KNAPP HICKS & PARTNERS LTD

CONSULTING STRUCTURAL, CIVIL & GEOTECHNICAL ENGINEERS

ISO 9001 REGISTERED FIRM

Prospect House
1 Highpoint Business Village
Henwood Ashford Kent
TN24 8DH
Tel: (01233) 502255
Fax: (01233) 643250

Head Office:
Suite 1 Laval House
Great West Quarter
Great West Road
Brentford
Middx TW8 0GL
Tel: 020 8232 1888

Also at:

Prospect House
24 Prospect Road Ossett
West Yorkshire WF5 8AE
Tel: (01924) 269785

Suite 10 Swan Park Business Centre 1 Swan Park
Kettlebrooke Road Tamworth
Staffordshire B77 1AG
Tel: (01827) 307691

Web site:
www.knapphicks.co.uk

Directors:
Geoff Davies *(Managing)*
IEng, AMICE

Paul Nicholls
IEng, AMIStructE, AMICE

Pamela Armstrong *(Finance)*
CGMA, ACMA, MAAT, MCMI

Principal Technical Directors:
Darren Cook
BEng (Hons), CEng, MIStructE
Steve Hazell
IEng, AMIStructE, AMICE
John Moss
IEng, AMIStructE

Technical Directors:
Darryl Bedwell
ACIOB
David Chrystal
BEng (Hons), MSc, CEng, MIStructE
Richard Moore
BSc, MSc, FGS, CGeol
Nick Sparrowhawk
BSc (Hons), CEng, MICE, ACILA
Phillip Taylor-Wright
BSc (Hons) Surveying; Grad BEng; Dip CII; ICIOB

Technical Consultant:
David Cherrett
CEng, MIStructE

Associates:
A Bird Grad ICE;HND
GJ Jenkins ICIOB

Knapp Hicks & Partners Ltd
Incorporated in England
No. 2886020

Registered office:
Laval House, Great West Quarter
Great West Road
Brentford TW8 0GL

27686/L/012A/G/RJM

20th January 2020

Mr R Graham
RPS
260 Park Avenue,
Aztec West,
Almondsbury,
Bristol,
BS32 4SY

Dear Richard,

TRIAL PIT & MONITORING INFORMATION
TOVIL QUARRY, FARLEIGH HILL, MAIDSTONE

Following our telecon on Wednesday, please find the following information attached with this letter which relates to recent supplementary investigations and monitoring at the above site:

- Trial Pit and Monitoring Well Location Plan
- Trial Pit Logs
- Trial Pit Photographs
- Gas Monitoring Borehole Logs- Tovil Quarry
- Groundwater Monitoring Wells – Borehole Logs – Tovil Quarry
- Groundwater Monitoring Results
- Ground Gas Monitoring Results – Tovil Quarry
- Ground Gas Monitoring Information – Adjacent KCC landfill site
- Laboratory Testing – Soil Samples- including WAC suite
- Laboratory Testing - Asbestos Quantification
- Laboratory Testing – Groundwater Samples (Note: Another round of groundwater sampling & testing will be carried out soon)

The results are encouraging.

In summary, our main observations are as follows:

Ground Gas

We have 3 sets of readings, 2 at low barometric pressure.

Some fairly low levels of methane have been recorded in the new monitoring wells to P J Burkes side of the gas barrier (maximum 3.1%) and a preliminary assessment of the gas risk indicates that NHBC Amber 1 levels of protection may be appropriate (vented floors and gas membrane – not unexpected for this type of site).

Subject to the results of further monitoring we think that it may be possible to zone the site in due course such that the northern narrower area of the site (referred to as Area E), which largely consists of an inert mix of quarry waste materials (hassock), could qualify for a lesser regime of gas protection measures.

Contamination & Leachates (WAC test results)
36No. samples were taken from the localised stockpiles of site-won material on site and from 40 trial pits spread across the areas which still need to be reduced to achieve an overall pre-development site level at approximately 750mm below proposed final site level.

This has achieved a quantity of testing similar to what was previously recommended by RPS.

The results have generally indicated negligible to very low levels of contaminants and the WAC testing has only detected the following in a proportion of the samples:

- sulphate levels exceeding the upper level for inert waste but not at a level to require SR cement
- Antimony levels close to the upper level for inert waste

Asbestos in soils

All samples submitted for chemical testing were screened for asbestos and, where asbestos was detected, a quantification analysis was carried out.

Of 12 samples submitted for asbestos quantification, 7 had levels <0.001% w/w while the other samples had asbestos present at between 0.002% and 0.007% w/w

Although levels are low it would be good practice to put affected materials into the deeper areas of filling. An asbestos aware person might also be advisable during significant points in earthworks.

The cut / fill exercise requires 700mm import of material in soft areas anyway to reach finished level so the materials management plan could require there to be 450mm sub soil and 150mm topsoil over all soft areas (fine tuning finished levels could ensure only 600mm imported make up is required).

Groundwater Testing

One round of sampling and laboratory testing has been carried out from 4 boreholes located at representative locations around the site perimeter, and a further round of sampling is proposed in the next week, to include re-measurement of groundwater levels in existing monitoring wells.

Results of the first round of testing has indicated reasonable water quality within the site when compared against Drinking Water Standards, and in comparison to the water quality within the adjacent landfill (High ammonia).

Review of Progress with Environment Agency

RPS Consulting Engineers have been appointed to arrange an appropriate waste recovery permit. At present it is undecided as to whether the CLAIRE Code of Practice or a Bespoke Rules Option will be applied for.

RPS submitted a request in December for a Pre-Application Meeting with the Environment Agency, and it is hoped that a date for this will be agreed in the coming weeks.

As discussed, RPS will explain to the EA that a local registered housing provider is interested in purchasing the site and so everyone IS hopeful the sign off process can progress expeditiously.

RPS will also explain to EA that piled foundations are expected on all / most of the site. (Southern Testing carried out deeper boreholes with insitu testing that will assist with pile design).

Environmental Health Officer (Duncan Haynes)

KHP and Ian Thompson will meet the EHO (next week if possible) to run through all the information we now have and agree a way forward.

We will explore whether the Gas Monitoring Planning Condition can be cleared.

Other matters

KHP have ground information that will help a purchaser understand what if anything is required to ensure stability of the level difference on the left as you enter the site.

NY will share this package of information with the potential purchaser / his contractor.

We trust that all of the above and the various attachments are clear but please do not hesitate to contact us if you have any queries.

Yours sincerely
For and on behalf of
Knapp Hicks & Partners Limited

RICHARD MOORE
Technical Director

Attachments

- Trial Pit and Monitoring Well Location Plan
- Trial Pit Logs
- Trial Pit Photographs
- Gas Monitoring Borehole Logs- Tovil Quarry
- Groundwater Monitoring Wells – Borehole Logs – Tovil Quarry
- Groundwater Monitoring Results
- Ground Gas Monitoring Results – Tovil Quarry
- Ground Gas Monitoring Information – Adjacent KCC landfill site
- Laboratory Testing – Soil Samples- including WAC suite
- Laboratory Testing - Asbestos Quantification
- Laboratory Testing – Groundwater Samples (Note: Another round of groundwater sampling & testing will be carried out soon)

27686/L/012A/G/RJM
20th January 2020

Attachments

- Trial Pit and Monitoring Well Location Plan

CDM REGULATIONS 2015 RESIDUAL HAZARDS

RESIDUAL HAZARDS IDENTIFIED

CONSTRUCTION

1. THE SITE IS BELIEVED TO BE A FORMER HOUSEHOLD REFUSE TIP. CONTRACTORS AND OTHERS ENGAGED TO WORK ON THE SITE SHOULD BE MADE AWARE OF THE POTENTIAL FOR CONTAMINATED GROUND CONDITIONS AND HAZARDOUS SUBSTANCES.
2. NO SIGNIFICANT OTHER HAZARDS BEYOND THOSE KNOWN TO AN EXPERIENCED CONTRACTOR.

FUTURE DEMOLITION

A. THE SITE'S ORIGINAL USE AND ITS POTENTIAL FOR CONTAMINATED OR HAZARDOUS GROUND CONDITIONS SHOULD BE HIGHLIGHED TO THE END USER.
B. NO SIGNIFICANT OTHER HAZARDS BEYOND THOSE KNOWN TO AN EXPERIENCED CONTRACTOR.

THIS REGISTER IS A NONEXHAUSTIVE LIST OF RESIDUAL HAZARDS RELATING TO THE WORKS SHOWN ON THIS DRAWING THAT HAVE BEEN IDENTIFIED DURING THE DESIGN STAGE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A CONTRACTOR WITH THE APPROPRIATE SKILLS, KNOWLEDGE & EXPERIENCE, AND IF THEY ARE AN ORGANISATION, THE ORGANISATIONAL CAPABILITY NECESSARY TO FULFILL THE ROLE.

Historic data provided by Knapp Hicks Consulting Civil, Structural and Geotechnical Engineers.

J.C.White drawing 17/00/093-02 titled 'Orthographic Aerial Image & Level Survey', dated April 2019 has been used to define the existing ground level surface profile.

BHD Architects drawing 2989-PD001-Rev E titled 'Site Plan', dated October 2015 has been used to define the proposed ground surface profile.

Various surfaces were developed from the survey and design information extracted from the above drawings, these are defined below;

EG
Existing ground level defined by the J.C.White survey data.

ASL
No surface strip has been allowed for.

Proposed Finish
Finished surface site profile as defined by the BDH Architects drawing with additional points introduced to define the road profiles and car parks & garden levels interpolated between plots and roads.

Proposesd Formation
Formation level (underside) of the permanent works defined by the proposed finished surface level reduced by an assumed 750mm construction thickness.

EG to Formation
Comparison between EG (existing ground level) and Proposed Formation surfaces delivering total volume of cut and fill for the whole site re-grade operation based on assumed construction thickness.

Contours in red at 0.50m intervals represent areas of cut. Contours in blue at 0.50m intervals represent areas of fill. Major contours displayed in light grey at 1.00m intervals and minor contours displayed in dark grey at 0.20m intervals represent existing ground level.

A grid is presented at 25.00m intervals.

No allowance has been made for bulking or compaction.

This assessment has been produced based on preliminary and assumed data. A more detailed volumetric assessment from a comprehensive set of proposed levels and construction thickness will be required if greater confidence is required in the assessment conclusion.

Waste Disposal Site
Hopper
Posts
29.3m
25.0m
Burial Ground
Playground
BM 35.84m
42.7m
GP
BM 44.99m
44.8m
4.5m
Track
Track
El Sub Sta
WB
Tank
El Sub Sta

154250mN
154200mN
154150mN
154100mN
154050mN
154000mN
153950mN

A1 43.231m AOD
A2 39.758m AOD
A3 39.839m AOD
A4 42.590m AOD
A5 38.487m AOD
B1 44.852m AOD
B2 44.256m AOD
B3 42.235m AOD
C1 37.617m AOD
C2 38.388m AOD
C3 38.629m AOD
D1 36.438m AOD
E1 38.116m AOD
E2 38.368m AOD
E3 37.893m AOD
E4 38.311m AOD
E5 36.985m AOD
E6 37.356m AOD
E7 37.066m AOD
E8 36.890m AOD
E9 38.623m AOD
E10 40.024m AOD
G1 43.064m AOD
G2 41.833m AOD
G3 40.106m AOD
G4 38.467m AOD
G5 39.381m AOD
KCC1 44.985m AOD
KCC2 44.324m AOD
KCC3 45.379m AOD
KCC4 45.715m AOD
KCC5 44.366m AOD
KCC6 44.798m AOD
KCC9 44.713m AOD
Manhole 43.136m AOD
1S1 42.522m AOD
1S2 41.903m AOD
2S1 44.010m AOD
3S1 43.678m AOD
4S1 42.399m AOD
4S2 42.830m AOD
5S1 41.497m AOD
5S2 41.861m AOD
6S1 40.312m AOD
6S2 42.204m AOD
6S3 43.146m AOD
7 38.008m AOD
8S1 40.934m AOD
8S2 41.584m AOD
8S3 41.255m AOD
8S4 40.582m AOD
8S5 40.007m AOD
8S6 40.286m AOD
BHA 37.535m AOD
BHB1 36.563m AOD

25.00m

0
SCALE IN METERS

Proposed

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
EG to Formation	1.000	1.000	65651.48sq.m	59025.12 Cu. M.	64443.07 Cu. M.	5417.95 Cu. M.<Fill>
Totals			65651.48sq.m	59025.12 Cu. M.	64443.07 Cu. M.	5417.95 Cu. M.<Fill>

CONTOUR REPRESENTING DEPTH OF CUT

CONTOUR REPRESENTING DEPTH OF FILL

STOCKPILE LIMIT

PHASE BOUNDARY

TRIAL PIT

BOREHOLE

Rev	Date	Description	By

Morgan Thacker ltd

Title:-
ISOPACH CONTOURS
OVERLAID ON EXISTING CONTOURS
PLUS DEC 19 TRIAL HOLES

Project:-
P.J.BURKE
FARLEIGH HILL
TOVIL

Drn by:-		Scale:-	Sheet number:-
MJW	13th January 2020	1:500 @ A0	1 of 1

Drawing number:- MTL-127-09 Revision:- /

27686/L/012A/G/RJM
20th January 2020

Attachments

- Trial Pit Logs

Trial Pit Log

Trialpit No: A1
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.50	ES					Made Ground comprising- Ash and Clay Matrix with rare gravel of brick, tile and chert. 0.6-0.7m band of Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				1.10			Grey fine to coarse SILT.
				1.50			End of pit at 1.50 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: A2
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged CD

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.50	ES					Made Ground comprising- Ash and Clay Matrix, with fine to coarse gravel of brick and rare concrete.
				1.30			Grey fine to coarse SILT.
				1.50			End of pit at 1.50 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Trialpit No A3 Sheet 1 of 1
Location: Maidstone		Dimensions (m):	Date 18/12/2019
Client: P J Burke		Depth 3.00	Scale 1:25 Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 3.00	ES					Made Ground comprising- Ash and Clay Matrix. Concrete block noted at 1.4mbgl (Very large boulder old floor slab). Pockets of brick, metals concrete, clay pipe, and wire. Cobbles of brick noted.
				3.00			End of pit at 3.00 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered. 3. Trial pit collapsed just after excavation.

Stability:

AGS

Trial Pit Log

Trialpit No: A4
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.50	ES					Made Ground comprising- Ash and Clay Matrix. Concrete block noted at 1.4mbgl (Very large boulder old floor slab). Pockets of brick, metals concrete, clay pipe, and wire. Cobbles of brick noted.
				0.65			Type 1 and Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock)
				1.00			Made Ground comprising Ash and Clay Matrix, with fine to coarse gravel of brick and rare concrete.
				1.50			End of pit at 1.50 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: A5
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 2.00	Scale 1:25
Client: P J Burke			Logged CO

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 2.00	ES					Made Ground comprising Ash and Clay Matrix, with fine to coarse gravel of brick, plastic, wood, metal and rare concrete.
				1.70			Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock)
				2.00			End of pit at 2.00 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Trialpit No B1 Sheet 1 of 1
Location: Maidstone		Dimensions (m): Depth 2.00	Date 18/12/2019
Client: P J Burke			Scale 1:25 Logged CL

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 2.00	ES					Made Ground comprising Clay Matrix, with fine to coarse gravel of brick, plastic, wood, metal and rare concrete. Ashy brick cobble layer 1.3-1.4m.
				2.00			End of pit at 2.00 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: B2
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 2.30	Scale 1:25
Client: P J Burke			Logged CD

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 2.30	ES					Made Ground comprising Clay Matrix, with fine to coarse gravel of brick, plastic, wood, metal and rare concrete. Pockets of Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock)
				2.30			End of pit at 2.30 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: B3
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged CJO

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.50	ES					Made Ground comprising Ash and Clay Matrix, with fine to coarse gravel of brick, plastics, rare wood and rare concrete.
				0.60			Orange brown clay with rare gravel of brick
				1.50			End of pit at 1.50 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: **Pile 1 S1**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: -	Date 18/12/2019
Location: Maidstone		Dimensions (m):	Scale 1:25
Client: P J Burke		Depth 2.30	Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 2.30	ES		2.30			Brown well graded mix of Quarry Waste comprising- creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock). Rare gravel of plastic, wire, brick, concrete and rare wood End of pit at 2.30 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: **Pile 1 S2**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 2.20	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 2.20	ES					Brown well graded mix of Quarry Waste comprising- creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock). Rare gravel of plastic, wire, brick, concrete and rare wood
				2.20			End of pit at 2.20 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: **Pile 2**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m):	Scale 1:25
Client: P J Burke		Depth 2.50	Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 2.50	ES					Brown well graded mix of Quarry Waste comprising- creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock). Rare gravel of plastic, wire, brick, concrete and rare wood
				2.50			End of pit at 2.50 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: **Pile 3**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.50	ES					Brown well graded mix of Quarry Waste comprising- creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock). Gravel of plastic, wire, brick, concrete, rag and rare wood
				1.50			End of pit at 1.50 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No	C1		Sheet 1 of 1
Project Name:	Tovil	Project No. 27686	Co-ords: - Level:
Date	18/12/2019		
Location:	Maidstone	Dimensions (m): Depth 2.00	Scale 1:25
Client:	P J Burke		Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 2.00	ES					Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				1.35			Black ashy fill with plastic. A metals gasket with rag noted within this strata.
				1.60			Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock), with rare brick, glass and plastic.
				2.00			End of pit at 2.00 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: C2
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.60	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				1.60			End of pit at 1.60 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: C3
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 2.00	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.20	ES					Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock), with rare brick, glass and plastic.
				1.20			Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				2.00			End of pit at 2.00 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: **Pile 4 S1**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.70	Scale 1:25
Client: P J Burke			Logged CD

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 3.70	ES					Brown gravelly CLAY. Fine to coarse gravel of plastic, glass, rag, clay pipe and brick.
				3.70			End of pit at 3.70 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: **Pile 4 S2**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.00	Scale 1:25
Client: P J Burke			Logged CO

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 3.00	ES					Brown gravelly CLAY. Fine to coarse gravel of plastic, glass, rag, clay pipe and brick.
				3.00			End of pit at 3.00 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: **Pile 5 S1**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.20	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 3.20	ES					Brown gravelly CLAY. Fine to coarse gravel of plastic, glass, rag, clay pipe and brick.
				3.20			End of pit at 3.20 m

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: **Pile 5 S2**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.80	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 3.80	ES					Brown gravelly CLAY. Fine to coarse gravel of plastic, glass, rag, clay pipe and brick.
				3.80			End of pit at 3.80 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.25m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: **Pile 6 S1**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 2.10	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 2.10	ES					Brown gravelly CLAY. Fine to coarse gravel of plastic, glass, rag, clay pipe and brick.
				1.20			Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				2.10			End of pit at 2.10 m

1 2 3 4 5

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: **Pile 6 S2**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 2.50	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.40	ES					Brown gravelly CLAY. Fine to coarse gravel of plastic, glass, rag, clay pipe and brick.
				0.40			Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				2.50			End of pit at 2.50 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: **Pile 6 S3**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 2.70	Scale 1:25
Client: P J Burke			Logged CD

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.70	ES					Brown gravelly CLAY. Fine to coarse gravel of plastic, glass, rag, clay pipe and brick.
				1.70			Orange brown silty CLAY.
				2.70			End of pit at 2.70 m

1

2

3

4

5

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: D1	Sheet 1 of 1		
Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged CD

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.50	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare brick.
				1.50			End of pit at 1.50 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

			Trialpit No: E1
			Sheet 1 of 1
Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 12/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.20	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare brick.
				1.20			Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				1.50			End of pit at 1.50 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: E2
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				1.50			End of pit at 1.50 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: E3
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.70	Scale 1:25
Client: P J Burke			Logged CH

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				1.70			End of pit at 1.70 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: E4
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 2.00	Scale 1:25
Client: P J Burke			Logged CD

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 2.00	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				2.00			End of pit at 2.00 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: E5
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged CM

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.70	ES					Orange brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				0.70			Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				1.50			End of pit at 1.50 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: E6
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 1.50	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.50	ES					Brown well graded mix of Quarry Waste comprising- creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock). Gravel of plastic, wire, brick, concrete, rag and rare wood
				1.50			End of pit at 1.50 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: E7
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.00	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 3.00	ES					Brown well graded mix of Quarry Waste comprising- creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock). Gravel of plastic, wire, brick, concrete, rag and rare wood.
				3.00			End of pit at 3.00 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

			Trialpit No **E8** Sheet 1 of 1
Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 4.00	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				4.00			End of pit at 4.00 m

1 2 3 4 5

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: E9
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.00	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 1.00	ES					Brown well graded mix of Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock). Gravel of plastic, wire, brick, concrete, rag and rare wood.
				1.00			Grey fine to coarse SILT.
				1.10			Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL. Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				3.00			End of pit at 3.00 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: **E10**
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.50	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 3.00	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				3.00			Quarry Waste comprising-creamy yellow silty fine sandy GRAVEL Gravel is fine to coarse subangular to subrounded (Ragstone & Hassock).
				3.50			End of pit at 3.50 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: **Pile 7**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.00	Scale 1:25
Client: P J Burke			Logged CD

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 3.00	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				3.00			End of pit at 3.00 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Trialpit No **Pile 8 S1** Sheet 1 of 1
Location: Maidstone		Dimensions (m):	Date 18/12/2019
Client: P J Burke		Depth 3.50	Scale 1:25 Logged CO

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 3.50	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				3.50			End of pit at 3.50 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Trialpit No **Pile 8 S2** Sheet 1 of 1
Location: Maidstone		Dimensions (m):	Date 18/12/2019
Client: P J Burke		Depth 3.70	Scale 1:25 Logged CO

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 3.70	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				3.70			End of pit at 3.70 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: **Pile 8 S3**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 4.00	Scale 1:25
Client: P J Burke			Logged CP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 4.00	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				4.00			End of pit at 4.00 m

1 2 3 4 5

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: **Pile 8 S4**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 4.00	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 4.00	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				4.00			End of pit at 4.00 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

Trial Pit Log

Trialpit No: **Pile 8 S5 D2**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.50	Scale 1:25
Client: P J Burke			Logged CO

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 3.50	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				3.50			End of pit at 3.50 m

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

AGS

Trial Pit Log

Trialpit No: **Pile 8 S6**
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: - Level:	Date 18/12/2019
Location: Maidstone		Dimensions (m): Depth 3.00	Scale 1:25
Client: P J Burke			Logged

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 3.00	ES					Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to subrounded gravel of Hassock and rare glass, brick and plastic.
				3.00			End of pit at 3.00 m

1
2
3
4
5

Remarks: 1. Rare fine roots noted near surface <0.10m. 2. No groundwater were encountered.

Stability:

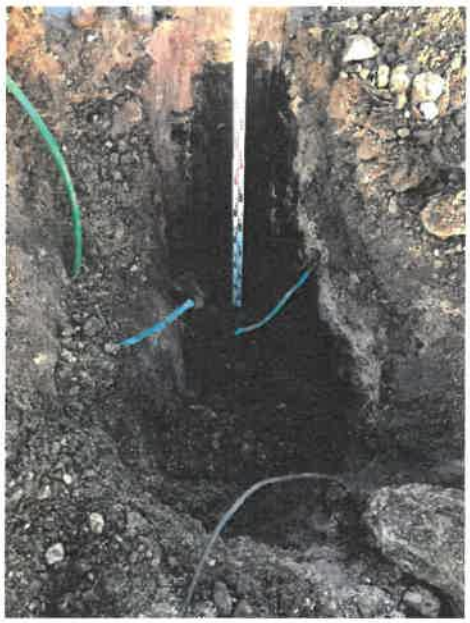
AGS

27686/L/012A/G/RJM
20th January 2020

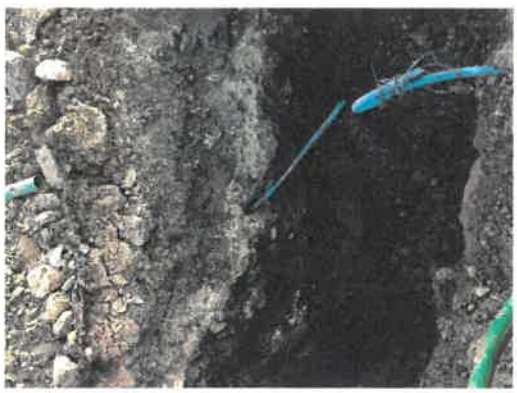
Attachments

- Trial Pit Photographs

A1 Location.



A1 Depth 1.50m.



A1 strata- Water supply pipe to the site cabin.

A2 Location.

A2 Depth 1.50m.

A2 Strata.

A3 Location.

A3 Depth 3.00m

Concrete block (old floor slab) noted at 1.40mbgl.

A3 collapsed.

A4 Location.

A4 Depth 1.50m.

A4 Strata.

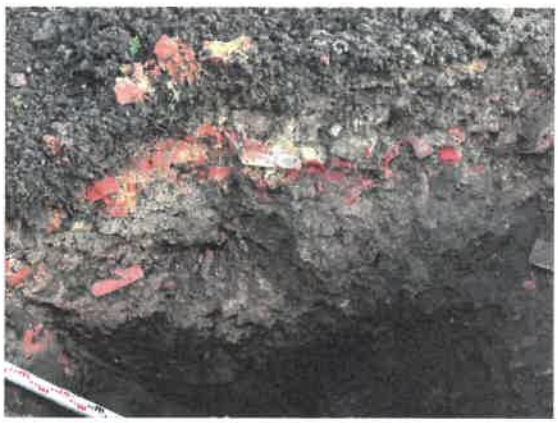
A5 Location.

A5 Depth 2.00mbgl.

A5 Strata.

B1 Location.

B1 Depth 2.00m



B1 Strata.

B2 Location.

B2 Depth 2.30m

B2 Strata.

B2 Strata.

B3 Location.

B3 Depth 1.50m

B3 Strata.

Pile 1 S1 Location.

Pile 1 S1 Depth 2.30m.

Pile 1 S1 Arisings.

Pile 1 S2 Location.

Pile 1 S2 Depth 2.20m.

Pile 1 S2 Arisngs.

Pile 2 Location.

Pile 2 Depth 2.50m and Arisings.

Pile 3 Location.

Pile 3 Depth 1.50m.

Pile 3 Arisings.

C1 Location.

C1 Depth 2.00m.

Ashy layer 1.35mbgl.

C1 Strata.

C2 Location.

C2 Quarried Ragstone & Hassock (Natural no sample recovered)

Location of C3.

C3 Depth 2.00m.

C3 Strata.

Pile 4 S1 Location.

Pile 4 S1 Depth 3.70m.

Pile 4 S1 Strata.

Pile 4 S2. Depth 3.00m.

Pile 4 S2 Arisings.

Pile 5 S1 Depth 3.20m.

Pile 5 S1 Strata.

Pile 5 S1 Collapsed side after excavation.

Pile 5 S2 Depth 3.80m.

Pile 5 S2 Strata.

Pile 5 S2 Collapse.

Pile 6 S1 Location.

Pile 6 S1 Depth 2.10m.

Pile 6 S1 Strata.

Pile 6 S2 Location.

Pile 6 S2 Depth 2.50m.

Pile 6 S2 Strata.

Pile 6 S3 Location.

Pile 6 Sample 3 Depth 2.70m.

Pile 6 S3 Strata.

D1 Depth 1.50m.

D1 Arisings.

E1 Location.

E1 Depth 1.50m.

E1 Strata.

E1 Strata.

E2 Depth 1.50m.

E2 Strata.

E3 Location.

E3 Depth 1.70m.

E3 Strata.

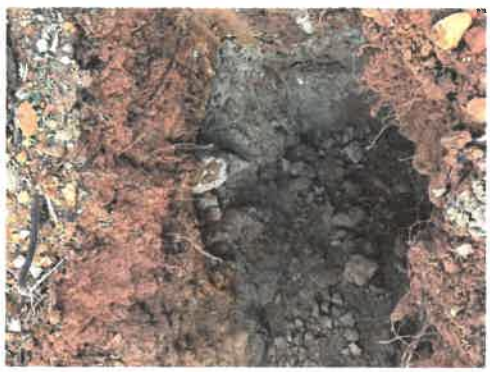
E4 Depth 2.00m.

E4 Strata.

E4 Strata.

E5 Location and Depth 1.50m.

E5 Strata.



E5 Strata.

E6 Depth 1.50m.

E6 Strata.

E6 Strata.

E7 Location ad Depth 3.00m.

E7 Strata.

E7 Strata.

E8 Depth 4.00m.

E8

E9 Location and Depth 3.00m.

E9 Strata.

E9 Strata.

E10 Location.

E10 Strata and Depth 3.50m.

Pile 7 Location and Depth 3.00m.

Pile 7 Strata.

Pile 8 S1 Location

Pile 8 S1 Depth 3.50m.

Pile 8 S1 Strata.

Pile 8 S2 Depth 3.70m.

Pile 8 S2 Strata.

Pile 8 S3 Depth 4.00m.

Pile 8 S3 Strata.

Pile 8 S4 Depth 4.00m

Pile 8 S4 Strata.

Pile 8 S5 (D2) Depth 3.50m.

Pile 8 S5 (D2) Strata.

Pile 8 S5 (D2) Strata

Pile 8 S6 Depth 3.00m.

Pile 8 S6 Strata.

Pile 8 S6 Strata.

27686/L/012A/G/RJM
20th January 2020

Attachments

- Gas Monitoring Borehole Logs- Tovil Quarry (Refer to separate attachment for KCC Borehole Logs & Monitoring Results)

Rotary Core Log

Borehole No. G1
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: -	Hole Type RC
Location: Maidstone		Level:	Scale 1:50
Client: P J Burke		Dates: 14/11/2019 - 14/11/2019	Logged By CO

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										Made Ground recovered as- Yellowish brown sandy CLAY with fine to boulder sized, gravel of SANDSTONE and LIMESTONE.
							3.50			Made Ground recovered as- Yellowish brown sandy CLAY with fine to boulder sized, gravel of SANDSTONE LIMESTONE and brick.
							5.00			Made Ground recovered as- fine to boulder sized gravel of brick, SANDSTONE and LIIMESTONE.
							6.00			End of borehole at 6.00 m

Remarks
1. Location was CAT scanned prior to works commencing. 2. A monitoring well was installed to 6.00 mbgl. 3. No Roots or groundwater were encountered. 4. Boreholes were open-hole rotary drilled with air mist flush.

Rotary Core Log

Borehole No. **G2**

Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: -	Hole Type RC
Location: Maidstone		Level:	Scale 1:50
Client: P J Burke		Dates: 15/11/2019 - 15/11/2019	Logged By CO

Well	Water Strikes	Depth (m)	Type / Fl	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										Made Ground recovered as- Yellowish brown sandy CLAY with fine to boulder sized, gravel of SANDSTONE and LIMESTONE.
							6.00			End of borehole at 6.00 m

Remarks

1. Location was CAT scanned prior to works commencing. 2. A monitoring well was installed to 6.00 mbgl. 3. No Roots or groundwater were encountered. 4. Boreholes were open-hole rotary drilled with air mist flush.

Rotary Core Log

Borehole No. G3
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: -	Hole Type RC
Location: Maidstone		Level:	Scale 1:50
Client: P J Burke		Dates: 15/11/2019 - 15/11/2019	Logged By

Well	Water Strikes	Depth (m)	Type / Fl	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										Made Ground recovered as- Yellowish brown sandy CLAY with fine to boulder sized, gravel of SANDSTONE and LIMESTONE.
							6.30			
							6.50			Made Ground recovered as- Yellowish brown sandy CLAY with fine to boulder sized, gravel of SANDSTONE LIMESTONE and brick. End of borehole at 6.50 m

Remarks
1. Location was CAT scanned prior to works commencing. 2. A monitoring well was installed to 6.50 mbgl. 3. No Roots or groundwater were encountered.

Rotary Core Log

Borehole No. G4
Sheet 1 of 2

Project Name: Tovil	Project No. 27686	Co-ords: -	Hole Type RC
Location: Maidstone		Level:	Scale 1:50
Client: P J Burke		Dates: 15/11/2019 - 15/11/2019	Logged By CD

Well	Water Strikes	Depth (m)	Type / Fl	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										Made Ground recovered as- Yellowish brown sandy CLAY with fine to boulder sized, gravel of SANDSTONE and LIMESTONE.
							8.00			Made Ground recovered as Yellowish brown sandy CLAY with fine to boulder sized, gravel of SANDSTONE LIMESTONE and brick.
										Continued on next sheet

1 2 3 4 5 6 7 8 9 10

Remarks

1. Location was CAT scanned prior to works commencing. 2. A monitoring well was installed to 14.00 mbgl. 3. No Roots or groundwater were encountered. 4. Boreholes were open-hole rotary drilled with air mist flush.

AGS

Rotary Core Log

Borehole No. **G4** Sheet 2 of 2

Project Name: Tovil	Project No. 27686	Co-ords: -	Hole Type RC
Location: Maidstone		Level:	Scale 1:50
Client: P J Burke		Dates: 15/11/2019 - 15/11/2019	Logged By CLO

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							13.00			Grey slightly silty CLAY.
							14.00			End of borehole at 14.00 m

11 12 13 14 15 16 17 18 19 20

Remarks

1. Location was CAT scanned prior to works commencing. 2. A monitoring well was installed to 14.00 mbgl. 3. No Roots or groundwater were encountered. 4. Boreholes were open-hole rotary drilled with air mist flush.

AGS

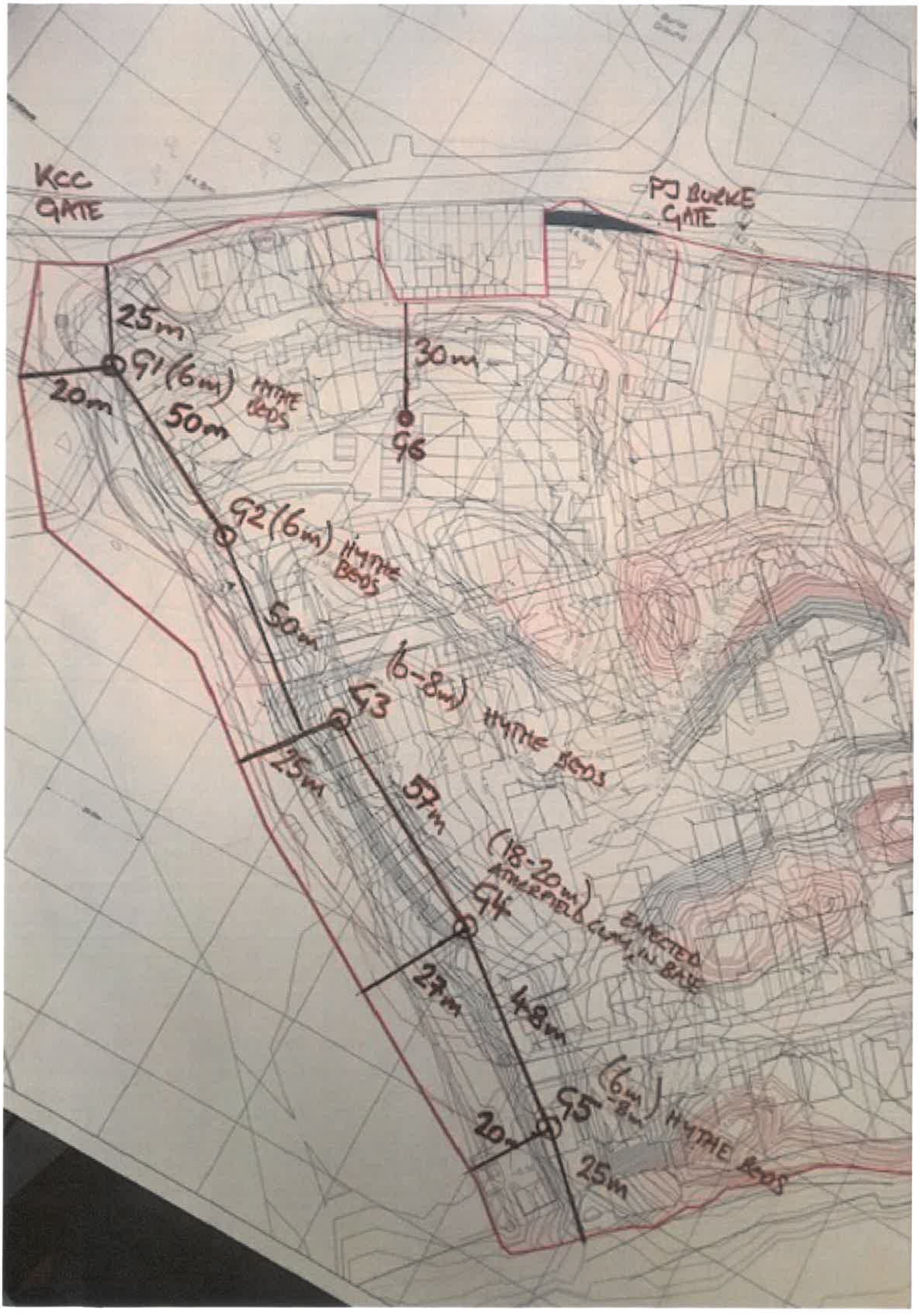
Rotary Core Log

Borehole No. G5
Sheet 1 of 1

Project Name: Tovil	Project No. 27686	Co-ords: -	Hole Type RC
Location: Maidstone		Level:	Scale 1:50
Client: P J Burke		Dates: 20/11/2019 - 20/11/2019	Logged By

Well	Water Strikes	Depth (m)	Type / Fl	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										Made Ground recovered as- Yellowish brown sandy CLAY with fine to boulder sized, gravel of SANDSTONE and LIMESTONE.
							4.00			Made Ground recovered as- Yellowish brown sandy CLAY with fine to boulder sized, gravel of SANDSTONE LIMESTONE and brick.
W							6.00			End of borehole at 6.00 m

Remarks
1. Location was CAT scanned prior to works commencing. 2. A monitoring well was installed to 6.00 mbgl. 3. No Roots or groundwater were encountered. 4. Boreholes were open-hole rotary drilled with air mist flush.


KCC GATE
PJ BURKE GATE
25m
20m
91 (6m) HYTHE BEDS
50m
30m
96
92 (6m) HYTHE BEDS
50m
(6-8m) HYTHE BEDS
43
25m
57m
(18-20m) ATHERFIELD CLAY, INJ BASE
94
EXPECTED
27m
48m
(6m-8m) HYTHE BEDS
95
20m
25m

Attachments

- Groundwater Monitoring Wells – Borehole Logs – Tovil Quarry (Refer to separate Attachment for KCC Borehole Logs & Monitoring Results)

GEO-TESTING SERVICES LTD.

Tel: 0117 9634471 Fax:0117 9636807

Machine : KLEMM 806 Flush : AIR Core Dia: N/A Method : ROTARY PERCUSSION	Casing Diameter 127mm to 27.00m Location SEE SITE PLAN	Ground Level (mOD) 37.81 Dates 03/05/2006-08/05/2006	Site TOVIL QUARRY, MAIDSTONE. Client P.J. BURKE. Engineer LIVERPOOL ENVIRONMENTAL ENGINEERING CONSULTANTS LIMITED.	Borehole Number A Job Number 14753 Sheet 1/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
							(4.00)	MADE GROUND (yellow brown friable sandy clayey fill with angular gravel to boulder sized sandstone and limestone fragments).			
						33.81	4.00	MADE GROUND (firm yellow and orange brown sandy clay fill with angular to gravel to boulder size sandstone and limestone fragments).			
					Rapid penetration - good returns of dust and subrounded chippings		(1.50)				
						32.31	5.50	MADE GROUND (yellow brown clayey sand fill with angular gravel to boulder sized sandstone and limestone fragments).			
							(3.00)				
						29.31	8.50	MADE GROUND (alternating slabs/boulders of strong light grey crystalline limestone and moderately strong orange brown sandstone).			
							(3.50)				
					12.0m Rapid penetration - poor returns and loss of flush	25.81	12.00	MADE GROUND (yellow orange brown clayey sandy fill with angular gravel to boulder sized sandstone fragments).			
					15.0m Rapid penetration - good returns of dust and subrounded chippings		(8.00)				
						17.81	20.00				

Remarks

1) Water strike (1) at 27m. Waterstrike (2) at 35m. Standing level of 22.5m recorded 15.05.06.
2) No obvious visual or olfactory evidence of ground contamination.
3) Descriptions based on tentative interpretation of dust returns.
4) 50mm nominal diameter slotted well screen installed on completion with granular response zone between 31 - 41m, backfilled around plain pipe above, with secure steel cover at ground level.

Scale (approx)	Logged By
1:100	JF

Figure No.
14753.A

GEO-TESTING SERVICES LTD.

Tel: 0117 9634471 Fax:0117 9636807

Site: TOVIL QUARRY, MAIDSTONE.				Borehole Number: A
Machine: KLEMM 806 Flush : AIR Core Dia: N/A Method : ROTARY PERCUSSION	Casing Diameter: 127mm to 27.00m	Ground Level (mOD): 37.81	Client: P.J. BURKE.	Job Number: 14753
	Location: SEE SITE PLAN	Dates: 03/05/2006-08/05/2006	Engineer: LIVERPOOL ENVIRONMENTAL ENGINEERING CONSULTANTS LIMITED.	Sheet: 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
							(7.00)	MADE GROUND (orange brown slightly clayey sandy fill with angular gravel to boulder sized sandstone and limestone fragments).			
					Water strike(1) at 27.00m. 27.0m Slow penetration good returns of dust and angular chipping	10.81	27.00	Interbedded moderately strong pale orange brown medium grained SANDSTONE and strong light grey crystalline LIMESTONE.		▽1	
							(8.00)				
					Water strike(2) at 35.00m.	2.81	35.00	Moderately strong pale orange brown and orange brown variegated medium grained SANDSTONE.		▽2	
							(5.00)				
					38.0m Slow penetration poor returns of dust and chippings	-2.19	40.00				

Remarks

Scale (approx)	Logged By
1:100	JF

Figure No. 14753.A

GEO-TESTING SERVICES LTD.

Tel: 0117 9634471 Fax:0117 9636807

Machine : KLEMM 806 Flush : AIR Core Dia: N/A Method : ROTARY PERCUSSION	Casing Diameter 127mm to 27.00m Location SEE SITE PLAN	Ground Level (mOD) 37.81 Dates 03/05/2006-08/05/2006	Site TOVIL QUARRY, MAIDSTONE. Client P.J. BURKE. Engineer LIVERPOOL ENVIRONMENTAL ENGINEERING CONSULTANTS LIMITED.	Borehole Number A Job Number 14753 Sheet 3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					40.0m Slow penetration - drill bit jamming, mudstone residue on drill rods		(1.00)	Weak blue grey silty clay MUDSTONE.			
						-3.19	41.00	Complete at 41.00m			

Remarks

Scale (approx)	Logged By
1:100	JF

Figure No.
14763.A

GEO-TESTING SERVICES LTD.

Tel: 0117 9634471 Fax:0117 9636807

Machine : KLEMM 806	Casing Diameter	Ground Level (mOD)	Site: TOVIL QUARRY MAIDSTONE.
Flush : AIR	127mm cased to 16.30m	38.53	Borehole Number: B-1
Core Dia:	Location	Dates	Client: P.J. BURKE.
Method : ROTARY PERCUSSION	SEE SITE PLAN	09/05/2006-10/05/2006	Job Number: 14753
		Engineer: LIVERPOOL ENVIRONMENTAL ENGINEERING CONSULTANTS LIMITED.	Sheet: 1/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
							(6.00)	MADE GROUND (yellow and orange brown sandy clay fill with gravel to boulder sized fragments of sandstone and limestone).			
					Rapid penetration good returns of dust and subrounded chippings	32.53	6.00	MADE GROUND (orange brown sandy to very sandy clay fill with gravel to boulder sized angular fragments of sandstone and limestone).			
							(3.00)				
						29.53	9.00	MADE GROUND (orange brown very sandy clay fill with gravel to boulder sized angular fragments of sandstone and limestone).			
							(2.00)				
					11.0 Slow penetration good returns of dust and angular chippings	27.53	11.00	Strong light grey crystalline LIMESTONE.			
							(2.00)				
						25.53	13.00	Interbedded strong light grey crystalline LIMESTONE and moderately strong orange brown medium grained SANDSTONE.			

Remarks

1) Water strike (1) at 35m. Standing level of 22.5m recorded 15.05.06.
2) No obvious visual or olfactory evidence of ground contamination.
3) Descriptions based on tentative interpretation of dust returns.
4) 50mm nominal diameter slotted well screen installed on completion with granular response zone between 32 - 42m, backfilled around plain pipe above, with secure steel cover at ground level.

Scale (approx)	Logged By
1:100	JF

Figure No. 14753.B-1

GEO-TESTING SERVICES LTD.

Tel: 0117 9634471 Fax:0117 9636807

Machine : KLEMM 806 Flush : AIR Core Dia: Method : ROTARY PERCUSSION	Casing Diameter 127mm cased to 16.30m Location SEE SITE PLAN	Ground Level (mOD) 36.53 Dates 09/05/2006-10/05/2006	Site TOVIL QUARRY, MAIDSTONE. Client P.J. BURKE. Engineer LIVERPOOL ENVIRONMENTAL ENGINEERING CONSULTANTS LIMITED.	Borehole Number B-1 Job Number 14753 Sheet 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
							(9.00)	Interbedded strong light grey crystalline LIMESTONE and moderately strong orange brown medium grained SANDSTONE.			
						16.53	22.00	Interbedded moderately strong orange brown medium grained SANDSTONE and strong light grey crystalline LIMESTONE.			
					25.0 Slow penetration good returns becoming damp		(6.00)				
						10.53	28.00	Moderately strong orange brown medium grained SANDSTONE.			
							(8.00)				
					Water strike(1) at 35.00m. 35.0 Slow penetration poor returns of dust and chippings, mudstone residue on drill rods	2.53	36.00	Interbedded moderately strong orange brown medium grained SANDSTONE and blue grey silty clayey MUDSTONE.			

Remarks

Scale (approx)	Logged By
1:100	JF

Figure No.
14753.B-1

GEO-TESTING SERVICES LTD.

Tel: 0117 9634471 Fax:0117 9636807

Site: TOVIL QUARRY, MAIDSTONE.				Borehole Number: B-1
Machine : KLEMM 806 Flush : AIR Core Dia: Method : ROTARY PERCUSSION	Casing Diameter: 127mm cased to 16.30m	Ground Level (mOD): 38.53	Client: P.J. BURKE.	Job Number: 14753
	Location: SEE SITE PLAN	Dates: 09/05/2006-10/05/2006	Engineer: LIVERPOOL ENVIRONMENTAL ENGINEERING CONSULTANTS LIMITED.	Sheet: 3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
							(6.00)	Interbedded moderately strong orange brown medium grained SANDSTONE and blue grey silty clayey MUDSTONE.			
						-3.47	42.00	Complete at 42.00m			

Remarks

Scale (approx)	Logged By
1:100	JF

Figure No. 14753.B-1

27686/L/012A/G/RJM
20th January 2020

Attachments

- Groundwater Monitoring Results

Ground Gas and Groundwater Monitoring Record Sheet

Job Details: Tovil Quarry
Job No: 27686
Client: PJ Burke
Visit No: Water visit Jan 20
Site: Tovil Quarry
Operator: RM
Date: 20/01/2020

	Gas Concentrations										Flow Data				PID	Well & Water Data				
Monitoring Point	Methane (%v/v)		% LEL		Carbon Dioxide (% v/v)		Hydrogen Sulphide (ppmv)		Oxygen (%v/v)		Flow rate (l/hr)		Differential borehole pressure (Pa)	Time for flow to equalise (secs)	PID %	Water Level (top of pipe)	Water Level (mbgl)	Depth of well (m)	Response Zone	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
B1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	19.37	19.23	31.00		
BHA	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	20.53	20.30	24.00		
BH TV S3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	20.59	20.09	25.05		
BH S8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	30m+	30m+	39.40		32.50mbgl in sept 2019 KCC data

Meteorological and Site Information:

State of ground:	x	Dry		Moist		Wet		Snow		Frozen
Wind:		Calm	x	Light		Moderate		Strong		
Cloud Cover:		None		Slight		Cloudy	x	Overcast		
Precipitation:	x	None		Slight		Moderate		Heavy		

NM- Not monitored

Barometric Pressure (mbar): 1042

27686/L/012A/G/RJM
20th January 2020

Attachments

- Ground Gas Monitoring Results – Tovil Quarry

Ground Gas and Groundwater Monitoring Record Sheet

Job Details: Tovil Quarry
Job No: 27686
Client: PJ Burke
Visit No: Initial
Site: Tovil Quarry
Operator: CD
Date: 25/11/2019

	Gas Concentrations										Flow Data				Well & Water Data			
Monitoring Point	Methane (%v/v)		% LEL		Carbon Dioxide (% v/v)		Hydrogen Sulphide (ppmv)		Oxygen (%v/v)		Flow rate (l/hr)		Differential borehole pressure (Pa)	Time for flow to equalise (secs)	Water Level (mbgl)	Depth of well (m)	Response Zone	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
G1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Dry	6.82	Fill	1m upstand measured to top
G2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Dry	6.83	Fill	1m upstand measured to top
G3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Dry	7.00	Fill	1m upstand measured to top
G4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Dry	14.10	Fill	1m upstand measured to top
G5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Damp at Base	6.83	Fill	1m upstand measured to top

Meteorological and Site Information:

State of ground:		Dry		Moist	x	Wet		Snow		Frozen
Wind:		Calm	x	Light		Moderate		Strong		
Cloud Cover:		None		Slight		Cloudy		Overcast	x	
Precipitation:		None		Slight		Moderate	x	Heavy		

NM- Not monitored

Barometric Pressure (mbar): 997

Ground Gas and Groundwater Monitoring Record Sheet

Job Details: Tovil Quarry
Job No: 27686
Client: PJ Burke
Visit No: 1 of 3
Site: Tovil Quarry
Operator: CD
Date: 03/12/2019

	Gas Concentrations										Flow Data				PID	Well & Water Data			
Monitoring Point	Methane (%v/v)		% LEL		Carbon Dioxide (% v/v)		Hydrogen Sulphide (ppmv)		Oxygen (%v/v)		Flow rate (l/hr)		Differential borehole pressure (Pa)	Time for flow to equalise (secs)	PID %	Water Level (mbgl)	Depth of well (m)	Response Zone	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady							
G1	0.00	0.00	1.20	0.40	2.60	2.60	0.03	0.02	16.10	16.00	5.80	5.70	51	20	1.8	Dry	6.82	Fill	1m upstand measured to top
G2	0.00	0.00	0.00	0.00	4.30	4.30	0.02	0.02	8.80	8.00	5.80	5.70	51	15	1.0	Dry	6.83	Fill	1m upstand measured to top
G3	1.20	1.20	27.00	27.00	2.30	2.30	0.06	0.04	0.30	0.30	5.80	5.70	51	30	1.5	Dry	7.00	Fill	1m upstand measured to top
G4	0.00	0.00	0.00	0.00	3.60	3.60	0.02	0.01	8.50	8.00	5.80	5.70	51	20	1.0	Dry	14.10	Fill	1m upstand measured to top
G5	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	19.70	18.00	5.80	5.70	51	30	1.0	Damp at Base	6.83	Fill	1m upstand measured to top

Meteorological and Site Information:

State of ground:		Dry	x	Moist		Wet		Snow		Frozen
Wind:		Calm	x	Light		Moderate		Strong	
Cloud Cover:		None	x	Slight		Cloudy		Overcast	
Precipitation:	x	None		Slight		Moderate		Heavy	

NM- Not monitored

Barometric Pressure (mbar): 1021

Ground Gas and Groundwater Monitoring Record Sheet

Job Details: Tovil Quarry
Job No: 27686
Client: PJ Burke
Visit No: 2 of 3
Site: Tovil Quarry
Operator: CD
Date: 12/12/2019

	Gas Concentrations										Flow Data				PID	Well & Water Data			
Monitoring Point	Methane (%v/v)		% LEL		Carbon Dioxide (% v/v)		Hydrogen Sulphide (ppmv)		Oxygen (%v/v)		Flow rate (l/hr)		Differential borehole pressure (Pa)	Time for flow to equalise (secs)	PID %	Water Level (mbgl)	Depth of well (m)	Response Zone	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady							
G1	0.00	0.00	0.00	0.00	2.60	2.60	0.02	0.02	16.80	16.00	5.80	5.70	52	20	1.0	Dry	6.82	Fill	1m upstand measured to top
G2	1.20	1.20	28.60	25.00	4.30	4.30	0.06	0.04	6.50	6.50	5.10	5.00	51	20	1.0	Dry	6.83	Fill	1m upstand measured to top
G3	1.60	1.40	42.60	30.00	2.30	2.30	0.09	0.08	0.20	0.20	5.20	5.00	44	20	1.9	Dry	7.00	Fill	1m upstand measured to top
G4	1.30	1.00	13.20	10.00	3.60	3.60	0.05	0.04	0.50	0.50	5.80	5.70	53	20	1.3	Dry	14.10	Fill	1m upstand measured to top
G5	1.20	1.00	27.90	20.00	0.00	0.00	0.07	0.06	2.50	2.50	5.70	5.70	51	35	1.0	Damp at Base	6.83	Fill	1m upstand measured to top

Meteorological and Site Information:

State of ground:		Dry		Moist	x	Wet		Snow		Frozen
Wind:		Calm		Light	x	Moderate		Strong	
Cloud Cover:		None		Slight		Cloudy		Overcast	x
Precipitation:		None		Slight		Moderate	x	Heavy	

NM- Not monitored

Barometric Pressure (mbar): 986

Ground Gas and Groundwater Monitoring Record Sheet

Job Details: Tovil Quarry
Job No: 27686
Client: PJ Burke
Visit No: 3 of 3
Site: Tovil Quarry
Operator: CD
Date: 10/01/2019

	Gas Concentrations										Flow Data				PID	Well & Water Data			
Monitoring Point	Methane (%v/v)		% LEL		Carbon Dioxide (% v/v)		Hydrogen Sulphide (ppmv)		Oxygen (%v/v)		Flow rate (l/hr)		Differential borehole pressure (Pa)	Time for flow to equalise (secs)	PID %	Water Level (mbgl)	Depth of well (m)	Response Zone	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady							
G1	0.00	0.00	0.00	0.00	2.50	2.40	0.03	0.02	16.80	16.00	5.80	5.70	72	20	1.0	Dry	6.82	Fill	1m upstand measured to top
G2	1.20	1.20	22.00	20.00	4.30	4.30	0.05	0.04	6.50	6.50	5.00	4.80	60	20	1.0	Dry	6.83	Fill	1m upstand measured to top
G3	3.30	3.20	84.60	83.00	2.40	2.30	0.16	0.12	0.80	0.60	6.20	6.00	72	20	3.6	Dry	7.00	Fill	1m upstand measured to top
G4	1.30	1.00	13.20	10.00	3.60	3.60	0.05	0.04	20.00	17.00	5.60	5.40	55	20	1.3	Dry	14.10	Fill	1m upstand measured to top
G5	1.20	1.00	25.00	21.00	0.00	0.00	0.06	0.05	17.40	16.00	5.60	5.50	53	35	1.0	Damp at Base	6.83	Fill	1m upstand measured to top

Meteorological and Site Information:

State of ground:	x	Dry		Moist		Wet		Snow		Frozen
Wind:		Calm	x	Light		Moderate		Strong	
Cloud Cover:		None		Slight		Cloudy	x	Overcast	
Precipitation:	x	None		Slight		Moderate		Heavy	

NM- Not monitored

Barometric Pressure (mbar): 1020

27686/L/012A/G/RJM
20th January 2020

Attachments

- Ground Gas Monitoring Information – Adjacent KCC landfill site

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

Start - End Date	Project ID:	Hole Type:	BH S8
09/10/2017 - 10/10/2017	J13325	CP	Sheet 1 of 5

Project Name:	Tovil Landfill	Remarks:	Co-ordinates:	Level:	Logger:
					TJ
Location:	Entrance to Tip, Dean Street	Drilled using DTHH with Air and Foam Mist. Logged by Driller. The DTHH Drilling method provides very poor sample recovery, from which to log.			
Client:	Kent County Council				

Well	Water Strikes	Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
						(2.50)			Concrete over CLAY/ SAND with much plastic. MADE GROUND
								2.50	Loose SAND and weak SANDSTONE with clay bands HYTHE FORMATION
						(6.00)		8.50	Yellow grey SANDSTONE and LIMESTONE HYTHE FORMATION

Continued on next sheet.

Hole Details		Casing Details		Waterstrike (m bgl)						Standing/Chiselling (m bgl)			
Depth (m bgl)	Dia. (mm)	Depth (m bgl)	Dia. (mm)	Date	Depth Strike	Depth Casing	Depth Sealed	Rose to:	Time (mins)	From	To	Time	Remarks
6.50 41.50	131 101	6.50	131	09-10-2017	34.00	6.50		34.20	20				

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

Start - End Date	Project ID:	Hole Type:	BH S8
09/10/2017 - 10/10/2017	J13325	CP	Sheet 2 of 5

Project Name:	Tovil Landfill	Remarks:	Co-ordinates:	Level:	Logger:
					TJ
Location:	Entrance to Tip, Dean Street	Drilled using DTHH with Air and Foam Mist. Logged by Driller. The DTHH Drilling method provides very poor sample recovery, from which to log.			
Client:	Kent County Council				

Well	Water Strikes	Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
						(3.50)			Yellow grey SANDSTONE and LIMESTONE HYTHE FORMATION
						(9.00)		12.00	Strong fractured LIMESTONE HYTHE FORMATION

11 12 13 14 15 16 17 18 19 20

Continued on next sheet.

Hole Details		Casing Details		Waterstrike (m bgl)						Standing/Chiselling (m bgl)			
Depth (m bgl)	Dia. (mm)	Depth (m bgl)	Dia. (mm)	Date	Depth Strike	Depth Casing	Depth Sealed	Rose to:	Time (mins)	From	To	Time	Remarks
6.50 41.50	131 101	6.50	131	09-10-2017	34.00	6.50		34.20	20				

Southern Testing ST Consult	Start - End Date	Project ID:	Hole Type:	BH S8
www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020	09/10/2017 - 10/10/2017	J13325	CP	Sheet 3 of 5

Project Name:	Tovil Landfill	Remarks:	Co-ordinates:	Level:	Logger:
					TJ
Location:	Entrance to Tip, Dean Street	Drilled using DTHH with Air and Foam Mist. Logged by Driller. The DTHH Drilling method provides very poor sample recovery, from which to log.			
Client:	Kent County Council				

Well	Water Strikes	Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
									Strong fractured LIMESTONE HYTHE FORMATION
								21.00	Weak SANDSTONE/ LIMESTONE HYTHE FORMATION *21m to 23m, No flush (Voids/ fractures??)*
						(2.00)		23.00	Very weak/ weak Limestone/ SANDSTONE HYTHE FORMATION *26m to 37m, No flush (Voids/ fractures??)*
						(14.00)			

21 22 23 24 25 26 27 28 29 30

Continued on next sheet.

Hole Details		Casing Details		Waterstrike (m bgl)						Standing/Chiselling (m bgl)			
Depth (m bgl)	Dia. (mm)	Depth (m bgl)	Dia. (mm)	Date	Depth Strike	Depth Casing	Depth Sealed	Rose to:	Time (mins)	From	To	Time	Remarks
6.50 41.50	131 101	6.50	131	09-10-2017	34.00	6.50		34.20	20				

Southern Testing ST Consult	Start - End Date	Project ID:	Hole Type:	BH S8
www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020	09/10/2017 - 10/10/2017	J13325	CP	Sheet 4 of 5

Project Name:	Tovil Landfill	Remarks:	Co-ordinates:	Level:	Logger:
					TJ
Location:	Entrance to Tip, Dean Street	Drilled using DTHH with Air and Foam Mist. Logged by Driller. The DTHH Drilling method provides very poor sample recovery, from which to log.			
Client:	Kent County Council				

Well	Water Strikes	Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
									31
									32 — *At 32m, Rods removed, waited 1hr to measure WL. No water measured.*
									33
									34
									35
									36
						(4.50)		37.00	37 — Stiff blue grey sandy CLAY. ATHERFIELD CLAY
									37m to 41.5m, Groundwater/ flush.
									38
									39
									40

Continued on next sheet.

Hole Details		Casing Details		Waterstrike (m bgl)						Standing/Chiselling (m bgl)			
Depth (m bgl)	Dia. (mm)	Depth (m bgl)	Dia. (mm)	Date	Depth Strike	Depth Casing	Depth Sealed	Rose to:	Time (mins)	From	To	Time	Remarks
6.50 41.50	131 101	6.50	131	09-10-2017	34.00	6.50		34.20	20				

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

Start - End Date	Project ID:	Hole Type:	BH S8
09/10/2017 - 10/10/2017	J13325	CP	Sheet 5 of 5

Project Name:	Tovil Landfill	Remarks:	Co-ordinates:	Level:	Logger:
					TJ
Location:	Entrance to Tip, Dean Street	Drilled using DTHH with Air and Foam Mist. Logged by Driller. The DTHH Drilling method provides very poor sample recovery, from which to log.			
Client:	Kent County Council				

Well	Water Strikes	Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
									Stiff blue grey sandy CLAY. ATHERFIELD CLAY
								41.50	End of borehole at 41.50m

41 42 43 44 45 46 47 48 49 50

Hole Details		Casing Details		Waterstrike (m bgl)						Standing/Chiselling (m bgl)			
Depth (m bgl)	Dia. (mm)	Depth (m bgl)	Dia. (mm)	Date	Depth Strike	Depth Casing	Depth Sealed	Rose to:	Time (mins)	From	To	Time	Remarks
6.50 41.50	131 101	6.50	131	09-10-2017	34.00	6.50		34.20	20				


Track
DEAN STREET
42.7m
GP
El Sub Sta
44.8m
Path
B2010
44.5m
Site Gates
Borehole S8 Location
DEAN STREET
43.6m

Sample Point	Date	Source	Site	Sample Type	Balance (%)	Barometric Pressure (MI	Carbon Dioxide (%)	Carbon Monoxide (PPM)	Hydrogen Sulfide (PPM)	Methane (%)	Oxygen (%)
TV-3 at 2m	24/10/2016 08:51:00	Gas Analyser	Tovil Green	No Sample Type	79.1	1011	0.1	0	0	0	20.8
TV-3 at 2m	21/11/2016 10:31:19	Gas Analyser	Tovil Green	No Sample Type	78.9	985	0	0	0	0	21.1
TV-3 at 2m	28/11/2016 08:44:22	Gas Analyser	Tovil Green	No Sample Type	78.8	1024	0.1	0	0	0	21.1
TV-3 at 2m	16/01/2017 10:35:00	Gas Analyser	Tovil Green	No Sample Type	79.1	1024	0.2	0	0	0	20.7
TV-3 at 2m	20/02/2017 11:43:50	Gas Analyser	Tovil Green	No Sample Type	79.3	1014	0.4	0	0	0	20.3
TV-3 at 2m	01/03/2017 12:04:10	Gas Analyser	Tovil Green	No Sample Type	79.2	995	0.2	0	0	0	20.6
TV-3 at 2m	21/04/2017 08:28:59	Gas Analyser	Tovil Green	No Sample Type	78.1	1030	0.3	0	0	0	21.6
TV-3 at 2m	08/05/2017 08:18:47	Gas Analyser	Tovil Green	No Sample Type	78.1	1022	0.4	0	0	0	21.5
TV-3 at 2m	27/06/2017 08:37:29	Gas Analyser	Tovil Green	No Sample Type	78.7	1006	0.2	1	0	0	21.1
TV-3 at 2m	13/07/2017 09:18:20	Gas Analyser	Tovil Green	No Sample Type	79.6	1020	0.1	1	0	0	20.3
TV-3 at 2m	31/07/2017 08:24:32	Gas Analyser	Tovil Green	No Sample Type	80.3	1009	0.1	0	0	0	19.6
TV-3 at 2m	17/10/2017 09:13:57	Gas Analyser	Tovil Green	No Sample Type	78.4	1019	0.3	0	0	0.1	21.2
TV-3 at 2m	04/12/2017 09:36:49	Gas Analyser	Tovil Green	No Sample Type	79.3	1030	0.6	0	0	0.1	20
TV-3 at 2m	08/01/2018 09:41:07	Gas Analyser	Tovil Green	No Sample Type	78.9	1021	0.1	0	0	0.1	20.9
TV-3 at 2m	22/02/2018 08:56:58	Gas Analyser	Tovil Green	No Sample Type	78.1	1022	0.1	0	0	0.1	21.7
TV-3 at 2m	12/03/2018 08:28:46	Gas Analyser	Tovil Green	No Sample Type	79	983	0.1	0	0	0.1	20.8
TV-3 at 2m	05/04/2018 10:28:10	Gas Analyser	Tovil Green	No Sample Type	79.6	1012	0.1	0	0	0	20.3
TV-3 at 2m	30/04/2018 09:11:01	Gas Analyser	Tovil Green	No Sample Type	78.3	999	1.8	0	0	0.2	19.7
TV-3 at 2m	11/06/2018 09:50:06	Gas Analyser	Tovil Green	No Sample Type	78.9	1012	0.7	0	0	0	20.4
TV-3 at 2m	02/07/2018 09:32:01	Gas Analyser	Tovil Green	No Sample Type	79.1	1013	0.7	0	0	0	20.2
TV-3 at 2m	24/08/2018 08:58:46	Gas Analyser	Tovil Green	No Sample Type	78.5	1012	0.6	1	1	0.1	20.8
TV-3 at 2m	17/09/2018 09:29:53	Gas Analyser	Tovil Green	No Sample Type	78.9	1014	0.1	0	2	0.2	20.8
TV-3 at 2m	01/10/2018 11:11:56	Gas Analyser	Tovil Green	No Sample Type	78.6	1023	0.8	0	0	0	20.6
TV-3 at 2m	26/11/2018 09:30:01	Gas Analyser	Tovil Green	No Sample Type	78	1011	0.5	0	0	0.3	21.2
TV-3 at 2m	10/12/2018 10:15:19	Gas Analyser	Tovil Green	No Sample Type	78.4	1026	0.3	0	2	0	21.3
TV-3 at 2m	07/01/2019 09:31:05	Gas Analyser	Tovil Green	No Sample Type	78.6	1032	0.3	0	0	0.1	21
TV-3 at 2m	04/02/2019 10:15:17	Gas Analyser	Tovil Green	No Sample Type	77.5	1016	0.2	0	0	0.1	22.2
TV-3 at 2m	04/03/2019 09:00:56	Gas Analyser	Tovil Green	No Sample Type	77.3	992	0.4	0	0	0.1	22.2
TV-3 at 2m	01/04/2019 09:05:18	Gas Analyser	Tovil Green	No Sample Type	77.8	1021	0.1	0	0	0.1	22
TV-3 at 2m	02/05/2019 09:19:49	Gas Analyser	Tovil Green	No Sample Type	78.7	1013	0.5	1	0	0.1	20.7
TV-3 at 2m	17/06/2019 09:16:06	Gas Analyser	Tovil Green	No Sample Type	80.2	1017	0.5	1	0	0	19.3
TV-3 at 2m	08/07/2019 09:10:58	Gas Analyser	Tovil Green	No Sample Type	79.5	1020	0.6	1	0	0	19.9
TV-3 at 2m	05/08/2019 10:36:30	Gas Analyser	Tovil Green	No Sample Type	79.3	1009	0.2	0	0	0	20.5
TV-3 at 2m	09/09/2019 11:21:54	Gas Analyser	Tovil Green	No Sample Type	78.1	1010	0.8	0	0	0.2	20.9
TV-3 at 2m	07/10/2019 10:08:33	Gas Analyser	Tovil Green	No Sample Type	78	1015	0.5	0	0	0.1	21.4
TV-E5	24/10/2016 10:10:45	Gas Analyser	Tovil Green	No Sample Type	77.8	1010	14.7	0	0	0	7.5
TV-E5	21/11/2016 12:00:00	Gas Analyser	Tovil Green	No Sample Type	76.6	983	13.4	0	0	0	10
TV-E5	28/11/2016 10:19:25	Gas Analyser	Tovil Green	No Sample Type	78.7	1025	9.5	0	0	0	11.8
TV-E5	16/01/2017 11:17:00	Gas Analyser	Tovil Green	No Sample Type	78.2	1024	10.4	0	0	0.2	11.2
TV-E5	20/02/2017 12:16:46	Gas Analyser	Tovil Green	No Sample Type	79.8	1013	13.6	0	0	0.1	6.5
TV-E5	01/03/2017 11:15:49	Gas Analyser	Tovil Green	No Sample Type	77.1	996	16.3	0	0	0.5	6.1
TV-E5	21/04/2017 09:53:50	Gas Analyser	Tovil Green	No Sample Type	79.6	1030	12.6	0	0	0.2	7.6
TV-E5	08/05/2017 09:39:30	Gas Analyser	Tovil Green	No Sample Type	77.4	1022	7.5	0	0	0	15.1
TV-E5	27/06/2017 09:40:44	Gas Analyser	Tovil Green	No Sample Type	77.8	1005	6.2	1	0	0	16
TV-E5	13/07/2017 10:25:39	Gas Analyser	Tovil Green	No Sample Type	78.5	1020	7.8	2	1	0	13.7
TV-E5	31/07/2017 09:56:00	Gas Analyser	Tovil Green	No Sample Type	79	1010	9.8	2	1	0	11.2
TV-E5	06/09/2017 09:31:50	Gas Analyser	Tovil Green	No Sample Type	79.5	1016	11.3	0	0	0	9.2
TV-E5	17/10/2017 10:18:23	Gas Analyser	Tovil Green	No Sample Type	78.7	1019	14.5	1	0	0.3	6.5
TV-E5	04/12/2017 09:28:00	Gas Analyser	Tovil Green	No Sample Type	78.6	1031	9	0	0	0.2	12.2
TV-E5	08/01/2018 10:57:33	Gas Analyser	Tovil Green	No Sample Type	78.2	1020	5.9	0	0	0.1	15.8
TV-E5	22/02/2018 09:45:52	Gas Analyser	Tovil Green	No Sample Type	77.1	1022	6.6	0	0	0.1	16.2
TV-E5	12/03/2018 10:23:05	Gas Analyser	Tovil Green	No Sample Type	80.3	982	16.4	0	0	0.7	2.6
TV-E5	05/04/2018 11:49:13	Gas Analyser	Tovil Green	No Sample Type	79.8	1014	2.4	1	2	0	17.8
TV-E5	30/04/2018 10:42:27	Gas Analyser	Tovil Green	No Sample Type	76.7	999	5.4	0	0	0	17.9
TV-E5	11/06/2018 11:31:06	Gas Analyser	Tovil Green	No Sample Type	79.1	1012	6.7	0	1	0	14.2
TV-E5	04/02/2019 09:57:04	Gas Analyser	Tovil Green	No Sample Type	82.4	1016	14.6	0	0	2.4	0.6
TV-E6	24/10/2016 10:12:52	Gas Analyser	Tovil Green	No Sample Type	79.6	1010	0.5	0	0	0	19.9
TV-E6	21/11/2016 12:02:14	Gas Analyser	Tovil Green	No Sample Type	79.2	983	0.4	0	0	0.1	20.3
TV-E6	28/11/2016 10:21:58	Gas Analyser	Tovil Green	No Sample Type	78.6	1025	0	0	0	0	21.4
TV-E6	16/01/2017 11:19:00	Gas Analyser	Tovil Green	No Sample Type	80.3	1023	0.3	0	0	0	19.4
TV-E6	20/02/2017 09:05:20	Gas Analyser	Tovil Green	No Sample Type	78.9	1015	0	0	0	0	21.1
TV-E6	01/03/2017 11:13:36	Gas Analyser	Tovil Green	No Sample Type	78.9	996	0.3	0	0	0.3	20.5
TV-E6	21/04/2017 09:57:13	Gas Analyser	Tovil Green	No Sample Type	77.7	1028	0.6	1	0	0	21.7
TV-E6	08/05/2017 09:41:50	Gas Analyser	Tovil Green	No Sample Type	77.4	1021	0.2	0	0	0	22.4
TV-E6	27/06/2017 09:43:47	Gas Analyser	Tovil Green	No Sample Type	79	1003	0.7	1	0	0	20.3
TV-E6	13/07/2017 10:28:00	Gas Analyser	Tovil Green	No Sample Type	79.8	1019	0.6	2	1	0	19.6
TV-E6	31/07/2017 09:58:27	Gas Analyser	Tovil Green	No Sample Type	79.8	1009	0.7	1	2	0	19.5
TV-E6	06/09/2017 09:29:14	Gas Analyser	Tovil Green	No Sample Type	78.8	1015	0.6	0	0	0	20.6
TV-E6	04/12/2017 09:30:21	Gas Analyser	Tovil Green	No Sample Type	78.1	1030	0.2	0	0	0.1	21.6
TV-E6	08/01/2018 11:00:40	Gas Analyser	Tovil Green	No Sample Type	77.7	1017	0.3	0	0	0.2	21.8
TV-E6	22/02/2018 09:48:06	Gas Analyser	Tovil Green	No Sample Type	78.4	1021	0.2	0	0	0.1	21.3
TV-E6	12/03/2018 10:25:27	Gas Analyser	Tovil Green	No Sample Type	78.5	982	0.2	0	0	0.1	21.2
TV-E6	05/04/2018 11:51:11	Gas Analyser	Tovil Green	No Sample Type	79.6	1013	0.1	1	2	0	20.3
TV-E6	11/06/2018 11:32:36	Gas Analyser	Tovil Green	No Sample Type	79.7	1012	0	0	1	0	20.3
TV-E6	02/05/2019 09:14:03	Gas Analyser	Tovil Green	No Sample Type	78.6	1012	0.1	0	0	0	21.3

Kent County Council
Waste Management

Tovil Closed Landfill Site, Maidstone

Environmental Monitoring Summary

Rev.0, July 2017

Contents

1 Introduction....1
2 Walkover Survey....2
3 Landfill Gas Assessment....3
3.1 In-Waste....3
3.2 Perimeter....4
3.3 Surface Emissions Survey....5
4 Water Assessment....5
4.1 Leachate Quality....6
4.2 Groundwater Quality....6
4.3 Surface Water....8
5 Conceptual Site Model and Preliminary Risk Assessment....9
6 Conclusions and Recommendations....11
7 References....12
8 Data Presentation....13

1 Introduction

This Environmental Monitoring Summary (EMS) has been produced by KCC Waste Management (KCC WM) as part of the ongoing aftercare programme for the closed landfill site at Tovil, Maidstone.

A full Environmental Monitoring Report (EMR) was produced by Jacobs UK Ltd (Jacobs) on behalf of KCC WM in January 2008. The EMR presented mainly historical information comprising a description of the factual details from a study of the existing records and from geological memoirs, with borehole logs and previous reports included as appendices. Subsequent shorter Environmental Monitoring Summary (EMS) documents were produced by Jacobs to provide an update to the EMR, each detailing the results of the monitoring undertaken up to the date of their issue.

This EMS document reviews gas and water data from the date of the last EMS[2] issued in December 2012, until present in order to review the conceptual site model (CSM) and update the preliminary risk assessment (PRA). It also presents the findings of a walkover survey and conclusions and recommendations for the site. Detailed historical information is not included in the EMS document and hence it should be read with reference to the last full EMR[2].

2 Walkover Survey

A walkover survey was conducted on 13th July 2017. Observations are shown on Figure 1 along with the location of the environmental monitoring points which are pre-fixed with the site identifier TV. The walkover was undertaken on a dry, sunny day with a slight breeze.

The site continues to be grazed by horses, although the grass across much of the site was long with the southern section being densely covered by teasels and thistles. Several wildflowers were found to be in bloom, with patches of ragwort also noted, as shown in Photo A. Despite the long grass, the undulating nature of the site was still apparent, with many large depressions present. These often appeared to follow the outline of the phases of tipping. An updated topographical survey is required in order to confirm this though.

As noted during previous walkover surveys, areas of distressed vegetation and bare ground were also apparent. These tended to be on ridges of higher ground, potentially associated with settlement within the different phases of tipping. An example of one of these areas is shown in Photo B.

Photo A View across site

Photo B Bare ground

At the time of the walkover, water was present in the two large ponds monitored as SW2 (Photo C) whilst SW1 and SW3 were dry.

Photo C Pond monitored as SW2

Photo D New pedestrian gate

Since the last report was issued, three new pedestrian gates have been installed; two on the southern boundary and one on the eastern, as shown in Photo D. These join up footpaths outside of the site, allowing pedestrians to avoid walking along the busy road.

3 Landfill Gas Assessment

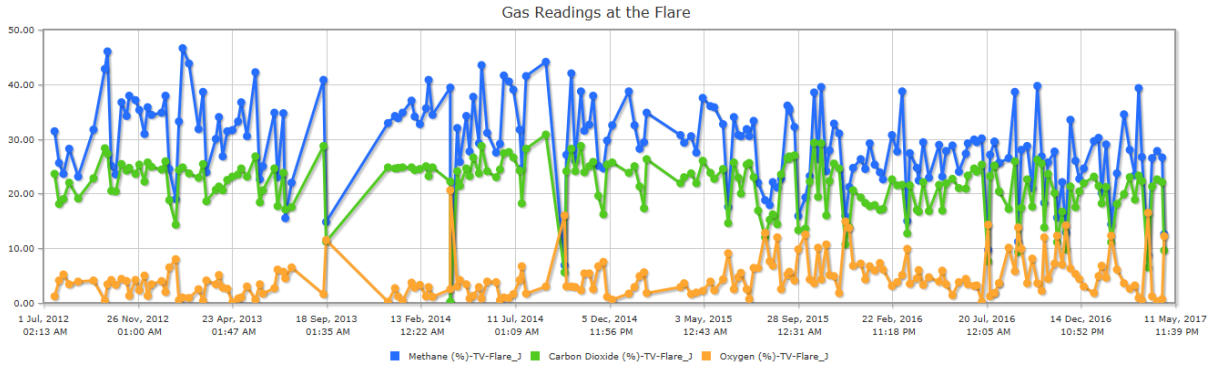
This gas assessment summarises the gas results since the previous environmental monitoring summary was issued in December 2012[1].

Since the last EMS was issued an audit of the landfill gas extraction system has been carried out. This comprised an assessment of gas well condition, gas quality, well depth and suction/relative pressure coverage. It highlighted the presence of some faults which required further investigation. This investigation with subsequent repairs was undertaken in September and November 2014 respectively.

3.1 In-Waste

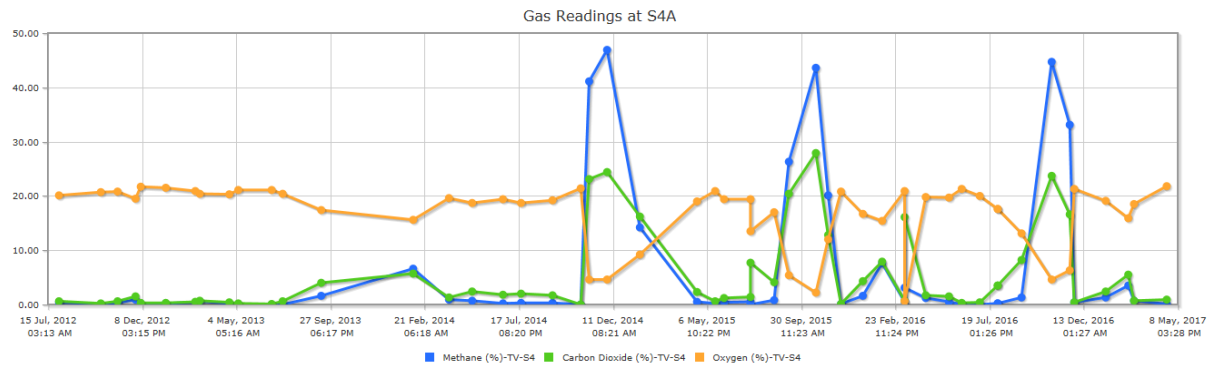
Gas monitoring from the three in waste boreholes (E2, S4A and S5A) as well as at the flare indicates that reasonable quality gas is still present within the site. Borehole E2 continues to record the best quality landfill gas with methane generally between 45% and 65%, carbon dioxide between 25% and 30% and very little oxygen. Results from S5A and the flare indicate a poorer quality landfill gas is present across the majority of the site, with methane typically between 20% and 35%, as shown in Graph 3-A.

Graph 3-A Gas readings at the Flare



Borehole S4A records a seasonal trend to its gas readings, as shown in Graph 3-B below, with peaks in methane towards the end of each year and none in the summer.

Graph 3-B Gas readings at borehole S4A



Flare counter readings continue to indicate that the operation of the flare is poor and generally only runs (and then only for up to 24 hours), once the monitoring officer has manually relit it on his weekly visits. An audit of the gas extraction system in July 2014 noted some faults that needed attention in order to establish suction across the system.

These were undertaken in November 2014. Gas balancing is undertaken on a quarterly basis. Since the audit and repairs in 2014, suction has been maintained across the site, although valves at wells D1 and A6 have recently been noted as faulty and require repair.

As recommended by the audit report in July 2014, now that the repairs have been made options to help the flare ignite on timer mode should be undertaken to help improve run times and make them more consistent.

3.2 Perimeter

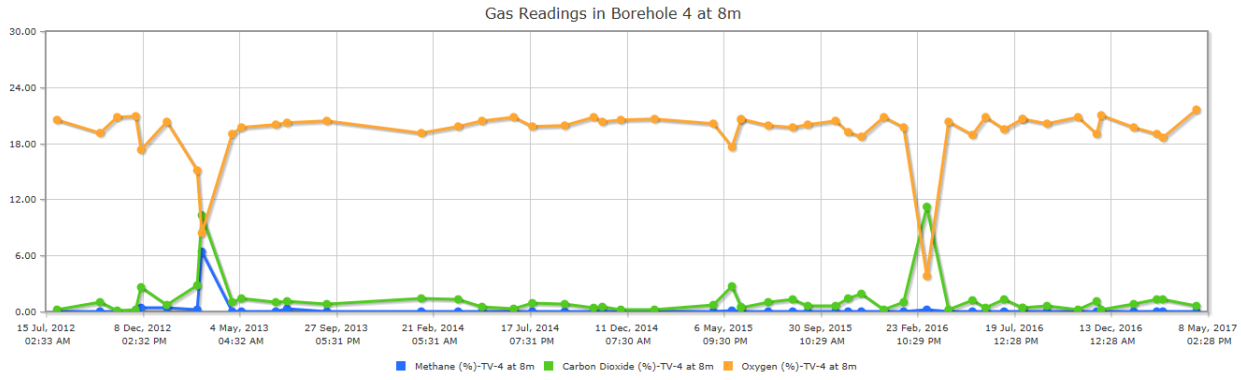
Since the last report in December 2012 boreholes 1 and A along the northern boundary of the site have been removed, as part of the excavation works to the adjacent quarry. The excavation works have meant that waste along the northern face of the landfill has been exposed. Care will need to be taken to ensure that this does not allow oxygen to be drawn into the site by the gas extraction system.

There has been little change to the gas regime within the perimeter boreholes within most continuing to show little if any evidence of landfill gas migration. Exceptions to this include:

- Boreholes E3 and E4 along the eastern boundary which continue to show evidence of landfill gas migration. Methane has recently been recorded up to 20% in E3 and 10% in E4.
- Isolated spike in methane in borehole 7 along the western boundary in February 2014 of 17.3%.
- Isolated spike in methane in borehole E5 along the northern boundary in January 2016 of 4.3%.

An improvement in the gas regime in borehole 4 has been noted recently. The 2m and 8m tips used to record isolated peaks in methane in March each year, but these were not recorded in 2014 or 2015. A peak in carbon dioxide was noted at these depths in March 2016 but with a maximum methane of 0.4%, as shown in Graph 3-C.

Graph 3-C Gas readings in borehole 4 at 8m



After recording methane in borehole E6 during 2014 and in September 2015, near natural atmospheric conditions have returned.

3.3 Surface Emissions Survey

Surface emissions surveys were undertaken across the site on 27th March and 6th August 2015 and 13th July 2017 where, using a portable laser diode methane detector, the concentrations of methane gas being emitted from the site were recorded.

The majority of the readings from the March 2015 survey were within the acceptable threshold of 5ppm. There are however areas that are showing both elevated (138 readings between five and 100) and significant readings (seven readings above 100, of which two are above 1,000). These readings are largely within areas that have previously produced higher readings, namely at the boundary of the waste/quarry edge, where settlement of the waste has allowed a preferential pathway for surface emissions to develop.

The August 2015 survey recorded a maximum value of 30ppm. This was along the eastern boundary, by a crack and an area of bare ground, similar to that noted in the March 2015 survey.

Similar to the March 2015 survey, the July 2017 survey noted both elevated (90 readings between five and 100ppm) and significant readings (15 readings above 100ppm, of which three were above 1,000ppm). Comparison with the March 2017 shows the elevated readings along the eastern boundary and between gas extraction wells C7 and C6 to be persistent. Figure 3-A shows the location of readings over 50ppm from both the March 2015 and July 2017 surveys.

Figure 3-A March 2015 and July 2017 SEM Comparison (readings over 50ppm)

4 Water Assessment

Leachate is the liquid that results from the percolation of water and liquid waste through solid waste. Leachate has the potential to cause harm through the depletion of oxygen and production of hydrogen sulphide, methane and ammonia, all of which are toxic to most higher level organisms. Consequently aquatic life may be reduced or even totally eradicated

by components in leachate. There is also the potential for trace contaminants such as heavy metals to be present, which can pose a risk to groundwater as a resource.

Samples are recovered and tested in the field every two months with samples sent for laboratory testing on a seven month cycle. Since the last EMS[1] was issued in December 2012, five rounds of laboratory testing have been undertaken; April 2013, June 2014, January 2015, October 2015 and October 2016.

4.1 Leachate Quality

Only three rounds of testing have been undertaken on samples from S4A; April 2013, June 2014 and January 2015 as the borehole is often noted as containing insufficient liquid to enable a sample to be taken. No samples have been recovered from S5A as this is consistently found to be dry. Where available leachate results have been compared with typical values for leachate from aged wastes set out in Waste Management Paper 26B (WMP26B)[3] and or the example completion criteria for leachate set out in Waste Management Paper 26A (WMP26A)[4]. It should be noted that these criteria have been used as a guide only in order to help assess the strength of the leachate and do not represent statutory limit values.

Leachate results continue to indicate that little water is being retained within the site and that which is retained is considered to be a very weak leachate. Recent testing has recorded the following for key landfill indicators.

Table 4-A Leachate Results S4A

Determinand	Average since December 2012
COD	240mg/l
Ammoniacal Nitrogen	180mg/l
BOD	14mg/l
Electrical conductivity	3674µS/cm (including field readings)
pH	6.97(including field readings)

4.2 Groundwater Quality

Where available, groundwater results have been compared against statutory freshwater environmental quality standards (EQS) as groundwater in the vicinity of the site is likely to be in continuity with the River Medway. Where these are not available UK Drinking Water Standards (DWS) have been used as a guide, although the site is not within a groundwater source protection zone.

Three groundwater boreholes are monitored at the site; S1, S2 and S3. Groundwater levels are very consistent, showing little seasonal influence. They indicate that flow is to the north, making borehole S2 up hydraulic gradient of the site and S1 and S3 down hydraulic gradient.

In-situ testing of dissolved oxygen, temperature, electrical conductivity and pH indicates a slight deterioration in groundwater quality in S3 compared with that at S1 and S2. This is most clearly shown by electrical conductivity values which since December 2012 have averaged 1289µS/cm at S2, 1463µS/cm at S1 and 2746µS/cm at S3, as shown below in Graph 4-A. pH remains near neutral for all locations, with S3 being slightly more alkaline than S1 and S2 and dissolved oxygen values are generally below 2mg/l at all three