	-	-	-	NA	1		
				11-Aug-09	-	1001	0.2	-	51.3	-	10.7	0.0	-	-	-	-	NA	1		
				18-Aug-09	-	1017	0.08	-	45.7	-	11.7	1.9	-	-	-	-	NA	1		
				01-Sep-09	-	1012	0.08	-	52.9	-	13.9	0.0	-	-	-	-	NA	1		
				07-Sep-09	-	993	0.02	-	52.0	-	13.2	0.2	-	-	-	-	NA	1		
				15-Sep-09	-	1012	0.14	-	52.6	-	13.7	0.0	-	-	-	-	NA	1		
				23-Sep-09	-	987	-	-	63.2	-	14.6	0.0	-	-	-	-	NA	1		
				06-Oct-09	-	1004	-0.05	-	57.6	-	16.8	0.3	-	-	-	-	NA	1		
				15-Oct-09	-	996	0.04	-	55.2	-	12.1	0.6	-	-	-	-	NA	1		
				20-Oct-09	-	1008	0.25	-	55.4	-	15.5	0.2	-	-	-	-	NA	1		
				04-Nov-09	-	1011	0.15	-	53.8	-	18.3	0.0	-	-	-	-	NA	1		
				17-Nov-09	-	1001	0.13	-	55.1	-	17.0	0.0	-	-	-	-	NA	1		
				01-Dec-09	-	1011	0.25	-	52.4	-	16.7	0.3	-	-	-	-	NA	1		
				14-Dec-09	-	1012	0	-	53.6	-	15.4	0.0	-	-	-	-	NA	1		
				04-Jan-10	-	1008	0.06	-	54.9	-	17.9	0.0	-	-	-	-	NA	1		
				18-Jan-10	-	1001	0.09	-	52.3	-	17.5	0.0	-	-	-	-	NA	1		
				21-Oct-10	-	1011	0	-	54.8	-	16.8	0.2	-	-	-	-	NA	1		
				03-Jul-13	14:05	1019	4.30	0.3	81.0	81.0	16.2	0.0	0	0	0.24	0.05	2			
				04-Jul-13	11:30	1007	0.13	0.7	82.3	82.2	16.6	0.0	1	3	0.58	0.12	2			Sampled again due to falling pressure conditions
				16-Apr-14	13:56	1014	0.01	0.6	67.4	67.4	17.6	0.1	4	3	0.40	0.11	2			Water in standpipe cover, H2S odour
				30-Aug-16	11:56	1007	0.94	13.2	71.2	71.1	19.1	0.0	5	1	9.40	2.52	4			Good condition
				20-Mar-17	13:00	1005	0.29	5.2	70.7	70.7	20.9	0.0	3	1	3.68	1.09	4			Good condition
12-Dec-17	9:09	1010	0.00	0.1	71.3	69.0	21.8	0.0	21	1	0.07	0.02	2			After sampling flow=0.4 and pressure=1 Pa				
14-Mar-18	13:13	1007	0.00	0.0	66.4	65.0	20.0	0.0	24	0	NA	NA	2			Good condition				
03-May-18	8:00	1004	0.29	0.2	58.6	53.1	21.2	0.0	0	0	0.12	0.04	2			Good condition				
17-May-18	15:35	1014	0.25	4.5	60.1	52.8	20.5	-	1	0	2.70	0.92	3							
13-Jun-19	12:50	1001	0.31	5.7	48.8	46.7	18.8	0.0	4	1	2.78	1.07	3							
31-Aug-16	13:12	1004	0.00	0.0	0.0	0.0	0.0	2.2	18.4	0	0	0	NA	NA	1		Good condition			
21-Mar-17	14:14	1002	0.00	0.0	0.0	0.0	0.0	1.2	19.5	0	0	0	NA	NA	1		Good condition			
14-Mar-18	15:34	1009	0.30	5.2	0.2	0.0	1.1	19.8	1	1	0.01	0.06	1			Good condition				
03-May-18	14:20	999	0.07	0.1	0.3	0.0	1.0	20.0	1	0	0.00	0.00	1			Good condition				
17-May-18	9:10	1013	0.30	5.2	0.0	0.0	0.9	21.8	0	0	0.00	0.05	1							
13-Jun-19	14:31	1005	0.00	0.0	0.0	0.0	1.3	19.4	0	0	NA	NA	1							
31-Aug-16	11:40	1001	0.04	1.0	0.5	0.0	5.1	0.0	1	1	0.01	0.05	1			Good condition				
20-Mar-17	14:45	1007	0.05	1.4	0.0	0.0	6.0	5.2	0	0	0.00	0.08	2			Broken stickup cover. PVC seems ok.				
18-May-18	10:35	1013	0.31	5.4	0.7	0.1	5.2	-	1	0	0.04	0.28	2							
11-Jun-19	14:46	1009	0.03	0.7	8.6	8.2	6.7	0.0	2	1	0.06	0.05	2			LEL = >>>				
GB37	NA	NA		24-Mar-09	-	1006	-	-	0.2	-	0.2	21.1	-	-	-	NA	1			
				02-Apr-09	-	1014	-0.37	-	30.9	-	19.5	0.0	-	-	-	-	NA	1		
				08-Apr-09	-	1022	0.13	-	36.0	-	20.4	0	-	-	-	-	NA	1		
				15-Apr-09	-	1003	-0.3	-	7.8	-	7.9	6.7	-	-	-	-	NA	1		
				22-Apr-09	-	1015	-1.32	-	33.6	-	19.9	0.0	-	-	-	-	NA	1		
				29-Apr-09	-	1018	-1.32	-	20.9	-	15.3	3.1	-	-	-	-	NA	1		
				09-Jun-09	-	998	0	-	39.5	-	20.6	0.0	-	-	-	-	NA	1		
				18-Jun-09	-	1023	0	-	23.6	-	17.3	0.6	-	-	-	-	NA	1		
				22-Jun-09	-	1011	0	-	40.8	-	19.3	0.0	-	-	-	-	NA	1		
				01-Jul-09	-	992	0	-	41.6	-	19.9	0.1	-	-	-	-	NA	1		
				07-Jul-09	-	1017	0	-	43.1	-	19.2	0.0	-	-	-	-	NA	1		
				05-Aug-09	-	1012	0.08	-	47.7	-	20.4	0.0	-	-	-	-	NA	1		
				11-Aug-09	-	1001	0.2	-	46.6	-	20.2	0.0	-	-	-	-	NA	1		
				18-Aug-09	-	1017	0.18	-	45.0	-	20.0	0.6	-	-	-	-	NA	1		
				01-Sep-09	-	1012	0.11	-	48.8	-	20.6	0.0	-	-	-	-	NA	1		
				07-Sep-09	-	993	0	-	37.0	-	16.0	4.8	-	-	-	-	NA	1		
				15-Sep-09	-	1012	0.26	-	48.8	-	19.9	0.0	-	-	-	-	NA	1		
				23-Sep-09	-	988	-	-	54.4	-	19.9	0.2	-	-	-	-	NA	1		
				06-Oct-09	-	1004	-0.06	-	53.2	-	19.9	0.5	-	-	-	-	NA	1		
				15-Oct-09	-	996	0.03	-	49.7	-	20.1	0.1	-	-	-	-	NA	1		
				20-Oct-09	-	1008	0.2	-	48.8	-	19.4	0.6	-	-	-	-	NA	1		
				04-Nov-09	-	1011	0.24	-	51.4	-	20.8	0.0	-	-	-	-	NA	1		
				17-Nov-09	-	1001	0.14	-	49.6	-	20.7	0.0	-	-	-	-	NA	1		
				01-Dec-09	-	1011	0.26	-	50.1	-	20.1	0.0	-	-	-	-	NA	1		
				14-Dec-09	-	1012	0	-	48.4	-	19.7	0.0	-	-	-	-	NA	1		
				04-Jan-10	-	1008	0	-	47.8	-	21.2	0.8	-	-	-	-	NA	1		
				18-Jan-10	-	1001	0.12	-	47.9	-	20.4	0.1	-	-	-	-	NA	1		
				21-Oct-10	-	1011	0	-	52.7	-	20.2	0.1	-	-	-	-	NA	1		
				16-Apr-14	14:53	1013	0.01	0.4	53.7	53.7	19.2	0.1	7	2	0.21	0.08	2			Good condition, strong H2S odour
				30-Aug-16	11:50	1007	1.01	13.5	0.0	0.0	6.8	13.1	1	1	0.00	0.92	3			Good condition
				20-Mar-17	12:55	1005	0.01	0.3	64.2	64.2	23.1	0.0	5	1	0.19	0.07	2			Good condition
				13-Dec-17	11:50	996	0.00	0.5	68.5	66.3	21.2	0.0	0	0	0.34	0.11	2			
				14-Mar-18	13:02	1007	0.29	4.4	58.4	56.5	21.9	0.0	5	3	2.57	0.96	3			Good condition
03-May-18	7:50	1004	0.29	0.2	47.8	35.0	23.2	0.0	2	0	0.10	0.05	2			Good condition				
17-May-18	16:02	1014	0.26	4.6	52.4	49.5	22.8	-	2	0	2.41	1.05	3							
13-Jun-19	12:15	1005	0.28	5.1	46.8	46.8	22.7	0.0	22	7	2.39	1.16	3							
GB40	NA	NA	AECOM	18-Jun-09	-	1023	0	-	0.0	0.0	2.5	19.0	-	-	-	NA	1			
				22-Jun-09	-	1009	0	-	0.0	0.0	1.5	19.2	-	-	-	-	NA	1		
				01-Jul-09	-	989	0	-	0.0	0.0	1.6	19.0	-	-	-	-	NA	1		
				07-Jul-09	-	1020	0	-	0.0	0.0	1.6	18.7	-	-	-	-	NA	1		
				05-Aug-09	-	1016	0	-	0.0	0.0	2.8	18.7	-	-	-	-	NA	1		
				11-Aug-09	-	1002	0.28	-	0.0	0.0	2.8	18.5	-	-	-	-	NA	1		
				18-Aug-09	-	1017	-0.03	-	0.0	0.0	2.4	18.6	-	-	-	-	NA	1		
				01-Sep-09	-	1011	0	-	0.0	0.0	2.5	18.6	-	-	-	-	NA	1		
				07-Sep-09	-	994	0	-	0.0	0.0	2.5	19.4	-	-	-	-	NA	1		
				15-Sep-09	-	1017	0.03	-	0.0	0.0	2.5	18.9	-	-	-	-	NA	1		
				23-Sep-09	-	989	-	-	0.0	0.0	2.1	18.6	-	-	-	-	NA	1		
				06-Oct-09	-	1004	0	-	0.0	0.0	2.6	18.1	-	-	-	-	NA	1		
				15-Oct-09	-	996	0	-	0.0	0.0	2.5	19.0	-	-	-	-	NA	1		
				20-Oct-09	-	1009	0.03	-	0.0	0.0	2.7	18.8	-	-	-	-	NA	1		
				04-Nov-09	-	1012	0	-	0.0	0.0	2.5	18.4	-	-	-	-	NA	1		
				17-Nov-09	-	-	0	-	0.0	0.0	2.1	18.8	-	-	-	-	NA	1		
				01-Dec-09	-	1014	0	-	0.0	0.0	3.2	17.6	-	-	-	-	NA	1		
				1																

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments		
GB41	NA	NA	AECOM	18-Jun-09	-	1023	0	-	0.0	0.0	2.6	19.0	-	-	-	NA	1			
				22-Jun-09	-	1009	0	-	0.0	0.0	0.0	0.0	1.2	19.4	-	-	-	NA	1	
				01-Jul-09	-	989	0	-	0.0	0.0	0.0	0.0	1.3	19.3	-	-	-	NA	1	
				07-Jul-09	-	1020	0	-	0.0	0.0	0.0	0.0	1.3	19.1	-	-	-	NA	1	
				05-Aug-09	-	1016	0.14	-	0.0	0.0	0.0	0.0	2.1	19.2	-	-	-	NA	1	
				11-Aug-09	-	1002	0	-	0.0	0.0	0.0	0.0	4.0	18.9	-	-	-	NA	1	
				18-Aug-09	-	1017	0	-	0.0	0.0	0.0	0.0	2.0	19.0	-	-	-	NA	1	
				01-Sep-09	-	1011	0.02	-	0.0	0.0	0.0	0.0	1.8	19.3	-	-	-	NA	1	
				07-Sep-09	-	994	0.02	-	0.0	0.0	0.0	0.0	2.0	19.7	-	-	-	NA	1	
				15-Sep-09	-	1017	0	-	0.0	0.0	0.0	0.0	2.2	19.0	-	-	-	NA	1	
				23-Sep-09	-	989	-	-	0.0	0.0	0.0	0.0	2.1	18.4	-	-	-	NA	1	
				06-Oct-09	-	1004	0	-	0.0	0.0	0.0	0.0	2.5	18.1	-	-	-	NA	1	
				15-Oct-09	-	998	-0.01	-	0.0	0.0	0.0	0.0	2.3	18.7	-	-	-	NA	1	
				20-Oct-09	-	1009	0.04	-	0.0	0.0	0.0	0.0	2.8	18.7	-	-	-	NA	1	
				04-Nov-09	-	1012	0	-	0.0	0.0	0.0	0.0	2.8	18.2	-	-	-	NA	1	
				17-Nov-09	-	1003	0	-	0.0	0.0	0.0	0.0	2.3	18.7	-	-	-	NA	1	
				01-Dec-09	-	1014	0	-	0.0	0.0	0.0	0.0	2.4	17.6	-	-	-	NA	1	
				14-Dec-09	-	1012	0	-	0.0	0.0	0.0	0.0	2.8	17.0	-	-	-	NA	1	
				04-Jan-10	-	1008	0.01	-	0.0	0.0	0.0	0.0	3.2	18.0	-	-	-	NA	1	
				18-Jan-10	-	1002	0	-	0.0	0.0	0.0	0.0	2.2	18.8	-	-	-	NA	1	
				21-Oct-10	-	1008	0	-	0.0	0.0	0.0	0.0	2.6	17.0	-	-	-	NA	1	
				16-Apr-14	10:54	1013	0.01	0.1	0.4	0.4	3.0	17.8	0	0	0.00	0.00	1			Good condition.
				30-Aug-16	15:04	1005	0.00	0.0	0.0	0.0	3.9	16.8	0	0	NA	NA	1			Good condition.
				21-Mar-17	9:43	1004	0.00	0.0	0.0	0.0	2.7	18.0	0	0	NA	NA	1			Good condition.
				12-Dec-17	7:50	1001	0.00	0.0	0.0	0.0	3.9	16.9	0	0	NA	NA	1			
				14-Mar-18	16:56	1004	0.30	5.4	0.0	0.0	2.4	18.8	1	1	0.00	0.13	2			Good condition
				24-Apr-18	8:10	1007	-0.10	-0.2	0.1	0.0	2.5	18.5	0	0	NA	NA	1			Good condition
				16-May-18	16:29	1019	0.30	5.2	0.0	0.0	2.2	22.7	0	0	0.00	0.11	2			
11-Jun-19	12:23	1011	0.00	0.0	0.0	0.0	3.1	17.9	0	0	NA	NA	1			LEL = 0.0%				
18-Jun-09	-	1023	0	-	0.0	0.0	2.7	18.9	-	-	-	-	NA	1						
22-Jun-09	-	1009	0	-	0.0	0.0	1.4	19.5	-	-	-	-	NA	1						
01-Jul-09	-	990	0	-	0.0	0.0	1.8	19.0	-	-	-	-	NA	1						
07-Jul-09	-	1020	0	-	0.0	0.0	1.9	18.3	-	-	-	-	NA	1						
05-Aug-09	-	1016	0	-	0.0	0.0	2.8	18.4	-	-	-	-	NA	1						
11-Aug-09	-	1002	0	-	0.0	0.0	3.0	18.0	-	-	-	-	NA	1						
18-Aug-09	-	1017	0	-	0.0	0.0	2.7	18.3	-	-	-	-	NA	1						
01-Sep-09	-	1011	0	-	0.0	0.0	2.7	18.2	-	-	-	-	NA	1						
07-Sep-09	-	994	0	-	0.0	0.0	2.8	19.0	-	-	-	-	NA	1						
15-Sep-09	-	1017	0	-	0.0	0.0	3.0	18.1	-	-	-	-	NA	1						
23-Sep-09	-	987	-	-	0.0	0.0	2.8	17.7	-	-	-	-	NA	1						
06-Oct-09	-	1004	-0.03	-	0.0	0.0	2.7	18.3	-	-	-	-	NA	1						
15-Oct-09	-	996	0	-	0.0	0.0	2.9	18.1	-	-	-	-	NA	1						
20-Oct-09	-	1009	0	-	0.0	0.0	2.7	18.9	-	-	-	-	NA	1						
04-Nov-09	-	1012	0	-	0.0	0.0	2.5	18.8	-	-	-	-	NA	1						
17-Nov-09	-	1003	0	-	0.0	0.0	2.2	18.7	-	-	-	-	NA	1						
01-Dec-09	-	1014	0	-	0.0	0.0	3.3	17.3	-	-	-	-	NA	1						
14-Dec-09	-	1012	0	-	0.1	-	2.9	17.3	-	-	-	-	NA	1						
04-Jan-10	-	1008	0	-	0.0	0.0	3.6	17.0	-	-	-	-	NA	1						
18-Jan-10	-	1002	0.03	-	0.0	0.0	2.2	19.0	-	-	-	-	NA	1						
21-Oct-10	-	1008	0	-	0.0	0.0	2.8	16.6	-	-	-	-	NA	1						
03-Jul-13	12:05	1021	0.00	0.0	0.0	0.0	2.7	18.3	0	0	NA	NA	1							
16-Apr-14	11:10	1013	0.01	0.1	0.4	0.4	2.4	17.9	1	0	0.00	0.00	1			Good condition				
30-Aug-16	14:51	1005	0.00	0.0	0.0	0.0	3.2	17.5	0	0	NA	NA	1			Good condition				
21-Mar-17	9:33	1004	0.00	0.0	0.0	0.0	2.5	18.3	0	0	NA	NA	1			Good condition				
13-Dec-17	7:50	1001	0.00	0.3	0.0	0.0	3.6	17.2	71	2	0.00	0.01	1			After sampling flow=0.1				
14-Mar-18	16:43	1004	0.31	5.3	0.0	0.0	2.0	19.3	2	1	0.00	0.11	2			Good condition				
24-Apr-18	8:21	1007	-0.10	-0.2	0.1	0.0	2.0	18.9	0	0	NA	NA	1			Good condition				
16-May-18	16:39	1020	0.30	5.2	0.0	0.0	1.9	22.4	0	0	0.00	0.10	2							
11-Jun-19	13:35	1010	0.02	1.1	0.0	0.0	2.3	8.2	0	0	0.00	0.03	1							
01-Jul-09	-	-	-	-	0.1	-	4.0	8.2	-	-	-	-	NA	1						
07-Jul-09	-	1020	-0.6	-	0.0	0.0	5.2	10.9	-	-	-	-	NA	1						
14-Jul-09	-	997	0.55	-	0.0	0.0	6.0	13.2	-	-	-	-	NA	1						
21-Jul-09	-	1004	-0.72	-	0.1	-	9.0	10.7	-	-	-	-	NA	1						
28-Jul-09	-	1016	-0.07	-	0.0	0.0	6.5	13.7	-	-	-	-	NA	1						
05-Aug-09	-	1016	0	-	0.0	0.0	6.2	14.2	-	-	-	-	NA	1						
11-Aug-09	-	1002	0.2	-	0.0	0.0	6.1	14.1	-	-	-	-	NA	1						
18-Aug-09	-	1017	0	-	0.0	0.0	5.3	15.4	-	-	-	-	NA	1						
01-Sep-09	-	1011	0	-	0.0	0.0	6.3	14.2	-	-	-	-	NA	1						
07-Sep-09	-	994	0	-	0.0	0.0	4.8	16.6	-	-	-	-	NA	1						
15-Sep-09	-	1017	0	-	0.0	0.0	6.2	14.3	-	-	-	-	NA	1						
23-Sep-09	-	988	-	-	0.0	0.0	5.5	13.8	-	-	-	-	NA	1						
06-Oct-09	-	1004	-0.02	-	0.0	0.0	6.2	14.3	-	-	-	-	NA	1						
15-Oct-09	-	996	-0.04	-	0.0	0.0	7.0	12.1	-	-	-	-	NA	1						
20-Oct-09	-	1009	0	-	0.0	0.0	6.7	14.1	-	-	-	-	NA	1						
04-Nov-09	-	1012	-0.02	-	0.0	0.0	7.1	13.2	-	-	-	-	NA	1						
17-Nov-09	-	1003	0	-	0.0	0.0	7.2	13.2	-	-	-	-	NA	1						
01-Dec-09	-	1014	0.05	-	0.0	0.0	7.1	13.4	-	-	-	-	NA	1						
14-Dec-09	-	1012	0	-	0.0	0.0	7.4	12.0	-	-	-	-	NA	1						
04-Jan-10	-	1008	0	-	0.0	0.0	7.7	13.0	-	-	-	-	NA	1						
18-Jan-10	-	1002	0.04	-	0.0	0.0	7.6	14.0	-	-	-	-	NA	1						
21-Oct-10	-	1008	0	-	0.0	0.0	6.3	11.4	-	-	-	-	NA	1						
16-Apr-14	11:18	1013	0.01	0.1	0.5	0.5	6.8	13.9	1	0	0.00	0.01	1			Good condition.				
21-Mar-17	9:24	1004	0.00	0.0	0.0	0.0	3.7	17.3	0	0	NA	NA	1			Good condition.				
01-Jul-09	-	-	-	-	0.1	-	6.4	6.2	-	-	-	-	NA	1						
07-Jul-09	-	1020	-1.1	-	0.1	-	6.9	6.6	-	-	-	-	NA	1						
14-Jul-09	-	997	0.1	-	0.0	0.0	8.4	9.2	-	-	-	-	NA	1						
21-Jul-09	-	1004	0	-	0.0	0.0	6.3	13.7	-	-	-	-	NA	1						
28-Jul-09	-	1016	0	-	0.0	0.0	4.9	15.0	-	-	-	-	NA	1						
05-Aug-09	-	1016	-0.39	-	0.0	0.0	8.4	12.2	-	-	-	-	NA	1						
11-Aug-09	-	1002	0.08	-	0.0	0.0	8.4	12.4	-	-	-	-	NA	1						
18-Aug-09	-	1017	0	-	0.0	0.0	6.6	14.8	-	-	-	-	NA	1						
01-Sep-09	-	1011	-0.04	-	0.0	0.0	8.6	12.6	-	-	-	-	NA	1						
07-Sep-09	-	994	0	-	0.0	0.0	5.6	16.3	-	-	-	-	NA	1						
15-Sep-09	-	1017	0	-	0.0	0.0	8.3	12.7	-	-	-	-	NA	1						
23-Sep-09	-	987	-	-	0.0	0.0	7.7	12.2	-	-	-	-	NA	1						
06-Oct-09	-	1004	-0.02	-	0.0	0.0	8.3	13.2	-	-	-	-	NA	1						
15-Oct-09	-	996	0	-	0.0	0.0	8.1	13.4	-	-	-	-	NA	1						
20-Oct-09	-	1009	0	-	0.0	0.0	8.4	13.4	-	-	-	-	NA	1						
04-Nov-09	-	1012	-0.03	-	0.0	0.0	8.5	12.6	-	-	-	-	NA	1						
17-Dec-09	-	1003	0	-	0.0	0.0	8.5	12.3	-	-	-	-	NA	1						
01-Dec-09	-	1014	0	-	0.0	0.0	8.5	12.6	-	-	-	-	NA	1						
14-Dec-09	-																			

Table 1:
Historical Gas Bore Monitoring

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments				
GB44	NA	NA	AECOM	18-Jun-09	-	1023	0	-	0.0	0.0	3.9	17.3	-	-	-	NA	1					
				22-Jun-09	-	1009	0	-	0.0	0.0	0.0	0.0	2.2	18.5	-	-	-	NA	1			
				01-Jul-09	-	990	0	-	0.0	0.0	0.0	0.0	2.6	17.8	-	-	-	NA	1			
				07-Jul-09	-	1020	0	-	0.0	0.0	0.0	0.0	3.1	16.9	-	-	-	NA	1			
				05-Aug-09	-	1016	0	-	0.0	0.0	0.0	0.0	3.4	17.6	-	-	-	NA	1			
				11-Aug-09	-	1002	-0.1	-	0.0	0.0	0.0	0.0	3.6	16.8	-	-	-	NA	1			
				18-Aug-09	-	1017	0.03	-	0.0	0.0	0.0	0.0	3.4	17.3	-	-	-	NA	1			
				01-Sep-09	-	1011	-0.01	-	0.0	0.0	0.0	0.0	2.7	17.8	-	-	-	NA	1			
				07-Sep-09	-	994	0	-	0.0	0.0	0.0	0.0	3.1	18.1	-	-	-	NA	1			
				15-Sep-09	-	1017	-0.05	-	0.0	0.0	0.0	0.0	3.6	17.3	-	-	-	NA	1			
				23-Sep-09	-	988	-	-	0.0	0.0	0.0	0.0	3.7	15.9	-	-	-	NA	1			
				06-Oct-09	-	1004	-0.06	-	0.0	0.0	0.0	0.0	4.4	16.2	-	-	-	NA	1			
				15-Oct-09	-	998	0	-	0.0	0.0	0.0	0.0	3.9	16.0	-	-	-	NA	1			
				20-Oct-09	-	1009	0.04	-	0.0	0.0	0.0	0.0	4.4	16.8	-	-	-	NA	1			
				04-Nov-09	-	1012	0	-	0.0	0.0	0.0	0.0	5.1	15.6	-	-	-	NA	1			
				17-Nov-09	-	1003	0	-	0.0	0.0	0.0	0.0	5.2	15.6	-	-	-	NA	1			
				01-Dec-09	-	1014	0	-	0.0	0.0	0.0	0.0	6.1	14.3	-	-	-	NA	1			
				14-Dec-09	-	1012	0	-	0.1	-	-	-	5.1	14.7	-	-	-	NA	1			
				04-Jan-10	-	1008	-0.01	-	0.0	0.0	0.0	0.0	5.6	15.2	-	-	-	NA	1			
				18-Jan-10	-	1002	0	-	0.0	0.0	0.0	0.0	5.0	16.6	-	-	-	NA	1			
				21-Oct-10	-	1008	0	-	0.0	0.0	0.0	0.0	4.6	13.8	-	-	-	NA	1			
				16-Apr-14	11:15	1013	0.01	0.1	0.4	0.4	0.1	0.4	6.1	13.5	1	0	0.00	0.01	1	Good condition		
				30-Aug-16	14:46	1005	0.00	0.0	0.0	0.0	0.0	0.0	8.7	10.8	9	0	0.00	0.01	1	Good condition		
21-Mar-17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not sampled					
Well Destroyed																						
GB44A	NA	NA	AECOM	17-May-18	10:25 AM	1013	0.3	5.2	0	0	2.9	24.7	0	0	0.00	0.15	2					
				18-Jun-09	-	1023	0	-	0.0	0.0	0.0	3.4	18.2	-	-	-	NA	1				
				22-Jun-09	-	1009	0	-	0.0	0.0	0.0	2.1	18.7	-	-	-	NA	1				
				01-Jul-09	-	990	0	-	0.0	0.0	0.0	2.0	18.3	-	-	-	NA	1				
				07-Jul-09	-	1020	0	-	0.0	0.0	0.0	2.3	18.1	-	-	-	NA	1				
				05-Aug-09	-	1013	0	-	0.0	0.0	0.0	3.5	18.1	-	-	-	NA	1				
				11-Aug-09	-	1002	0.2	-	0.0	0.0	0.0	3.6	17.5	-	-	-	NA	1				
				18-Aug-09	-	1017	0.02	-	0.0	0.0	0.0	3.3	17.6	-	-	-	NA	1				
				01-Sep-09	-	1011	0	-	0.0	0.0	0.0	2.9	18.1	-	-	-	NA	1				
				07-Sep-09	-	994	0	-	0.0	0.0	0.0	3.0	19.0	-	-	-	NA	1				
				15-Sep-09	-	1013	0	-	0.0	0.0	0.0	3.1	18.0	-	-	-	NA	1				
				23-Sep-09	-	988	-	-	0.0	0.0	0.0	3.4	17.1	-	-	-	NA	1				
				06-Oct-09	-	1004	0	-	0.0	0.0	0.0	2.9	18.0	-	-	-	NA	1				
				15-Oct-09	-	998	0.01	-	0.0	0.0	0.0	3.1	17.2	-	-	-	NA	1				
				20-Oct-09	-	1009	0	-	0.0	0.0	0.0	3.1	18.6	-	-	-	NA	1				
				04-Nov-09	-	1012	0	-	0.0	0.0	0.0	3.3	17.9	-	-	-	NA	1				
				17-Nov-09	-	1003	0	-	0.0	0.0	0.0	3.2	17.9	-	-	-	NA	1				
				01-Dec-09	-	1011	0	-	0.0	0.0	0.0	3.9	16.6	-	-	-	NA	1				
				14-Dec-09	-	1012	0	-	0.0	0.0	0.0	3.2	16.2	-	-	-	NA	1				
				04-Jan-10	-	1008	0	-	0.0	0.0	0.0	3.9	16.7	-	-	-	NA	1				
				18-Jan-10	-	1002	-0.03	-	0.0	0.0	0.0	3.0	18.5	-	-	-	NA	1				
				21-Oct-10	-	1008	0	-	0.0	0.0	0.0	4.1	14.7	-	-	-	NA	1				
				03-Jul-13	12:25	1020	-0.01	0.0	0.0	0.0	0.0	4.5	15.9	0	0	NA	NA	1				
16-Apr-14	12:48	1014	0.00	0.0	0.0	0.0	0.0	3.4	16.8	0	0	NA	NA	1	Good condition							
11-Jun-19	13:28	1011	0.00	0.0	0.0	0.0	0.0	10.8	6.5	0	0	NA	NA	1	LEL = 0.0%							
30-Aug-16	14:27	1005	0.00	0.0	0.0	0.0	0.0	4.4	16.1	0	0	NA	NA	1	Good condition							
21-Mar-17	9:02	1004	0.00	0.0	0.3	0.0	0.0	4.7	16.2	0	0	NA	NA	1	Good condition							
13-Dec-17	8:02	1001	0.00	0.0	0.0	0.0	0.0	4.0	16.4	0	0	NA	NA	1								
14-Mar-18	16:30	1005	0.31	5.5	0.0	0.0	0.0	3.1	18.2	1	1	0.00	0.17	2	Good condition							
24-Apr-18	8:33	1007	-0.02	-0.1	0.1	0.0	0.0	3.2	18.0	0	0	NA	NA	1	Good condition							
16-May-18	17:03	1019	0.30	5.2	0.0	0.0	0.0	3.1	23.6	0	0	0.00	0.16	2	Good condition							
11-Jun-19	13:55	1010	-0.09	-0.5	0.0	0.0	0.0	3.8	16.7	0	0	NA	NA	1	LEL = 0.0%							
GB46	NA	NA	AECOM	01-Jul-09	-	992	0	-	91.6	-	2.9	0.0	-	-	-	NA	1					
				07-Jul-09	-	1020	0	-	90.8	-	2.4	0.2	-	-	-	NA	1					
				05-Aug-09	-	1008	0.44	-	85.5	-	3.3	0.0	-	-	-	NA	1					
				11-Aug-09	-	1000	0.18	-	86.3	-	3.4	0.0	-	-	-	NA	1					
				18-Aug-09	-	1017	0.31	-	83.3	-	3.0	0.2	-	-	-	NA	1					
				01-Sep-09	-	1012	0.21	-	86.8	-	3.0	0.0	-	-	-	NA	1					
				07-Sep-09	-	993	0	-	71.8	-	2.8	2.5	-	-	-	NA	1					
				15-Sep-09	-	1010	0.27	-	84.2	-	3.0	0.0	-	-	-	NA	1					
				23-Sep-09	-	989	-	-	95.0	-	3.2	0.0	-	-	-	NA	1					
				06-Oct-09	-	1004	-0.07	-	90.4	-	2.8	0.3	-	-	-	NA	1					
				15-Oct-09	-	998	0.08	-	91.9	-	2.7	0.0	-	-	-	NA	1					
				20-Oct-09	-	1008	0.32	-	85.5	-	2.6	0.3	-	-	-	NA	1					
				04-Nov-09	-	1010	0.29	-	84.3	-	2.8	0.0	-	-	-	NA	1					
				17-Nov-09	-	1000	0.14	-	85.2	-	2.7	0.0	-	-	-	NA	1					
				01-Dec-09	-	1009	0.23	-	86.4	-	2.6	17.6	-	-	-	NA	1					
				14-Dec-09	-	1012	0	-	84.3	-	1.4	0.0	-	-	-	NA	1					
				04-Jan-10	-	1009	0.29	-	87.4	-	2.2	0.0	-	-	-	NA	1					
				18-Jan-10	-	1001	0.37	-	85.4	-	2.7	0.2	-	-	-	NA	1					
				21-Oct-10	-	1011	0	-	85.9	-	2.7	0.0	-	-	-	NA	1					
				30-Aug-16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not sampled	
				Well Lost / Destroyed																		
				GB46A	1.0-6.0	7	coffey - 21/06/2016	30-Aug-16	11:13	1009	0.50	8	95.9	95.8	4.1	0.0	11	1	7.67	0.33	4	Good condition
								20-Mar-17	11:25	1006	0.00	0	1.2	0.1	7.9	4.8	1	0	NA	NA	2	Good condition
13-Dec-17	14:07	995	0.00					0	4.9	4.9	6.8	0.0	0	0	NA	NA	2	Good condition				
24-Apr-18	15:03	1009	0.02					0	0.1	0.1	6.7	6.0	0	0	NA	NA	1	Good condition				
14-Mar-18	9:50	1012	0.00					0.0	0.2	0.2	6.7	6.6	3	0	NA	NA	1	Good condition				
17-May-18	11:25	1014	0.01					0.3	0.9	0.8	7.5	0.0	0	0	0.00	0.02	1					
13-Jun-19	9:12	1005	-0.03					-0.1	9.5	3.5	9.5	0.0	1	1	NA	NA	2					
18-Jun-09	-	1023	0					-	0.0	0.0	0.0	1.2	19.6	-	-	-	NA	1				
GB47	NA	NA	AECOM	22-Jun-09	-	1011	0.01	-	0.0	0.0	1.6	17.3	-	-	-	NA	1					
				01-Jul-09	-	992	0	-	0.0	0.0	3.0	16.2	-	-	-	NA	1					
				07-Jul-09	-	1017	0	-	0.0	0.0	0.0	3.1	15.9	-	-	-	NA	1				
				05-Aug-09	-	1008	0	-	0.0	0.0	0.0	5.2	14.0	-	-	-	NA	1				
				11-Aug-09	-	1000	0	-	0.0	0.0	0.0	5.2	13.8	-	-	-	NA	1				
				18-Aug-09	-	1017	0.02	-	0.0	0.0	0.0	5.3	13.4	-	-	-	NA	1				
				01-Sep-09	-	1012	0	-	0.0	0.0	0.0	5.5	13.6	-	-	-	NA	1				
				07-Sep-09	-	993	-0.01	-	0.0	0.0	0.0	4.6	15.5	-	-	-	NA	1				
				15-Sep-09	-	1010	0	-	0.0	0.0	0.0	5.6	13.0	-	-	-	NA	1				
				23-Sep-09	-	989	-	-	0.0	0.0	0.0	5.8	10.8	-	-	-	NA	1				
				06-Oct-09	-	1004	0	-	0.0	0.0	0.0	6.3	11.0	-	-	-	NA	1				
				15-Oct-09	-	998	0	-	0.0	0.0	0.0	6.0	12.3	-	-	-	NA	1				
				20-Oct-09	-	1008	0	-	0.0	0.0	0.0	6.9	9.3	-	-	-	NA	1				
				04-Nov-09	-	1010	0	-	0.0	0.0	0.0	8.7	6.1	-	-	-	NA	1				
				17-Nov-09	-	1000	0	-	0.0	0.0	0.0	9.8	5.5	-	-	-	NA	1				
				01-Dec-09	-	1009	0.02	-	0.0	0.0	0.0	10.7	6.6	-	-	-	NA	1				
				14-Dec-09	-	1012	0	-	0.0	0.0	0.0	10.7	3.4	-	-	-	NA	1				
				04-Jan-10	-	1009	0	-	0.0	0.0	0.0	10.2	6.2	-	-	-	NA	1				
				18-Jan-10	-	1001	0.01	-	0.0	0.0												

Table 1:
Historical Gas Bore Monitoring

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments			
GB48	NA	NA	AECOM	18-Jun-09	-	1023	0	-	0.0	0.0	2.8	18.2	-	-	-	NA	1				
				22-Jun-09	-	1011	0	-	0.0	0.0	0.0	0.0	2.3	18.8	-	-	-	NA	1		
				01-Jul-09	-	992	0	-	0.0	0.0	0.0	0.0	2.0	18.5	-	-	-	NA	1		
				07-Jul-09	-	1017	0	-	0.0	0.0	0.0	0.0	2.1	18.3	-	-	-	NA	1		
				05-Aug-09	-	1012	0	-	0.0	0.0	0.0	0.0	3.5	16.2	-	-	-	NA	1		
				11-Aug-09	-	1001	0.07	-	0.0	0.0	0.0	0.0	3.6	16.8	-	-	-	NA	1		
				18-Aug-09	-	1017	0	-	0.0	0.0	0.0	0.0	2.9	17.4	-	-	-	NA	1		
				01-Sep-09	-	1012	0	-	0.0	0.0	0.0	0.1	3.6	16.5	-	-	-	NA	1		
				07-Sep-09	-	993	0	-	0.0	0.0	0.0	0.0	2.9	18.7	-	-	-	NA	1		
				15-Sep-09	-	1012	0	-	0.0	0.0	0.0	0.0	3.7	16.9	-	-	-	NA	1		
				23-Sep-09	-	988	-	-	0.0	0.0	0.0	0.0	3.6	15.7	-	-	-	NA	1		
				06-Oct-09	-	1004	0	-	0.0	0.0	0.0	0.0	7.4	10.5	-	-	-	NA	1		
				15-Oct-09	-	998	0	-	0.0	0.0	0.0	0.0	7.6	10.9	-	-	-	NA	1		
				20-Oct-09	-	1008	0	-	0.0	0.0	0.0	0.0	9.4	10.0	-	-	-	NA	1		
				04-Nov-09	-	1011	0	-	0.0	0.0	0.0	0.0	8.0	12.0	-	-	-	NA	1		
				17-Nov-09	-	1001	0	-	0.0	0.0	0.0	0.0	5.7	14.9	-	-	-	NA	1		
				01-Dec-09	-	1011	-0.03	-	0.1	-	0.1	-	9.7	8.0	-	-	-	NA	1		
				14-Dec-09	-	1012	0	-	0.0	0.0	0.0	0.0	12.0	6.0	-	-	-	NA	1		
				04-Jan-10	-	1008	0	-	0.0	0.0	0.0	0.0	11.2	8.2	-	-	-	NA	1		
				18-Jan-10	-	1001	0	-	0.0	0.0	0.0	0.0	5.5	15.1	-	-	-	NA	1		
				21-Oct-10	-	1011	0	-	0.0	0.0	0.0	0.0	10.5	5.7	-	-	-	NA	1		
				03-Jul-13	14:15	1019	0.00	0.0	7.4	0.0	7.4	0.0	15.6	0.0	0	0	0	0.0	0.0	1	Water in standpipe cover
				16-Apr-14	14:02	1013	0.01	0.1	0.1	0.1	0.1	0.1	5.7	13.0	0	0	0.00	0.01	0.01	1	Water in standpipe cover
				30-Aug-16	13:23	1007	0.00	0.0	0.3	0.0	0.3	0.0	13.4	3.7	1	1	0.00	0.00	0.00	1	Good condition
				20-Mar-17	13:10	1005	0.00	0.0	0.0	0.0	0.0	0.0	6.9	12.6	0	0	0.00	0.00	0.00	1	Good condition
14-Mar-18	13:19	1008	0.30	5.4	0.0	0.0	5.4	0.0	6.0	13.9	2	2	0.00	0.32	0.00	2	Good condition				
03-May-18	14:30	999	0.09	0.2	0.0	0.0	0.2	0.0	5.0	13.0	1	0	0.00	0.01	0.00	1	Good condition				
17-May-18	15:50	1014	0.30	5.4	0.0	0.0	5.4	0.0	4.6	25.9	0	0	0.00	0.25	0.00	2	Good condition				
13-Jun-19	13:19	1004	0.00	0.0	0.0	0.0	0.0	0.0	5.1	13.7	0	0	0.00	0.00	0.00	1	Fallen tree surrounding well				
18-Jun-09	-	1023	0	-	0.0	0.0	0.0	0.0	1.5	20.0	-	-	-	NA	1						
22-Jun-09	-	1011	0	-	0.0	0.0	0.0	0.0	0.9	20.4	-	-	-	NA	1						
01-Jul-09	-	992	0	-	0.0	0.0	0.0	0.0	0.8	20.3	-	-	-	NA	1						
07-Jul-09	-	1017	0	-	0.0	0.0	0.0	0.0	0.9	19.4	-	-	-	NA	1						
05-Aug-09	-	1012	-0.15	-	0.0	0.0	0.0	0.0	1.1	19.9	-	-	-	NA	1						
11-Aug-09	-	1000	0	-	0.0	0.0	0.0	0.0	1.0	20.4	-	-	-	NA	1						
18-Aug-09	-	1017	0	-	0.0	0.0	0.0	0.0	0.9	19.9	-	-	-	NA	1						
01-Sep-09	-	1012	0	-	0.0	0.0	0.0	0.0	0.9	19.8	-	-	-	NA	1						
07-Sep-09	-	993	0	-	0.0	0.0	0.0	0.0	0.8	21.2	-	-	-	NA	1						
15-Sep-09	-	1011	0	-	0.0	0.0	0.0	0.0	0.9	20.0	-	-	-	NA	1						
23-Sep-09	-	989	-	-	0.0	0.0	0.0	0.0	1.2	19.4	-	-	-	NA	1						
06-Oct-09	-	1004	-0.29	-	0.0	0.0	0.0	0.0	1.8	18.5	-	-	-	NA	1						
15-Oct-09	-	998	0	-	0.0	0.0	0.0	0.0	1.3	19.9	-	-	-	NA	1						
20-Oct-09	-	1008	0	-	0.0	0.0	0.0	0.0	1.6	19.5	-	-	-	NA	1						
04-Nov-09	-	1010	0.01	-	0.4	-	0.4	-	2.1	17.8	-	-	-	NA	1						
17-Nov-09	-	1000	0	-	0.3	-	0.3	-	1.7	18.6	-	-	-	NA	1						
01-Dec-09	-	1009	0	-	0.5	-	0.5	-	3.7	16.0	-	-	-	NA	1						
14-Dec-09	-	1012	0.01	-	0.0	0.0	0.0	0.0	2.4	17.8	-	-	-	NA	1						
04-Jan-10	-	1009	0	-	0.2	-	0.2	-	2.9	17.7	-	-	-	NA	1						
18-Jan-10	-	1001	0.01	-	0.3	-	0.3	-	2.0	18.8	-	-	-	NA	1						
21-Oct-10	-	1011	0	-	0.2	-	0.2	-	5.0	14.7	-	-	-	NA	1						
17-Apr-14	9:50	1012	0.01	0.0	0.0	0.0	0.0	0.0	2.8	17.2	0	0	0.00	0.00	0.00	1	Good condition				
30-Aug-16	9:41	1009	0.00	0.0	0.0	0.0	0.0	0.0	1.9	19.2	0	0	0.00	0.00	0.00	1	Good condition				
20-Mar-17	11:55	1007	0.00	0.0	0.0	0.0	0.0	0.0	2.1	18.2	0	0	0.00	0.00	0.00	1	Good condition				
13-Dec-17	13:16	996	0.00	0.0	0.0	0.0	0.0	0.0	5.1	11.6	0	0	0.00	0.00	0.00	1	Good condition				
14-Mar-18	12:08	1012	0.30	5.2	0.0	0.0	5.2	0.0	2.8	17.6	1	1	0.00	0.15	0.00	2	Good condition				
24-Apr-18	15:18	1009	0.19	0.0	0.1	0.1	0.1	0.1	3.0	18.5	0	0	0.00	0.00	0.00	1	Good condition				
17-May-18	15:15	1011	-	0.0	0.0	0.0	0.0	0.0	3.3	17.0	-1	0	0.00	0.00	0.00	1					
13-Jun-19	10:33	1005	-0.01	0.0	0.0	0.0	0.0	0.0	2.4	18.1	0	0	0.00	0.00	0.00	1					
18-Jun-09	-	1023	0	-	0.0	0.0	0.0	0.0	4.8	16.9	-	-	-	NA	1						
22-Jun-09	-	1011	0	-	0.0	0.0	0.0	0.0	3.2	17.5	-	-	-	NA	1						
01-Jul-09	-	992	0	-	0.0	0.0	0.0	0.0	3.6	17.1	-	-	-	NA	1						
07-Jul-09	-	1017	0	-	0.0	0.0	0.0	0.0	3.6	16.7	-	-	-	NA	1						
05-Aug-09	-	1012	-0.19	-	0.0	0.0	0.0	0.0	5.5	15.3	-	-	-	NA	1						
11-Aug-09	-	1000	0.22	-	0.0	0.0	0.0	0.0	5.6	15.2	-	-	-	NA	1						
18-Aug-09	-	1017	0.02	-	0.0	0.0	0.0	0.0	5.7	14.8	-	-	-	NA	1						
01-Sep-09	-	1012	0	-	0.0	0.0	0.0	0.0	6.2	13.9	-	-	-	NA	1						
07-Sep-09	-	993	-0.01	-	0.0	0.0	0.0	0.0	5.4	15.7	-	-	-	NA	1						
15-Sep-09	-	1011	0.04	-	0.0	0.0	0.0	0.0	6.2	13.7	-	-	-	NA	1						
23-Sep-09	-	989	-	-	0.0	0.0	0.0	0.0	6.1	12.5	-	-	-	NA	1						
06-Oct-09	-	1004	0.01	-	0.0	0.0	0.0	0.0	7.1	12.1	-	-	-	NA	1						
15-Oct-09	-	998	0	-	0.0	0.0	0.0	0.0	7.0	11.9	-	-	-	NA	1						
20-Oct-09	-	1008	0	-	0.0	0.0	0.0	0.0	8.0	11.3	-	-	-	NA	1						
04-Nov-09	-	1010	0	-	0.0	0.0	0.0	0.0	8.9	10.9	-	-	-	NA	1						
17-Nov-09	-	1000	0	-	0.0	0.0	0.0	0.0	8.7	12.5	-	-	-	NA	1						
01-Dec-09	-	1009	-0.03	-	0.0	0.0	0.0	0.0	9.7	10.4	-	-	-	NA	1						
14-Dec-09	-	1012	0	-	0.0	0.0	0.0	0.0	10.3	9.2	-	-	-	NA	1						
04-Jan-10	-	1009	0.03	-	0.0	0.0	0.0	0.0	10.6	10.7	-	-	-	NA	1						
18-Jan-10	-	1001	0	-	0.0	0.0	0.0	0.0	6.7	15.5	-	-	-	NA	1						
21-Oct-10	-	1011	0	-	0.0	0.0	0.0	0.0	7.9	9.6	-	-	-	NA	1						
03-Jul-13	15:30	1018	0.00	0.0	0.1	0.1	0.1	0.0	7.5	11.8	0	0	0.00	0.00	0.00	1					
17-Apr-14	9:43	1012	0.00	0.1	0.0	0.0	0.0	0.0	4.7	15.4	0	0	0.00	0.00	0.00	1	Good condition				
30-Aug-16	9:47	1010	0.00	0.0	0.0	0.0	0.0	0.0	6.2	14.2	0	1	0.00	0.00	0.00	1	Good condition				
20-Mar-17	12:00	1007	0.00	0.0	0.0	0.0	0.0	0.0	4.1	16.9	0	0	0.00	0.00	0.00	1	Good condition				
13-Dec-17	13:12	997	0.00	0.0	0.0	0.0	0.0	0.0	4.5	13.8	0	0	0.00	0.00	0.00	1	Good condition				
14-Mar-18	12:18	1009	0.00	0.0	0.0	0.0	0.0	0.0	4.0	16.8	0	0	0.00	0.00	0.00	1	Good condition				
24-Apr-18	15:17	1009	-0.05	0.1	0.1	0.1	0.1	0.1	4.0	17.9	0	0	0.00	0.00	0.00	1	Good condition				
17-May-18	15:22	1011	-	0.0	0.0	0.0	0.0	0.0	3.9	17.1	-1	0	0.00	0.00	0.00	1					
13-Jun-19	10:40	1005	0.03	0.7	0.0	0.0	0.7	0.0	3.7	16.3	0	0	0.00	0.03	0.00	1	broken guard rail, vegetation may be in the way for future access				
01-Jul-09	-	-	-	-	0.0	0.0	0.0	0.0	0.4	17.4	-	-	-	NA	1						
07-Jul-09	-	1017	0	-	0.0	0.0	0.0	0.0	0.7	16.6	-	-	-	NA	1						
14-Jul-09	-	995	0	-	0.0	0.0	0.0	0.0	0.9	6.6	-	-	-	NA	1						
21-Jul-09	-	1004	0	-	0.0	0.0	0.0	0.0	1.2	16.0	-	-	-								

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments			
GB51 7.8	NA	NA	AECOM	14-Jul-09	-	995	-5.61	-	0.0	0.0	5.6	0.4	-	-	-	NA	1				
				21-Jul-09	-	1004	-1.52	-	0.0	0.0	0.0	7.5	2.2	-	-	-	-	NA	1		
				28-Jul-09	-	1013	-0.27	-	0.0	0.0	0.0	6.1	5.4	-	-	-	-	NA	1		
				05-Aug-09	-	1012	-0.26	-	0.0	0.0	0.0	8.2	2.1	-	-	-	-	NA	1		
				11-Aug-09	-	1000	0	-	0.0	0.0	0.0	8.6	2.0	-	-	-	-	NA	1		
				18-Aug-09	-	1017	0	-	0.0	0.0	0.0	9.4	2.4	-	-	-	-	NA	1		
				01-Sep-09	-	1012	0	-	0.0	0.0	0.0	10.2	1.9	-	-	-	-	NA	1		
				07-Sep-09	-	993	0	-	0.0	0.0	0.0	7.5	7.9	-	-	-	-	NA	1		
				15-Sep-09	-	1011	0.06	-	0.0	0.0	0.0	10.1	2.3	-	-	-	-	NA	1		
				23-Sep-09	-	988	-	-	0.0	0.0	0.0	9.7	1.6	-	-	-	-	NA	1		
				06-Oct-09	-	1004	-0.03	-	0.0	0.0	0.0	10.7	3.3	-	-	-	-	NA	1		
				15-Oct-09	-	996	0	-	0.0	0.0	0.0	9.9	2.1	-	-	-	-	NA	1		
				20-Oct-09	-	1008	0.05	-	0.0	0.0	0.0	10.6	3.6	-	-	-	-	NA	1		
				04-Nov-09	-	1011	0.03	-	0.0	0.0	0.0	11.1	3.3	-	-	-	-	NA	1		
				17-Nov-09	-	1000	0.1	-	0.0	0.0	0.0	11.0	3.8	-	-	-	-	NA	1		
				01-Dec-09	-	1009	0	-	0.0	0.0	0.0	10.7	4.6	-	-	-	-	NA	1		
				14-Dec-09	-	1012	0	-	0.0	0.0	0.0	10.1	3.9	-	-	-	-	NA	1		
				04-Jan-10	-	1009	0	-	0.0	0.0	0.0	7.1	4.9	-	-	-	-	NA	1		
				18-Jan-10	-	1001	0	-	0.0	0.0	0.0	11.1	4.7	-	-	-	-	NA	1		
				21-Oct-10	-	1011	0	-	0.0	0.0	0.0	8.5	7.1	-	-	-	-	NA	1		
16-Apr-14	15:38	1013	0.01	0.1	0.0	0.0	0.0	1.9	17.1	0	0	0.00	0.00	1	1	Good condition, possible backage					
20-Mar-17	12:18	1006	0.00	0.0	0.0	0.0	0.0	8.1	10.5	0	0	0	0	NA	1	1	Good condition				
GB52	NA	NA	AECOM	18-Jun-09	-	1023	0	-	0.0	0.0	1.8	19.7	-	-	-	NA	1				
				22-Jun-09	-	1011	0	-	0.0	0.0	1.0	20.2	-	-	-	-	NA	1			
				01-Jul-09	-	992	0	-	0.0	0.0	1.5	19.2	-	-	-	-	NA	1			
				07-Jul-09	-	1017	0	-	0.0	0.0	1.1	19.6	-	-	-	-	NA	1			
				05-Aug-09	-	1012	-0.21	-	0.0	0.0	2.5	18.5	-	-	-	-	NA	1			
				11-Aug-09	-	1000	0.04	-	0.0	0.0	2.8	18.4	-	-	-	-	NA	1			
				18-Aug-09	-	1017	0.01	-	0.0	0.0	2.6	18.1	-	-	-	-	NA	1			
				01-Sep-09	-	1012	0	-	0.0	0.0	3.0	17.3	-	-	-	-	NA	1			
				07-Sep-09	-	993	0	-	0.0	0.0	3.5	18.1	-	-	-	-	NA	1			
				15-Sep-09	-	1011	0.04	-	0.0	0.0	3.5	17.2	-	-	-	-	NA	1			
				23-Sep-09	-	988	-	-	0.0	0.0	4.2	16.1	-	-	-	-	NA	1			
				06-Oct-09	-	1004	-0.03	-	0.0	0.0	4.2	16.3	-	-	-	-	NA	1			
				15-Oct-09	-	996	0.02	-	0.0	0.0	3.4	18.3	-	-	-	-	NA	1			
				20-Oct-09	-	1008	0.02	-	0.0	0.0	3.9	17.6	-	-	-	-	NA	1			
				04-Nov-09	-	1011	0	-	0.0	0.0	2.8	18.0	-	-	-	-	NA	1			
				17-Nov-09	-	1000	0	-	0.0	0.0	2.0	19.0	-	-	-	-	NA	1			
				01-Dec-09	-	1009	0	-	0.0	0.0	2.7	18.1	-	-	-	-	NA	1			
				14-Dec-09	-	1012	0	-	0.0	0.0	2.5	11.0	-	-	-	-	NA	1			
				04-Jan-10	-	1009	0.01	-	0.0	0.0	1.7	19.3	-	-	-	-	NA	1			
				18-Jan-10	-	1001	0	-	0.0	0.0	1.6	19.4	-	-	-	-	NA	1			
				21-Oct-10	-	1011	0	-	0.0	0.0	3.7	15.8	-	-	-	-	NA	1			
				03-Jul-13	15:10	1018	0.00	0.0	0.1	0.0	2.6	18.3	0	0	0	0	NA	1	1	Good condition, spiders present	
				16-Apr-14	15:22	1013	0.00	0.1	0.0	0.0	2.7	17.8	0	0	0.00	0.00	1	1	1	Good condition, spiders present	
				30-Aug-16	10:00	1010	0.00	0.0	0.0	0.0	3.9	16.8	0	0	0	0	NA	1	1	Good condition	
				20-Mar-17	12:25	1006	0.00	0.0	0.0	0.0	1.7	19.3	0	0	0	0	NA	1	1	Good condition	
				13-Dec-17	14:11	994	0.00	0.0	0.0	0.0	2.4	18.1	0	0	0	0	NA	1	1	Good condition	
				14-Mar-18	12:38	1009	0.00	0.0	0.0	0.0	1.2	19.6	0	0	0	0	NA	1	1	Good condition	
				24-Apr-18	15:29	1009	0.03	0.1	0.1	0.0	1.4	20.4	0	0	0.00	0.00	1	1	1	Good condition	
				17-May-18	15:43	1011	-	0.0	0.0	0.0	1.7	19.1	-1	0	0	0	NA	1	1	Good condition	
				13-Jun-19	11:09	1005	-0.01	-0.3	0.0	0.0	2.0	19.0	0	0	0	0	NA	1	1	Good condition	
GB53	NA	NA	AECOM	18-Jun-09	-	1023	0	-	0.0	0.0	1.4	20.0	-	-	-	NA	1				
				22-Jun-09	-	1011	0	-	0.0	0.0	0.8	20.5	-	-	-	-	NA	1			
				01-Jul-09	-	992	0	-	0.0	0.0	1.0	20.0	-	-	-	-	NA	1			
				07-Jul-09	-	1017	0	-	0.0	0.0	0.9	19.9	-	-	-	-	NA	1			
				05-Aug-09	-	1012	0	-	0.0	0.0	1.5	19.7	-	-	-	-	NA	1			
				11-Aug-09	-	1000	0	-	0.0	0.0	1.8	19.6	-	-	-	-	NA	1			
				18-Aug-09	-	1017	0	-	0.0	0.0	1.3	19.5	-	-	-	-	NA	1			
				01-Sep-09	-	1012	0	-	0.0	0.0	1.4	19.5	-	-	-	-	NA	1			
				07-Sep-09	-	993	0	-	0.0	0.0	1.5	20.7	-	-	-	-	NA	1			
				15-Sep-09	-	1011	0	-	0.0	0.0	1.4	19.8	-	-	-	-	NA	1			
				23-Sep-09	-	988	-	-	0.0	0.0	1.8	19.1	-	-	-	-	NA	1			
				06-Oct-09	-	1004	-0.02	-	0.0	0.0	1.6	19.3	-	-	-	-	NA	1			
				15-Oct-09	-	996	0	-	0.0	0.0	1.2	20.0	-	-	-	-	NA	1			
				20-Oct-09	-	1008	0	-	0.0	0.0	1.7	19.8	-	-	-	-	NA	1			
				04-Nov-09	-	1011	0	-	0.0	0.0	1.9	18.9	-	-	-	-	NA	1			
				17-Nov-09	-	1000	0	-	0.0	0.0	1.4	19.5	-	-	-	-	NA	1			
				01-Dec-09	-	1009	0.02	-	0.0	0.0	2.4	18.3	-	-	-	-	NA	1			
				14-Dec-09	-	1012	0	-	0.0	0.0	1.6	18.9	-	-	-	-	NA	1			
				04-Jan-10	-	1008	0	-	0.0	0.0	2.9	18.0	-	-	-	-	NA	1			
				18-Jan-10	-	1001	0	-	0.0	0.0	1.3	19.6	-	-	-	-	NA	1			
				21-Oct-10	-	1011	0	-	0.0	0.0	2.3	17.8	-	-	-	-	NA	1			
				03-Jul-13	15:00	1018	0.00	0.0	0.0	0.0	2.2	19.2	0	0	0	0	NA	1	1	Good condition	
				16-Apr-14	15:16	1012	0.10	0.1	0.0	0.0	1.8	18.8	0	0	0.00	0.00	1	1	1	Good condition	
				30-Aug-16	10:06	1010	0.00	0.0	0.0	0.0	2.1	19.2	0	1	0	0	NA	1	1	Good condition	
				20-Mar-17	12:30	1005	0.00	0.0	0.0	0.0	2.5	18.3	0	0	0	0	NA	1	1	Good condition	
				13-Dec-17	13:46	997	0.00	0.0	0.0	0.0	3.3	0.0	29	1	0	0	0	NA	1	1	After sampling flow=0.2 and pressure=0.1 Pa
				14-Mar-18	12:35	1009	0.30	5.3	0.0	0.0	1.9	19.2	1	1	0.00	0.10	2	2	1	Good condition	
03-May-18	7:25	1004	0.09	0.3	0.0	0.0	3.3	18.7	0	0	0.00	0.01	1	1	1	Good condition					
17-May-18	15:45	1011	-	0.0	0.0	0.0	2.4	18.4	-1	0	0	0	NA	1	1	Good condition					
13-Jun-19	11:20	1005	0.04	0.7	0.0	0.0	1.8	19.3	0	0	0.00	0.01	1	1	1	Good condition					
GB54	NA	NA	AECOM	18-Aug-09	-	1015	0.02	-	0.0	0.0	1.3	19.1	-	-	-	NA	1				
				01-Sep-09	-	1012	0	-	0.0	0.0	1.9	18.4	-	-	-	-	NA	1			
				07-Sep-09	-	993	0	-	0.3	-	2.1	19.2	-	-	-	-	NA	1			
				15-Sep-09	-	1012	0	-	0.0	0.0	2.2	18.5	-	-	-	-	NA	1			
				23-Sep-09	-	988	-	-	0.5	-	3.7	14.9	-	-	-	-	NA	1			
				06-Oct-09	-	1004	0	-	0.0	0.0	4.8	14.2	-	-	-	-	NA	1			
				15-Oct-09	-	996	0	-	0.0	0.0	5.2	15.1	-	-	-	-	NA	1			
				20-Oct-09	-	1008	0	-	0.1	-	5.7	13.8	-	-	-	-	NA	1			
				04-Nov-09	-	1011	0	-	0.2	-	4.9	14.5	-	-	-	-	NA	1			
				17-Nov-09	-	1001	0	-	0.0	0.0	3.7	16.4	-	-	-	-	NA	1			
				01-Dec-09	-	1011	0.02	-	0.0	0.0	7.4	10.8	-	-	-	-	NA	1			
				14-Dec-09	-	1012	0	-	0.0	0.0	6.2	12.3	-	-	-	-	NA	1			
				04-Jan-10	-	1008	0	-	0.0	0.0	9.6	11.7	-	-	-	-	NA	1			
				18-Jan-10	-	1001	0	-	0.0	0.0	3.8	16.2	-	-	-	-	NA	1			
				21-Oct-10	-	1011	0	-	0.0	0.0	5.3	11.6	-	-	-	-	NA	1			
				16-Apr-14	15:43	1012	0.01	0.1	0.0	0.0	5.8	13.4	0	0	0.00	0.01	1	1	1	Good condition	
				30-Aug-16	11:45	1007	0.11	2.2	0.0	0.0	7.0	11.4	0	0	0.00	0.15	2	2	1	Good condition	
				20-Mar-17	12:28	1005	0.00	0.0	0.0	0.0	7.9	9.5	1	1	0	0	NA	1	1	Good condition	
				13-Dec-17	12:00	99															

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments
GB55	1-8.5	8.5	coffey - 08/04/2014	17-Apr-14	12:08	1015	0.01	0.3	59.8	59.8	16.2	0.1	2	0	0.18	0.05	2	Good condition
				31-Aug-16	13:29	1001	0.38	6.4	45.1	45.1	12.4	1.7	5	1	2.89	0.79	3	Good condition
				20-Mar-17	9:30	1008	0.00	0.0	63.2	63.0	18.5	0.0	1	1	NA	NA	2	Casing damaged and bent, not cracked.
				14-Mar-18	10:53	1013	0.25	4.4	61.6	57.6	18.6	0.0	4	1	2.71	0.82	3	Good condition
				03-May-18	10:05	1004	0.21	0.1	53.5	52.7	17.6	0.0	0	0	0.05	0.02	2	Good condition
				17-May-18	10:20	1015	-	-1.8	60.9	57.8	17.4	0.0	1	0	NA	NA	2	Good condition
11-Jun-19	15:52	1009	0.34	5.7	53.7	53.7	15.0	0.0	8	4	3.06	0.86	3	LEL = >>>				
GB56	1.0 - 5	7	coffey - 08/04/2014	16-Apr-14	11:21	1015	0.01	0.1	17.8	17.8	1.1	0.3	1	0	0.02	0.00	2	Good condition
				30-Aug-16	10:30	1010	0.17	3.1	11.5	11.5	2.4	3.3	0	0	0.36	0.07	2	Good condition
				20-Mar-17	11:00	1007	0.03	0.6	19.7	19.3	1.4	0.0	0	0	0.12	0.01	2	Good condition
				13-Dec-17	10:00	1000	0.00	0.0	22.3	21.4	1.1	0.0	22	0	NA	NA	2	Good condition
				14-Mar-18	10:28	1011	0.00	0.0	23.4	19.6	2.1	0.0	8	1	NA	NA	2	Good condition
				24-Apr-18	14:25	1009	-0.03	0.1	17.6	0.7	1.3	18.7	0	0	0.02	0.00	2	Good condition
				17-May-18	11:10	1015	0.60	1.2	19.4	17.4	2.3	0.0	0	0	0.23	0.03	2	Good condition
				13-Jun-19	8:57	1005	-0.03	-0.7	11.4	11.4	2.0	0.0	1	0	NA	NA	2	Good condition
GB57	1.0 - 9.5	9.5	coffey - 08/04/2014	17-Apr-14	13:15	1015	0.10	0.3	0.2	0.2	8.6	10.9	2	0	0.00	0.03	1	Good condition
				30-Aug-16	8:37	1012	0.00	0.0	0.0	0.0	7.0	11.6	1	1	NA	NA	1	Good condition
				21-Mar-17	11:30	1004	0.00	0.0	0.0	0.0	6.0	14.3	0	0	NA	NA	1	Good condition
				13-Dec-17	9:11	998	0.00	0.0	0.0	0.0	8.8	11.2	0	0	NA	NA	1	Good condition
				15-Mar-18	15:35	1007	0.30	5.2	0.0	0.0	2.5	18.1	1	1	0.00	0.13	2	Good condition
				24-Apr-18	11:20	1009	0.21	0.1	0.4	0.1	1.4	19.9	0	0	0.00	0.00	1	Good condition
				17-May-18	10:16	1016	-	0.0	0.0	0.0	3.9	16.4	-1	0	NA	NA	1	Good condition
				11-Jun-19	15:46	1008	0.13	2.8	0.0	0.0	6.8	12.7	0	0	0.00	0.19	2	Good condition
GB58	1.0 - 9.5	9.5	coffey - 08/04/2014	17-Apr-14	13:25	1015	0.01	0.1	0.0	0.0	6.2	14.3	0	0	0.00	0.01	1	Good condition
				31-Aug-16	9:25	1003	0.00	0.0	0.0	0.0	6.3	12.8	0	0	NA	NA	1	Good condition
				21-Mar-17	11:35	1004	0.00	0.0	0.0	0.0	7.4	13.8	0	0	NA	NA	1	Good condition
				13-Dec-17	10:40	998	0.00	0.1	61.8	59.4	20.1	0.0	22	0	0.06	0.02	2	After sampling flow=0.3 and pressure 0.1 Pa
				15-Mar-18	15:43	1006	0.31	5.4	0.0	0.0	6.8	14.7	1	1	0.00	0.37	2	Well casing broken
				24-Apr-18	11:26	1009	0.02	0.2	0.1	0.1	4.0	18.2	0	0	0.00	0.01	1	Good condition
				17-May-18	10:10	1017	-	0.0	0.0	0.0	4.4	16.4	-1	0	NA	NA	1	Good condition
				11-Jun-19	11:13	1012	0.01	0.8	0.0	0.0	2.6	17.9	0	0	0.00	0.02	1	Good condition
				16-Apr-14	9:32	1018	0.00	0.0	0.0	0.0	2.2	19.2	0	0	NA	NA	1	Good condition
GB59	1.0 - 9.5	9.5	coffey - 08/04/2014	31-Aug-16	8:41	1004	-0.08	-1.5	0.0	0.0	5.4	10.0	0	0	NA	NA	1	Good condition
				21-Mar-17	11:54	1004	0.00	0.0	0.0	0.0	2.5	17.7	0	0	NA	NA	1	Good condition
				13-Dec-17	8:54	998	0.00	0.0	0.0	0.0	5.2	12.5	0	0	NA	NA	1	Good condition
				15-Mar-18	13:40	1007	0.29	5.2	0.0	0.0	2.7	17.7	1	1	0.00	0.14	2	Good condition
				24-Apr-18	11:37	1009	-0.05	0.1	0.2	0.1	2.3	18.9	0	0	0.00	0.00	1	Good condition
				16-May-18	17:10	1017	-	0.0	0.0	0.0	3.1	16.3	-1	0	NA	NA	1	Good condition
				11-Jun-19	10:24	1012	-0.01	-0.3	0.0	0.0	1.2	19.5	0	0	NA	NA	1	Good condition
				30-Aug-16	11:37	1008	0.46	7.4	8.6	8.5	0.8	0.0	5	1	0.64	0.06	2	Good condition
				20-Mar-17	14:29	1009	0.27	5.1	6.4	6.4	1.1	0.0	0	1	0.33	0.06	2	Good condition
GB60	2.5-6.5	7.5	coffey - 22/06/2016	13-Dec-17	11:10	1000	0.00	0.0	6.5	5.5	0.7	0.0	51	2	NA	NA	2	Good condition
				14-Mar-18	13:55	1006	0.00	0.0	7.0	6.4	0.8	0.0	55	3	NA	NA	2	Good condition
				03-May-18	8:40	1004	0.19	0.1	6.7	6.2	1.0	1.9	0	0	0.01	0.00	2	Good condition
				17-May-18	14:34	1012	0.00	0.0	6.8	6.6	0.9	0.2	0	0	NA	NA	2	Good condition
				13-Jun-19	10:55	1005	0.16	3.1	4.8	4.8	0.5	0.0	4	1	0.15	0.02	2	LEL = >>>-> GF varied between 0.4 to 3.7 pretty stable at 3.1, BP varied between 1 to 17 but pretty stable at 16 Pa
				31-Aug-16	11:46	1002	0.49	7.9	65.3	65.3	20.6	0.0	5	1	5.16	1.63	4	Good condition
GB61	1.0-4.5	4.7	coffey - 23/06/2016	20-Mar-17	14:23	1007	0.42	7.6	66.2	66.1	19.8	0.0	0	1	5.03	1.50	4	Good condition
				13-Dec-17	11:55	998	0.00	0.2	68.9	68.4	15.4	0.0	21	3	0.14	0.03	2	After sampling flow=0.2 and pressure=1 Pa
				14-Mar-18	13:41	1010	0.24	4.3	61.6	58.7	20.6	0.0	1	5	2.65	0.89	3	H2S odour/ petrol odour observed
				03-May-18	8:30	1004	0.33	0.1	52.0	51.2	22.0	0.0	0	4	0.05	0.02	2	Good condition
				17-May-18	12:46	1013	-0.07	-1.6	55.7	48.9	21.9	0.0	1	0	NA	NA	2	Good condition
				12-Jun-19	15:59	998	-0.03	-0.3	52.1	52.1	22.0	0.0	5	19	NA	NA	2	Good condition
GB62	1.0-5.0	5	coffey - 22/06/2016	30-Aug-16	11:32	1008	0.50	8.0	17.2	17.1	1.5	0.0	1	0	1.38	0.12	3	Good condition
				20-Mar-17	14:33	1008	0.20	4.0	3.1	3.1	3.3	1.4	0	1	0.12	0.13	2	Good condition
				13-Dec-17	13:24	997	0.00	0.1	4.7	4.4	1.5	0.0	29	1	0.00	0.00	2	After sampling flow=0.2 and pressure=0.1 Pa
				14-Mar-18	13:14	1010	0.30	5.3	1.3	0.3	4.2	0.4	4	1	0.07	0.22	2	Good condition
				03-May-18	8:50	1004	0.12	0.0	2.1	0.0	4.5	10.2	0	0	NA	NA	2	Good condition
				17-May-18	14:42	1012	0.00	0.0	1.6	0.7	4.6	0.0	0	0	NA	NA	2	Good condition
GB63	3.5-6.5	6.5	coffey - 22/06/2016	30-Aug-16	11:25	1008	0.30	5.2	2.4	1.9	0.8	0.6	6	1	0.12	0.04	2	Good condition
				20-Mar-17	11:50	1006	0.06	1.3	2.7	2.7	0.7	4.0	0	1	0.04	0.01	2	Good condition
				13-Dec-17	13:15	996	0.00	0.1	1.8	1.6	0.8	0.6	18	0	0.00	0.00	2	Good condition
				14-Mar-18	15:11	1007	0.00	0.0	2.3	2.2	0.6	2.6	9	1	NA	NA	2	Good condition
				03-May-18	9:10	1004	0.13	0.1	1.6	1.6	0.5	1.6	1	0	0.00	0.00	2	Good condition
				17-May-18	14:56	1011	-	0.1	1.9	1.6	0.7	1.8	1	0	0.00	0.00	2	Good condition
GB64	6.0-10.0	10	coffey - 23/06/2016	13-Jun-19	10:20	1004	0.00	0.0	0.6	0.6	0.0	0.0	3	1	NA	NA	1	LEL = >>>-> GF varied between 0.4 to 3.7 pretty stable at 3.1, BP varied between 1 to 17 but pretty stable at 16 Pa
				31-Aug-16	12:25	1001	0.64	9.7	37.6	37.5	2.9	0.0	5	1	3.65	0.28	4	Good condition
				20-Mar-17	14:12	1008	0.43	7.6	40.0	40.0	2.8	0.0	0	1	3.04	0.21	3	Good condition
				13-Dec-17	10:38	997	0.00	0.0	47.5	46.7	2.2	0.0	0	0	NA	NA	2	Good condition
				14-Mar-18	13:57	1008	0.24	4.5	40.0	37.3	2.3	0.0	4	1	1.80	0.10	3	Slight petrol like odour
				03-May-18	9:50	1004	0.09	0.0	41.4	38.1	2.6	0.0	1	0	NA	NA	2	Good condition
				17-May-18	14:19	1014	-0.02	-0.7	38.3	11.4	2.8	0.0	0	0	NA	NA	2	Good condition
				12-Jun-19	13:12	999	0.62	9.4	28.0	28.0	2.0	0.0	2	0	2.63	0.19	3	LEL = >>>->
GB65	4.0-8.5	8.5	coffey - 23/06/2016	30-Aug-16	9:07	1010	0.00	0.0	0.0	0.0	8.2	9.3	1	0	NA	NA	1	Good condition
				20-Mar-17	11:15	1006	0.00	0.0	1.5	1.5	0.3	18.5	0	1	NA	NA	2	Good condition
				13-Dec-17	13:50	998	0.00	0.0	0.0	0.0	6.1	12.6	0	0	NA	NA	1	Good condition
				14-Mar-18	12:01	1009	0.00	0.0	0.0	0.0	8.4	9.5	0	0	NA	NA	1	Standpipe lid is broken
				24-Apr-18	13:52	1008	0.00	0.2	0.0	0.0	8							

Bore Number	screen interval	depth (m)	installed by	Date	Time	Barometric Pressure	Relative Pressure	Stable Flow	Peak Methane	Sustained Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulfide	GSV CH ₄	GSV CO ₂	Character-istic Situation ¹	Comments			
GB71	4.0-9.0	10	coffey - 22/06/2016	31-Aug-16	11:11	1002	0.13	2.5	17.4	17.4	5.2	10.3	0	0	0.44	0.13	2	Good condition			
				20-Mar-17	15:31	1004	0.68	11.0	46.1	46.1	7.9	0.0	0	0	0	0	5.07	0.87	4	Good condition	
				13-Dec-17	10:10	997	0.00	0.4	61.0	59.4	6.9	0.0	0	0	0	0	0.24	0.03	2	Flow after sampling increased to 0.6	
				14-Mar-18	16:18	1004	0.00	0.0	49.9	43.5	7.9	0.0	13	0	0	0	NA	NA	2	Good condition	
				24-Apr-18	11:07	1009	0.50	0.1	49.9	51.7	9.1	0.6	0	0	0	0	0.05	0.01	2	Good condition	
				17-May-18	14:18	1016	-	4.2	64.4	54.4	5.5	-	0	0	0	7	2.70	0.23	3	Good condition	
				12-Jun-19	8:40	1004	-0.56	-8.7	53.0	53.0	5.3	0.0	1	0	0	0	NA	NA	2	LEL = >>>> Gas flow and BP fluctuating	
				12-Jun-19	12:56	1000	0.20	23.4	-	-	-	-	-	-	-	-	-	-	-	0	Remove cap and leave off for 1 hr, cap removed at 1pm, readings were stable, put cap back on at 2:41 pm wait 2 min and take readings, flow = 2.7L/hr, pressure = -8Pa, try second meter, GFM430 10550 Flow - 4.4L/hr and BP - 18Pa (bouncing around)
				12-Jun-19	16:27	999	0.63	9.7	42.7	42.7	15.1	5.3	1	0	0	0	4.14	1.46	4	LEL = >>>> Gas flow and BP stable over min period second has measurements	
				27-Jun-19	9:20	1022	0.32	5.4	56.1	56.1	6.9	0.0	0	0	0	0	3.03	0.37	3	LEL = >>>> Gas flow and BP stable over min period second has measurements	
29-Jul-19	13:23	1007	0.89	13.2	45.9	45.9	14.4	3.2	1	0	0	0	6.06	1.90	4	LEL = >>>>					
GB72	2.0-6.5	7.2	coffey - 21/06/2016	31-Aug-16	11:00	1002	0.00	0.0	0.0	0.0	0.1	21.4	0	0	NA	NA	1	Good condition			
				20-Mar-17	15:20	1004	0.00	0.0	0.0	0.0	0.0	12.3	6.6	0	0	NA	NA	1	Good condition		
				13-Dec-17	10:15	998	0.00	0.0	0.0	0.0	0.0	14.6	0.0	15	0	NA	NA	1	Good condition		
				14-Mar-18	16:42	1004	0.00	0.0	0.9	0.8	16.7	0.0	15	0	0	NA	NA	1	Standpipe lid broken		
				24-Apr-18	10:47	1009	0.09	-0.1	0.6	0.4	17.5	0.0	0	0	0	NA	NA	1	Good condition		
				16-May-18	17:10	1019	0.32	5.5	0.8	0.6	17.5	-	0	5	0.04	0.96	3	Groundwater within screen interval (6.4 - 7.2)			
				29-Jul-19	11:44	1009	0.06	1.1	9.0	9.0	15.6	0.0	0	0	0.10	0.17	2	LEL = >>>> Gas flow fluctuated between -3 and 3 and BP fluctuated between -1 and 3. Groundwater within screen interval (6.4 - 7.2)			
				31-Aug-16	10:36	1005	0.00	0.0	12.1	12.1	9.4	1.7	1	1	NA	NA	2	Good condition			
GB73	1.0-6.0	6	coffey - 21/06/2016	21-Mar-17	8:59	1004	0.00	0.0	41.8	41.8	26.4	0.0	0	0	NA	NA	2	Good condition			
				13-Dec-17	8:15	1002	0.00	0.0	43.1	41.7	16.2	0.0	5	0	NA	NA	2	Good condition			
				15-Mar-18	16:34	1005	0.31	5.4	3.3	0.0	16.0	0.8	1	1	0.18	0.86	3	Good condition			
				24-Apr-18	10:35	1009	-0.03	0.0	24.9	24.2	21.0	0.0	0	0	0	NA	NA	2	Good condition		
				17-May-18	16:31	1013	0.27	4.6	48.9	44.3	19.5	-	0	0	2.25	0.90	3	Groundwater within screen interval (5.8 - 6.0)			
				14-Mar-18	17:02	1005	0.00	0.0	4.7	3.9	14.9	0.0	28	2	2	NA	NA	2	Good condition		
				24-Apr-18	12:27	1009	0.07	-0.1	3.8	3.7	17.1	0.0	0	2	2	NA	NA	2	Good condition		
				16-May-18	17:21	1020	0.31	5.4	4.6	4.0	17.3	-	0	8	0.25	0.93	3	Good condition			
GB74	1.0-2.5	3	coffey - 21/06/2016	12-Jun-19	10:48	1002	0.00	0.0	0.0	0.0	0.0	21.5	0	0	NA	NA	1	LEL = 0.0 Bore casing cut down on 6/8/19			
				29-Jul-19	12:23	1008	0.01	0.1	0.0	0.0	0.0	21.0	0	0	0.00	0.00	1	LEL = 0.0			
				31-Aug-16	9:20	1004	0.00	0.0	2.7	2.7	13.6	0.0	1	0	0	NA	NA	2	Good condition		
				21-Mar-17	11:17	1004	0.00	0.0	0.9	0.9	20.5	0.0	1	0	0	NA	NA	1	Good condition		
				13-Dec-17	8:40	998	-	-	-	-	-	-	-	-	-	-	-	-	-	Cap missing, not sampled	
				15-Mar-18	16:12	1005	0.33	5.70	0.5	0.5	16.8	0.4	2	1	0.03	0.96	3	Good condition			
				24-Apr-18	12:13	1009	-0.07	0.10	5.9	5.8	18.1	0.0	0	0	0.01	0.02	2	Good condition			
				16-May-18	17:43	1019	-0.31	5.40	6.4	0.2	18.1	-	4	5	0.35	0.98	3	Good condition			
GB75	1.0-3.5	4	coffey - 22/06/2016	11-Jun-19	16:20	1009	0.11	2.20	0.9	0.9	3.2	15.0	0	0	0.02	0.07	2	LEL = 24.0%			
				30-Aug-16	15:51	1004	0.00	0.0	0.1	0.1	14.0	0.0	0	0	0	NA	NA	1	Good condition		
				21-Mar-17	10:15	1004	0.00	0.0	0.0	0.0	9.7	11.7	0	0	0	NA	NA	1	Good condition		
				13-Dec-17	7:50	1001	0.00	0.0	0.0	0.0	14.6	1.5	0	0	0	NA	NA	1	Good condition		
				14-Mar-18	17:30	1007	0.31	5.4	0.0	0.0	8.8	12.7	1	1	0.00	0.48	2	Good condition			
				24-Apr-18	11:04	1009	0.00	0.1	0.1	0.1	5.9	15.6	0	0	0.00	0.01	1	Good condition			
				16-May-18	15:50	1021	0.31	5.4	0.0	0.0	6.9	-	0	0	0.00	0.37	2	Good condition			
				11-Jun-19	11:05	1013	0.00	0.0	9.8	9.8	24.4	1.3	0	0	0	NA	NA	2	Good condition		
GB76	1.0-3.0	4.2	coffey - 20/06/2016	30-Aug-16	15:55	1004	0.00	0.0	0.0	0.0	2.1	18.2	0	0	NA	NA	1	Good condition			
				21-Mar-17	10:20	1004	0.00	0.0	0.1	0.1	9.5	11.8	0	0	0	NA	NA	1	Good condition		
				13-Dec-17	8:01	1001	0.00	0.0	0.0	0.0	9.6	1.9	0	0	0	NA	NA	1	Good condition		
				15-Mar-18	15:55	1006	0.31	5.4	0.0	0.0	7.2	14.6	1	1	0.00	0.39	2	Good condition			
				24-Apr-18	11:58	1009	-0.02	0.1	0.1	0.1	5.4	16.7	0	0	0.00	0.01	1	Good condition			
				16-May-18	3:44	1021	31.00	5.3	0.0	0.0	5.4	-	0	0	0.00	0.29	2	Good condition			
				11-Jun-19	11:05	1013	0.00	0.0	9.8	9.8	24.4	1.3	0	0	0	NA	NA	2	Good condition		
				30-Aug-16	15:45	1005	0.00	0.0	0.3	0.0	11.2	5.3	0	0	0	NA	NA	1	Good condition		
GB77	1.0-3.0	4.1	coffey - 20/06/2016	21-Mar-17	10:10	1004	0.00	0.0	0.0	0.0	5.9	16.0	0	0	NA	NA	1	Good condition			
				13-Dec-17	8:09	999	0.00	0.0	0.0	0.0	11.8	3.1	0	0	0	NA	NA	1	Good condition		
				14-Mar-18	17:23	1007	0.30	5.4	0.3	0.0	6.3	14.5	1	1	0.02	0.34	2	Good condition			
				16-May-18	16:00	1021	0.30	5.3	0.0	0.0	3.6	-	0	0	0.00	0.19	2	Good condition			
				11-Jun-19	11:47	1012	0.02	1.2	6.0	0.2	13.5	1.9	0	0	0.07	0.16	2	Good condition			
				30-Aug-16	15:26	1004	0.00	0.0	0.0	0.0	13.4	4.8	1	0	0	NA	NA	1	Good condition		
				21-Mar-17	9:53	1004	0.00	0.0	0.0	0.0	15.0	6.7	0	0	0	NA	NA	1	Good condition		
				13-Dec-17	8:42	998	0.00	0.0	0.0	0.0	15.4	12.5	0	0	0	NA	NA	1	Good condition		
GB78	1.0-2.0	3.2	coffey - 20/06/2016	14-Mar-18	17:11	1007	0.31	5.4	0.0	0.0	4.3	16.7	1	1	0.00	0.23	2	Good condition			
				12-Jun-19	10:00	1003	0.23	4.5	2.4	2.4	3.2	13.6	0	0	0.11	0.14	2	LEL = 57.0 Gas flow and BP stable Note: gas cap (black) initially loose tighten prior to sampling			
				27-Jul-19	11:57	1020	1.18	15.9	12.9	12.9	13.3	0.3	1	0	2.05	2.11	3	Jumping around 15.5-16.5 BP 116-130			
				29-Jul-19	10:05	1011	-0.25	-5.2	16.0	16.0	14.6	0.3	1	1	NA	NA	2	LEL=>>>>			
				12-Jun-19	11:20	1001	0.49	7.9	34.5	34.5	1.3	0.0	7	0	0	2.73	0.10	3	LEL = >>>> GF and BP stable		
				12-Jun-19	13:05	999	0.74	12.4	-	-	-	-	-	-	-	-	-	-	-	Take cap off at 1:12pm Readings were stable, cap back on at 2:54, wait 2 min, take readings with primary meter, 1.2L/hr, & - 5 Pa, Meter 2 (10550) flow - 4 and BP =22Pa, readings were bouncing with both meters, meter 2 stabilised better.	
				12-Jun-19	16:22	998	0.38	6.4	31.9	31.9	1.7	1.2	1	1	2.04	0.11	3	Good condition			
				27-Jun-19	9:39	1020	0.32	5.4	22.5	22.3	1.7	1.2	1	1	1.22	0.09	3	Gas flow + BP bouncing around, a bit (GF between 4 - 3.4 and BP 22 - 40)			
GB79	1.0-2.5	3.2	coffey - 21/06/2016	29-Jul-19	12:45	1007	0.37	6.4	20.9	20.9	4.2	0.0	0	0	1.34	0.27	3	LEL=>>>>			
				12-Jun-19	11:46	1001	0.11	2.3	2.4	2.4	9.2	0.0	4	0	0.06	0.21	2	LEL = 55.2% GF fluctuating 0.0 to 3.3, BP fluctuating 0 to 20 pretty stable at 20 Pa)			
				27-Jun-19	13:19	1016	0.15	2.6	3.1	3.1	12.3	0.0	4	0	0.08	0.32	2	LEL = 70.8%, bouncing 2.0-3.5 GF, BP 10-15			
				29-Jul-19	12:08	1008	0.08	1.5	3.0	3.0	12.1	0.0	4	0	0.05	0.18	2	LEL = 68.6%			
				11-Jun-19	16:24	1009	0.04	0.8	11.4	11.4	15.6	0.10	6.00	2	0.09	0.12	2	LEL=>>>>, jumping GF 0.6-2.6, BP 4 - 14			
				27-Jun-19	13:42	1018	0.09	1.8	12.4	12.6	15.1	0.30	1.00	0	0.22	0.27	2	LEL=>>>>			
				29-Jul-19	13:03	1008	0.09	1.6	11.0	10.8	17.5	0.00	0.00	1	0.18	0.28	2	LEL=>>>>			
				GB80	3.0-4.5	6.3	Coffey - 05/06/2019	12-Jun-19	10:00	1003	0.23	4.5	2.4	2.4	3.2	13.6	0	0	0.11	0.14	2
27-Jul-19	11:57	1020	1.18					15.9	12.9	12.9	13.3	0.3	1	0	2.05	2.11	3	Jumping around 15.5-16.5 BP 116-130			
29-Jul-19	10:05	1011	-0.25					-5.2	16.0	16.0	14.6	0.3	1	1	NA	NA	2	LEL=>>>>			
12-Jun-19	10:17	1002	0.13					2.9	3.0	3.0	17.5	0.0	1	0	0.09	0.51	2	LEL = 69.0% Gas flow and BP fluctuated			
27-Jun-19	12:18	1018	0.56					7.9	4.2	4.2	18.6	0.0	0	0	0.33	1.47	3	LEL = 99.4%			
29-Jul-19	11:30	1010	0.10					2.2	4.2	4.2	18.3	0.0	1	0	0.09	0.40	2	LEL = 95.7%			
12-Jun-19	11:20	1001	0.49					7.9	34.5	34.5	1.3	0.0	7	0	0	2.73	0.10	3	LEL = >>>> GF and BP stable		
12-Jun-19	13:05	999	0.74					12.4	-	-	-	-	-	-	-	-	-	-	-	Take cap off at 1:12pm Readings were stable, cap back on at 2:54, wait 2 min, take readings with primary meter, 1.2L/hr, & - 5 Pa, Meter 2 (10550) flow - 4 and BP =22Pa, readings were bouncing with both meters, meter 2 stabilised better.	
GB81	4.0-5.0	6	Coffey - 05/06/2019	12-Jun-19	10:00	1003	0.23	4.5	2.4	2.4	3.2	13.6	0	0							

**Attachment C - Important Information About Your
Coffey Environmental Report**

Important information about your **Coffey** Environmental Report

Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice.

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept apprised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and

Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

**Appendix D – Building Protection Measures
Verification Inspection Pro Forma**

A5 Verification pro formas and worked examples



VISUAL INSPECTION OF GAS PROTECTION MEASURES

Site name:	Gas characteristic situation:
Job number:	Type of development and building/block checked: (residential/commercial/other)
Date:	Building description:
Visit by:	Foundation type: (suspended floor/raft/other)
Weather at time of inspection:	Gas protection type: passive/active

No.	Item	Comments (see notes)
1 Gas membrane		
1.1	Condition of sub-grade and underside of gas membrane	
1.2	Gas membrane type	
1.3	Gas membrane condition	
1.4	Joining tape product	
1.5	Lapping design	
1.6	Laps, welds and joints seals	
1.7	Service entries seals	
2 Passive venting		
2.1	Sub-floor void	
2.2	External wall airbricks	
2.3	Internal sleeper walls	
2.4	External vent trenches/ducts	
3 Active venting		
3.1	System details	
Additional notes:		

Notes: inspection checklist

1.1	Underside of gas membrane	Check that the sub grade does not contain rough/uneven surfaces, is appropriately clean and that there are no hard/sharp objects. That protective sand blinding or geotextile (if specified) is present and meets the design criteria.
1.2	Gas membrane type	Manufacturer and product specification, gauge, colour, brand/name, material batch/roll numbers, storage arrangements (protected from dirt/damage?)
1.3	Gas membrane condition	Open punctures, tears, rips, stretching? Excessive footprints/evidence of traffic? Presence of debris? Repairs? Signs of weakness such as raised or sunken indentations? Protection plan in place to restrict access to lain gas membrane?
1.4	Joining tape product	Product type, brand, thickness, material, width, colour? Use of double sided tape?
1.5	Lapping design	Joints lapped and sealed in accordance with manufacturer's requirements/ specification? Minimum overlap insured? Sections taped twice?
1.6	Laps and joints sealed	Welds complete? Appropriate joining/double sided tape used?
1.7	Service entries sealed	Top hats seal arrangements fixed around service entries? Use of Jubilee clips?
2.1	Sub-floor void	Is a check possible? Void former? Gravel (type/specification)? Height of void space? Is it clear?
2.2	External wall airbricks	Numbers, size, positions as design drawing?
2.3	Internal sleeper walls	Ventilation holes (honeycomb brickwork/pipe crossings?) – size, spacing, location in accordance with design?
2.4	External vent trenches/ducts	Located and constructed in accordance with design drawings? If open-topped gravel – gravel type/presence of fines? If pipe or other vent, check position and construction for functionality and absence of blockages. Ability of void former to withstand bearing of the superstructure?
3.1	Active venting	Type of air supply: mechanical, natural, combined? Location/condition/number of fans and vents? Location and size of inlets? Provision of air-cleaning devices and air heaters? Supply and exhaust ductwork? Alarm provision/installation? Gas monitoring system in under-floor void?

Photographs

No.	Description

The gas protection measures inspected:	a Are acceptable and comply with the specification
	b Are acceptable but attention is drawn to issues related to item no. xxx
	c Are not acceptable due to the issues related to item no. xxx

Name:

Signature:

Date:



EXAMPLE: PRO FORMA 1

Site name: XXXX		Gas characteristic situation:
Job number: XXXX		Type of development and building/block checked: (residential/commercial/other): Plot 39-39
Date: 15/08/2011		Building description:
Visit by: BJT		Foundation type: (suspended floor/raft/other)
Weather at time of inspection: Dry but rain previously		Gas protection type: passive/active
No.	Item	Comments (see notes)
1 Gas membrane		
1.1	Underside of gas membrane	<i>Gas membrane placed over insulation: smooth with no debris or stress points</i>
1.2	Gas membrane type	<i>Manufacturer name/type low permeability gas membrane (2000g)</i>
1.3	Gas membrane condition	<i>Very good, minimal traffic marks, single puncture had been noted and repaired prior to inspection</i>
1.4	Joining tape product	<i>Visqueen double sided butyl tape</i>
1.5	Lapping design	<i>Minimum 150 mm. All joints use double sided tape to form seal and are finished with single sided tape</i>
1.6	Laps, welds and joints seals	<i>All appear in good condition, joints over cavity tray between plots constructed from gas membrane sheets rather than preformed products but high degree of workmanship evident, joints with proprietary gas resistant tape also well formed</i>
1.7	Service entries seals	<i>Proprietary top hats used throughout, well-constructed with good fit over service pipes and compressed with jubilee clips</i>
2 Passive venting		
2.1	Sub-floor void	<i>Open void inspected previously (30/07/2012)</i>
2.2	External wall airbricks	<i>Three to the rear and two to the front of each plot</i>
2.3	Internal sleeper walls	<i>None constructed during void inspection</i>
2.4	External vent trenches/ducts	<i>Not used</i>
3 Active venting		
3.1	System details	<i>Not used</i>
Additional notes:		

Photographs



Void during construction



Airbricks to rear



Finished gas membrane on plot 36



Finished gas membrane on plot 37



Patch over puncture



Cavity tray

The gas protection measures inspected:	a Are acceptable and comply with the specification
	b Are acceptable but attention is drawn to issues related to item no. xxx
	c Are not acceptable due to the issues related to item no. xxx

Name:

Signature:

Date:



EXAMPLE: PROFORMA 2

Site name: <i>Shed S, Dundee</i>		Gas characteristic situation:
Job number: <i>312109</i>		Type of development and building/block checked: (residential/commercial/other): <i>One plot</i>
Date: <i>06/08/12</i>		Building description: <i>Flats</i>
Visit by: <i>xxxx</i>		Foundation type: (suspended floor/raft/other)
Weather at time of inspection: <i>Intermittent showers</i>		Gas protection type: <i>passive/active</i>
No.	Item	Comments (see notes)
1 Gas membrane		
1.1	Underside of gas membrane	<i>20 mm stone at 200 mm depth</i>
1.2	Gas membrane type	<i>1.0 m manufacturer name/type/code</i>
1.3	Gas membrane condition	<i>Good. No evidence of damage</i>
1.4	Joining tape product	<i>All welded</i>
1.5	Lapping design	<i>120 mm overlap weld</i>
1.6	Laps, welds and joints seals	<i>All welded and checked ok</i>
1.7	Service entries seals	<i>110 m UPVC and 20 m water services. All sealed with top hats and tape</i>
2 Passive venting		
2.1	Sub-floor void	<i>25 mm geocomposite and 20 mm stone</i>
2.2	External wall airbricks	<i>Periscopic vents. Jubilee clips present. Three opposing sets at 2 m centres</i>
2.3	Internal sleeper walls	<i>Geocomposite passes through sleeper walls</i>
2.4	External vent trenches/ducts	<i>Six periscopic vents with 9" x 6" air bricks</i>
3 Active venting		
3.1	System details	<i>Not used</i>
<p>Additional notes:</p> <p><i>Gas membrane installed with fully welded seam construction inclusive of DPC and pipe shrouds.</i></p> <p><i>X carried out independent verification and integrity testing using 100 per cent carbon dioxide with blown air feed. All witnessed by the consulting engineer and local contaminated land officer. All passed.</i></p>		

Photographs



Gas membrane showing air/gas mixture pressurised



Edge detail showing one course of block work to seal



Same as above, with inspectors present

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The gas protection measures inspected:	a Are acceptable and comply with the specification
	b Are acceptable but attention is drawn to issues related to item no. xxx
	c Are not acceptable due to the issues related to item no. xxx

Name:

Signature:

Date:

06/08/2012

Appendix E – EPA Victoria CUTEP Determination

Mr. Kenneth Mival
EHS-Support
PO BOX 2057
HAZELDENE VIC 3658

3/10/2019

Reference: 208448 (7001930/70403-2)

Dear Mr. Mival

**RE: CLEAN UP GROUNDWATER SO FAR AS REASONABLY PRACTICABLE -
1221-1249 CENTRE RD, OAKLEIGH SOUTH VIC 3167**

Thank you for your correspondence accepted by EPA on 05/07/2019, and subsequent additional information, requesting advice as to whether the Environment Protection Authority ("the Authority") is satisfied that groundwater pollution has been cleaned up so far as reasonably practicable at the above site

Pursuant to Clause 58 of the *State environment protection policy (Waters)* ("SEPP Waters"), the Authority on 03/10/2019 determined that groundwater pollution at the site has been cleaned up so far as reasonably practicable and the site is within a Groundwater Quality Restricted Use Zone ("GQRUZ").

In finalising the environmental audit for this site, you must ensure that the following are included in the Statement of Environmental Audit ("SoEA"):

1. a condition restricting groundwater use for existing and potential precluded extractive beneficial uses of groundwater;
2. a condition with sufficient detail to make clear the required ongoing monitoring and management;
3. a condition requiring compliance with a groundwater quality management plan;
4. as an attachment to the SoEA, a detailed groundwater quality management plan (GQMP) identifying a s.53V audit as the appropriate mechanism for cessation of the groundwater management and monitoring;
5. in the "other related information" section: a) a note that the Authority has determined that; i). groundwater has been cleaned so far as reasonably practicable, and ii). the site is within a GQRUZ; b) information relating to the pollution of groundwater such as a list of beneficial uses of groundwater for which you consider the site suitable; and c) a note that, in accordance with clause 58(4) of SEPP (Waters), the Authority may require periodic reassessment of the practicability of groundwater clean up.

You must also ensure that the environmental audit report clearly delineates the extent of the GQRUZ.

Lvl 3, 200 Victoria Street
Carlton
Victoria 3053
GPO Box 4395
Melbourne Victoria 3001
T: 1300 EPA VIC
F: 03 9695 2610
DX 210082
www.epa.vic.gov.au

If you have any questions please contact the Environmental Audit Unit on telephone number 1300 EPA VIC (1300 372 842).

Yours sincerely

A handwritten signature in black ink, appearing to read 'T. Eaton', written in a cursive style.

TIM EATON
EXECUTIVE DIRECTOR - REGULATORY STANDARDS, ASSESSMENTS &
PERMISSIONING
ENVIRONMENT PROTECTION AUTHORITY

Groundwater zone with restricted uses

OAKLEIGH SOUTH

This zone has been cleaned up to the relevant environmental standards (section 53X environmental audit) but is still subject to restricted groundwater uses.

Environmental audit site

1221 - 1249 CENTRE RD OAKLEIGH SOUTH VIC 3167






Restrictions on use

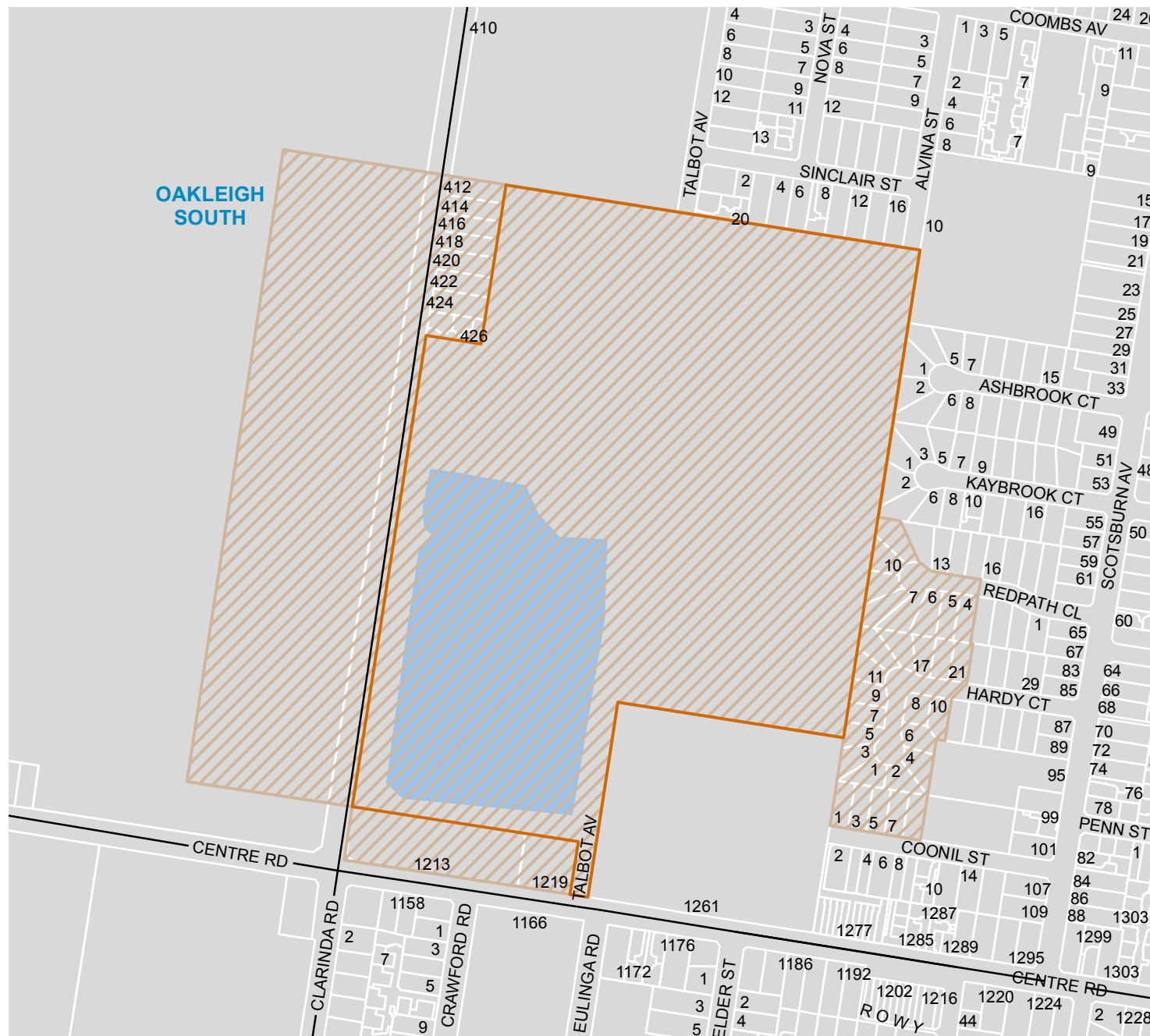
Drinking water
Livestock water supply
Irrigation of crops (including domestic gardens) and parks
Water used for recreational purposes (e.g. swimming)

Site history

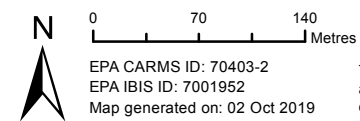
Quarry filled with putrescible waste

Legend

-  Environmental audit site
-  Groundwater zone with restricted uses
-  Properties
-  Unit/house/building number
-  Primary road



Disclaimer: The map represents an approximate estimation of an area where groundwater quality has been impacted by human activities. It does not provide information on the naturally occurring quality of groundwater, which can also have restrictions on its use. The environmental audit boundary and groundwater zone are based on land parcel boundaries at the time of mapping. Subsequent changes to land parcel boundaries do not change the location of the zone.



EPA CARMS ID: 70403-2
EPA IBIS ID: 7001952
Map generated on: 02 Oct 2019

This map may also contain data from:



For more information contact 1300 EPA VIC

**Appendix F - Important Information About Your
Coffey Environmental Report**

Important information about your **Coffey** Environmental Report

Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice.

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept apprised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and

Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

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