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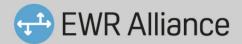
Title: The Network Rail (East West Rail Bicester to Bedford Improvements) Order Development Stages 2A1, 2A2, 2A3 & 2A4

Contaminated Land Risk Assessment.

Document Number: 133735-EWR-REP-EEN-000137

Date: 19th February 2020





East West Rail Phase 2

The Network Rail (East West Rail Bicester to Bedford Improvements) Order Development Stages 2A1, 2A2, 2A3 & 2A4

Contaminated Land Risk Assessment

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Document History

*The history of this document can be found on eB.

QR Code

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eB Ref	133735-EWR-REP-EEN-000137		
Revision*	B02	10	
Changes*	Final		



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1. Introduction

1.1 Background

This Contaminated Land Risk Assessment report has been prepared by the EWR Alliance (the Alliance) for Development Stages 2A1, 2A2, 2A3 and 2A4 including offline highways (within Route Section 2A) to provide a summary of the available ground investigation (GI) data for Route Section 2A of the East West Rail Phase 2 (EWR2) Project to support the proposed construction works along the route and to discharge Condition 11 of the Network Rail (East West Rail Bicester to Bedford Improvement) Order.

Route Section 2A is located within Oxfordshire County Council, Buckinghamshire County Council, Cherwell District Council and Aylesbury Vale District Council jurisdiction.

As part of the report, a review of the GI data has been carried out and a Generic Quantitative Risk Assessment (GQRA) and Conceptual Site Model (CSM) have been undertaken for Route Section 2A.

1.2 Purpose and structure of the report

The purpose of this report is to collate and assess the historic GI data undertaken for the project in 2016 by WSP for GRIP 3 and data from the GI which was undertaken by The EWR Alliance (the Alliance) for GRIP 4 in 2017 / 2018, to provide information on the contamination status of the soils, groundwater and surface water along Route Section 2A and assessment of the risk to humans and the environment in respect to the proposed development. This report can also be used as evidence for the CEEQUAL assessment question 4.2 of the project.

An outline of the report content is provided below:

- Section 2 provides a description of the site and its location, including details of the proposed development.
- Section 3 provides a summary of the existing data including publicly available data sources which have been used to prepare this report.
- Section 4 provides the Preliminary CSM for Section 2A which has been developed for the site based on the existing information.
- Section 5 summarises the intrusive ground investigations which have been carried out at the site within GRIP 3 and GRIP 4 undertaken by WSP and the Alliance.
- Section 6 provides a description of the ground conditions encountered at the site.
- Section 7 provides a GQRA of the data obtained in the ground investigations to assess potential risks to controlled waters, human health, ecological and property receptors.
- Section 8 provides a revised CSM which has been updated based on the findings of the ground investigations and GQRA.
- Section 9 provides an overall summary of the findings of the report.

1.3 Assumptions and Limitations

The conclusions of this report are based partly on the findings of the assessment of data taken from exploratory holes advanced on site as part of previous GIs and from information obtained from a variety of sources including documents provided by third party sources as detailed within this report, and which the Alliance believes is reliable. Nevertheless, the Alliance cannot and does not guarantee the authenticity or reliability of the information. No attempt has been made to verify independently any data collected by others.

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Exploratory holes sample or test a fraction of the ground being investigated and variation can occur between sampling points. Therefore, this report cannot guarantee against unexpected ground conditions occurring between the sampling points.

Ground gas and groundwater conditions are based on observations made at the time of investigation and subsequent monitoring visits and therefore conditions at the site may be subject to variation due to atmospheric, seasonal or other effects.

A geotechnical assessment is outside of the scope of this report and aggressive ground conditions and the potential implications to buried structures will need to be considered separately as part of the geotechnical investigation report.

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Site Setting and Description

2.1 Site Location and description

Development Stages 2A1, 2A2, 2A3 and 2A4 including offline highways sit within Route Section 2A which is approximately 8.5 km in length running between Bicester in the west and Charndon in the east and has a general southwest-northeast orientation, along the existing OXD line. The route was an operational single-track line used for freight transport and was taken out of service by the Alliance in September 2018.

Route Section 2A passes through predominantly agricultural land with isolated residential housing and woodland. Urban development, including residential homes, industrial and light commercial properties, are present in the west of Route Section 2A associated with the town of Bicester. Several roadways and bridges intersect Route Section 2A at various points.

In this report Route Section 2A applies to the area within the Transport Work Order Act (TWAO) red line boundary.

2.2 Proposed Development

The existing single track OXD Line within Route Section 2A will be double tracked to current design standards as part of the proposed works.

The existing earthworks and trackbed are to be re-engineered in order to achieve a new profile. This will include widening embankments, reengineering slopes, raising track levels in some areas and reducing track levels in other areas, and constructing retaining structures. In some areas, earthworks will have a wider profile than the existing degraded and over-steep earthworks.

New footbridges will be constructed replace existing level crossing points. Three new highways overbridges will be constructed at approximate chainages 109000, 108400 and 10700 to replace existing level crossing points. Five existing highways overbridges / underbridges will also receive repairs and maintenance works.

Seven ecological compensation areas will be constructed as part of the works to mitigate habitat loss. Compensation Flood Storage Areas (CFSAs) sites for flood mitigation have also been proposed along Route Section 2A.

To facilitate the construction works, four temporary compound areas (Compound A1 to A4) will be constructed, centred at approximate Grid References 460304E, 223134N, 461948E, 223411N, 464863E, 224479N and 465685E, 225050N. The compound areas will be reinstated to their original use upon completion of the works and separate planning permission has been sought for these compound sites. On the compounds temporary modular portacabins and/or shipping container type units will be placed but these will have a ventilated void beneath.

Construction of new drainage channels and culverts, and refurbishment and reconstruction of existing culverts and track drainage are required along the length of Route Section 2A. Some minor realignment of a watercourse to the north of Route Section 2A at approximate chainage 106900 is also required. There are also areas of temporary highway widening and passing places.

No permanent buildings are to be constructed as part of the proposed works within Route Section 2A.

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3. Environmental Context

3.1 Introduction

The following sections provide a summary of the environmental setting in Route Section 2A.

3.2 Source of Information

3.2.1 Publicly available information sources

The baseline assessment has relied on existing data from previous desk studies and ground investigations (GIs), and historical records. The following sources have been reviewed:

- Environmental data from Landmark Envirocheck Report (September 2017)¹;
- Historical mapping to identify former industrial or similar land uses with the potential to cause residual land contamination;
- Publicly available information from the British Geological Survey (BGS) online mapping resource²;
- Publicly available information from the Defra Multi-Agency Geographic Information for the Countryside (MAGIC) website³;
- Publicly available information from the Environment Agency⁴; and
- Existing risk assessment reports regarding the potential risk from unexploded ordnance^{5,6};

.

A site visit was also undertaken along Route Section 2A and within the Study Area on 26 July 2017 and 16 August 2017 to assess current site conditions at the time of the visit.

3.2.2 Previously prepared reports

Previous reports undertaken for Route Section 2A are summarised in Table 3.1 below. The information from these reports has been used to prepare the baseline for Route Section 2A

Table 3.1 - Previous Reports/Investigations undertaken in Route Section 2A

Date	Report	Author
February 2016	Final Factual Geotechnical Report on GI. 5624,2A – East West Rail Phase 2A7.	Bam Ritchies on behalf of WSP Parsons Brinckerhoff
October 2016	Final Factual Geotechnical Report on GI. 5624.3 – East West Rail GRIP 3 additional works8.	Bam Ritchies on behalf of WSP Parsons Brinckerhoff

¹ Landmark. (2017). Envirocheck Report, EWR Route (September of 2017). Supplied as GIS Data

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² British Geological Survey. [online]. http://www.bgs.ac.uk/GeoIndex/ (accessed September 2017).

³ Department for Environment, Food and Rural Affairs. MAGIC website [online]. http://magic.defra.gov.uk/MagicMap.aspx (accessed September 2017).

⁴ Environment Agency. What's in your backyard [online]. http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e (accessed September 2017).

 $^{5 \ \, \}text{Bomb Search (2014) Preliminary Unexploded Ordnance (UXO) Risk Assessment: East West Rail Phase \ 2.}$

⁶ CIRIA (2009) Unexploded Ordnance (UXO) A guide for the Construction industry. London.

⁷ Final Factual Geotechnical Report on Gl.5624,2A – East West Rail Phase 2A

⁸ Final Factual Geotechnical Report on Gl. 5624.3 - East West Rail GRIP 3 additional works



Date	Report	Author
June 2016	East West Rail Phase 2A Ground Investigation Report, Document No.: 133735-PBR-REP-EGE-000002 – Revision 019.	WSP Parsons Brinckerhoff
June 2017 – present	Route Section 2A Additional GI: Preliminary logs and chemical testing data ¹⁰ .	EWR Alliance
June 2018	The Network Rail (East West Rail Western Section Phase 2) Order. Environmental Statement, Chapter 11: Geology, Soils and Land Contamination ¹¹ .	EWR Alliance

3.3 Site History

A historical data review was undertaken using publicly available mapping sources and Envirocheck data¹⁷. The historical development of Route Section 2A is outlined in Table 3.2.

Table 3.2 - Summary of Historical Development

Date	Within Route Section 2A	Within 500 m of Route Section 2A
1885	The Route Section comprises railway (The London and North Western) at grade, in cutting and on embankment. The railway is mainly located within agricultural fields. Two Stations are present at Launton and Marsh Gibbon and Poundon. There is a weighbridge and earthworks associated with Launton Station. There are several surface watercourses crossing the Route Section in an approximate northeast/southwest orientation. Roads also cross the Route Section and signal posts are present along the railway line.	The Bicester main sewage pipe is indicated to run parallel to the line adjacent to the west of Bicester Station. The surrounding area is predominantly agricultural. There is a disused Brick and Tile Works approximately 150 m north, to the east of which is also an old clay pit approximately 110 m to the north of the redline boundary. There is a spring to the south west of the disused Brick and Tile Works. A graveyard is present associated with St. Mary's Church in Launton, approximately 190 m to the south of the redline boundary. The outskirts of Bicester are present approximately 500 m west of Route Section 2A.

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⁹ East West Rail Phase 2A Ground Investigation Report, Document No.: 133735-PBR-REP-EGE- 000002 - Revision 01

¹⁰ Route Section 2A Additional GI: Preliminary logs and chemical testing data

¹¹ The Network Rail (East West Rail Western Section Phase 2) Order. Environmental Statement, Chapter 11: Geology, Soils and Land Contamination



Date	Within Route Section 2A	Within 500 m of Route Section 2A
1899	Launton Station weighbridge no longer listed.	The disused Brick and Tile Works located approximately 150 m north is no longer indicated. This is now labelled as Launton Fields. A second spring is also indicated in the vicinity of Launton Fields, to the east of first spring. The old clay pit approximately 110 m north is now indicated to be a slightly marshy area. There is a quarry approximately 415 m to north west of the redline boundary (near Bicester).
1922	No significant change.	At Marsh Gibbon there are old quarries approximately 110 m south and a stump well approximately 420 m south. There is a reservoir approximately 435 m north at Poundon Hill. There are now filter beds approximately 460 m north west associated with the quarry approximately 415 m to north west of the redline boundary (near Bicester). Allotment gardens appear immediately west of Launton Road in Bicester approximately 260 m from the redline boundary.
1923	The Great Western Railway route from Banbury to Princes Risborough which enters Bicester from the south east and intersects with the London and North Western Railway has been constructed. This intersection is at the western end of the Route Section.	To the east of Bicester, the area is largely agricultural with many cottages and farm buildings. There is further residential development in Launton (it is of a similar size to the present day). A sewage works has been added approximately 380 m to the south east at Launton.
1950s	There is a cattle pen at the Marsh Gibbon and Poundon Station.	Bicester has expanded, with more residential properties and businesses being indicated. The agricultural areas to the east of Route Section 2A including the areas around Launton are predominantly unchanged. The reservoir at Poundon Hill is no longer labelled. There is a large pit denoted 'Old Clay Pit (now known as Calvert Brickworks No. 2 pit) located approximately 500 m to the southeast of the Route Section associated with the Calvert Brickworks. The Old Clay Pit appears to extend into a second pit (now known as Calvert Brickworks No. 3 pit) which is present approximately 120 m of the east of the Route Section 2A redline boundary.
1961	No significant change.	Bicester has expanded to the south and east.



Date	Within Route Section 2A	Within 500 m of Route Section 2A
1967-1980	In 1980, the Marsh Gibbon and Poundon Station is no longer labelled and the cattle pen at the station is now a coal yard.	At Poundon Hill the reservoir has been replaced and is now a wireless station. Sewage works are now present to the south of Poundon Hill approximately 262 m to the north of the redline boundary. In 1979, at Marsh Gibbon the old quarries approximately 110 m south of the redline boundary no longer appear on the map.
1983/ 1984	The coal yard.at the former Marsh Gibbon and Poundon Station no longer appears on the map.	The northern third of the Old Clay Pit to the southeast is no longer indicted suggesting that it has been infilled and the southern two thirds is full of water and indicated to be a Nature Reserve. To the west of the Old Clay Pit another large water body denoted 'Nature Reserve' is present approximately 120 m southeast of the Route Section 2A red line boundary.
Present Day	Route Section 2A appears predominantly unchanged.	Bicester has expanded significantly with industrial and commercial properties being constructed to the north of the western extent of Route Section 2A to the north and south of the point that the two railway lines intersect, to the south east of Bicester.

3.4 Geology

3.4.1 Mapped Geology

Made Ground is anticipated along the length of Route Section 2A, primarily associated with the original construction (and in places removal) of the existing railway and stations, as well as at specific locations where landfilling or other earthworks have occurred.

BGS 1:50,000 mapping¹² of Route Section 2A indicates that superficial deposits are in the majority absent under most of Route Section 2A. However, superficial deposits comprising Alluvium are indicated to be present under discrete sections of Route Section 2A around Bicester (associated with the Langford Brook) and along Station Road in Launton associated with Summerston Ditch, Launton Brook and Cutters Brook.

The bedrock geology along Route Section 2A comprises the Oxford Clay Formation (consisting of mudstones from the Stewartby Member and Peterborough Member), this is underlain by the Kellaways Formation (comprising the Kellaways Sand and Clay Members) which in turn are underlain by the Great Oolite Group (comprising the Cornbrash Formation, the Forest Marble and the White Limestone Formation. The base depth of the Great Oolite Group is not proven in any exploratory hole locations. The published geological information for Route Section 2A is summarised in Table 3.3, outlining where the respective bedrock geological units outcrop along Route Section 2A. he bedrock units are generally overlain by Made Ground and/or topsoil.

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¹² British Geological Survey. [online]. Geolndex. http://www.bgs.ac.uk/Geolndex/ (accessed September 2017).



Table 3.3 - Summary of Published Geological Conditions along Route Section 2A

Geological Unit	Description	Extent
Made Ground	Unknown - Made Ground associated with the construction of the railway.	Made Ground, infilled ground and worked ground associated with the construction (and in places removal) of the existing railway.
Superficial Geology – Alluvium	The alluvial sequence is expected to comprise clays, sands and gravels.	Restricted to the routes of Longford Brook and Summerston Ditch, Launton Brook and Cutters Brook.
Bedrock Geology – Oxford Clay Formation – Weymouth Member	Mudstone	Isolated outcrop to the south of Route Section 2A, north east of Marsh Gibbon.
Bedrock Geology – Oxford Clay Formation – Stewartby Member	Mudstone	Eastern end of Route Section 2A, east of Marsh Gibbon. It crosses Route Section 2A diagonally from Hill View Farm/Rectory Farm north of the route to Charndon to the south.
Bedrock Geology – Oxford Clay Formation – Peterborough Member	Mudstone	From Launton to the eastern extent of Route Section 2A.
Bedrock Geology – Kellaways Formation - Kellaways Sand Member.	Interbedded Sandstone and Siltstone	Unit crosses Route Section 2A around Bicester Park and at the eastern boundary of Bicester along Charbridge Lane.
Bedrock Geology – Kellaways Formation – Kellaways Clay Member	Mudstone	Western end of Route Section 2A, through the east of Bicester.
Bedrock Geology – Cornbrash Formation	Limestone with sandy units	While this formation does not directly underlie the track, it occurs to the west of the western boundary of the Route Section 2A area.
Bedrock Geology – Forest Marble	Silicate-mudstone.	At depth, underlying the Cornbrash Formation along Route Section 2A.
Bedrock Geology – White Limestone Formation	Limestone	At depth underlying the Forest Marble Formation along Route Section 2A.

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3.4.2 Historical Borehole Records

A number of historical borehole and trial pit logs held by the BGS archives¹³ are located within 500 m of Route Section 2A and a selection are summarised below:

- Trial Pit SP62SW72 located adjacent to the south of Route Section 2A to the west of Launton.
 Topsoil was encountered from ground level to 0.3 metres below ground level (m bgl) overlying
 possible Weathered Kellaways Clay Member to 2.5 m bgl and Kellaways Sand Member to the base
 of the pit at 5.0 m bgl;
- Trial Pit SP62SW77 located adjacent to the south of Route Section 2A to the north west of Launton. Topsoil and possible subsoil were encountered from ground level to 0.4 m bgl overlying possible reworked Kimmeridge Clay Member to 1.7 m bgl overlying Kimmeridge Sand Member to the base of the hole at 3.0 m bgl;
- Trial Pit SP52SE197 located approximately 255 m south west of Route Section 2A in Bicester encountered topsoil overlying what are likely to be naturally reworked materials to 1.25 m bgl where the Kellaways Clay Member was encountered to the base of the pit at 3.5 m bgl; and
- Borehole SP62SW66 located approximately 350 m to the south of Route Section 2A to the west of Launton. Made Ground was encountered from 0 to 0.5 m bgl overlying an organic clay, possibly representing Alluvium to approximately 1.2 m bgl overlying the Peterborough Member.

3.4.3 Ground Stability Hazards

Geological hazards within Route Section 2A, identified in the Envirocheck Report¹ are detailed within Table 3.4.

Table 3.4 - Geological Hazards

Geological Hazard	Details
Collapsible Ground	Predominantly designated Very Low Hazard. Two bands which correspond to the location of Alluvial deposits are designated No Hazard and located to the south east of Bicester and further to the east.
Compressible Ground	Predominantly designated No Hazard. Two bands which conform with the location of Alluvial deposits are designated Moderate in the south east of Bicester and further to the east.
Ground Dissolution	Predominantly designated No Hazard. An area designated Very Low Hazard corresponds with the location of the Cornbrash Formation to the north west of Route Section 2A.
Landslide	Very Low.
Running sand	No Hazard to Low.
Shrinking or swelling clay	No Hazard in the north west of Route Section 2A which corresponds with the location of the Cornbrash Formation, with a further band designated as No Hazard corresponding with the location of the Kellaways Sand Member. Moderate hazard along the remaining eastern portion of Route Section 2A corresponding with the location of the Peterborough Member and the Kellaways Clay member.
Radon hazards	According to the Envirocheck Report ¹ , Route Section 2A is within a lower probability radon area, with less than 1% of homes at or exceeding the Action Level.

¹³ British Geological Survey. [online]. Borehole Scans. http://www.bgs.ac.uk/data/boreholescans/home.html (accessed October 2017).

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3.4.4 Mineral Sites

3.4.4.1 Coal mining

Reference to the Coal Authority records¹⁴ indicates that Route Section 2A does not lie within an area affected by coal mining.

3.4.4.2 Mineral Sites

Information within the Envirocheck Report¹ identifies a common clay and shale pit at a location named Hareley's Farm 1.6 km to the northeast of Launton, approximately 290 m to the north of Route Section 2A. It is noted that this name may be incorrect as Hare Leys Farm is further to the east with this location actually being named Field Farm. There is a large pond in this location with the area to the northeast associated with the Brick and Tile Works seen on the earliest map edition. A second common clay and shale pit (Calvert Brickworks No. 3 pit now Grebe Lake and also known as Aylesbury Borough Refuse Tip) is present approximately 120 m to the east of Route Section 2A in Charndon.

Reference to historical maps indicates that there were old quarries located approximately 110 m south of the Route Section at Marsh Gibbon and 415 m to the north west of the Route Section near Bicester.

3.5 Hydrogeology

3.5.1 Aguifer Designations

The Environment Agency's aquifer classifications for the geology underlying Route Section 2A within Route Section 2A are summarised in Table 3.5.

Geology	Stratum and General Description	Aquifer Classification
Superficial	Alluvium	Secondary A Aquifer
Bedrock	Oxford Clay – Weymouth Member	Unproductive Strata
	Oxford Clay – Stewartby Member	Unproductive Strata
	Oxford Clay – Peterborough Member	Unproductive Strata
	Kellaways Sand Member	Secondary A Aquifer
	Kellaways Clay Member	Unproductive Strata
	Cornbrash Formation	Secondary A Aquifer
	Forest Marble Formation	Unproductive Strata
	White Limestone Formation	Principal Aquifer

Table 3.5 - Aquifer Designations

Principal Aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

Secondary A Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are aquifers formerly classified as minor aquifers.

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¹⁴ British Geological Survey. [online]. Coal Authority Interactive Map. http://mapapps2.bgs.ac.uk/coalauthority/home.html (accessed October 2017).



Unproductive Strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

3.5.2 Groundwater Vulnerability

According to the Envirocheck Report¹ Route Section 2A is not situated within a groundwater Source Protection Zone (SPZ) and there are no SPZs located within 500m of Route Section 2A.

A minor aquifer with high groundwater vulnerability is present approximately 400 m to the north of Route Section 2A, at the western portion around Bicester. This relates to the bedrock geology (Cornbrash Formation) in this area.

3.5.3 Licensed Groundwater Abstractions

The Envirocheck Report¹ does not provide any indication of licensed groundwater abstractions within 500 m of Route Section 2A. The local councils did not identify any records of private groundwater abstraction along or within 500 m of Route Section 2A. There are 13 groundwater wells recorded by the BGS within 500 m of Route Section 2A, the closest is located within the Route Section 2A redline boundary, near station house to the north of Marsh Gibbon.

3.5.4 Discharge Consents to Groundwater

According to the Envirocheck Report¹ there are no discharge consents to groundwater within 500 m of Route Section 2A. However, two consents for sewage discharges to land are indicated to be present approximately 250 m to the north of the site in Poundon and 205 m to the south of the Section 2A area, with the entry location is listed as premises behind Launton House.

3.6 Hydrology

3.6.1 Surface water

There are two Water Framework Directive (WFD) designated surface water bodies which intersect Route Section 2A at four points. Langford Brook crosses the west of Route Section 2A, to the east of Bicester and discharges to the River Ray located approximately 6.5 km to the south of Route Section 2A¹⁵. Launton Brook crosses Route Section 2A to the east of Launton and north of Marsh Gibbon and along with the Summerstown Ditch discharges to Cutters Brook which discharges to the River Ray.

Three additional minor watercourses which are tributaries of Langford Brook intersect with Route Section 2A at various points and are identified as ordinary watercourses. Track drainage is also present along Route Section 2A. There is also an additional drain that starts just north of Lawn Farm, flowing northwards to the Padbury Brook just north of Twyford, in the eastern area of Section 2A.

Grebe Lake, a man-made lake in a disused clay pit is located approximately 120m east of Route Section 2A with another man-made lake located further east, to the north of the former Calvert brickworks.

3.6.2 Flood risk

According to the Envirocheck Report¹ the western extent of Route Section 2A falls within an area of extreme flood risk. This is the flooding extent of the Langford Brook and extends approximately 2.7 km to the south west and approximately 1.4 km to the north east of the route.

There is a further area of flood risk located to the east associated with Launton Brook which intersects the southern extent of Route Section 2A approximately 1.5 km to the east of Bicester. This area extends approximately 2.2 km to the south west of the route.

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¹⁵ Environment Agency. [online] Catchment Data Search. http://environment.data.gov.uk/catchment-planning/ (accessed October 2017).



3.6.3 Licensed surface water abstractions

According to the Envirocheck Report¹ there are no licensed surface water abstractions recorded within 500 m of Route Section 2A.

3.6.4 Discharge consent to surface water

According to the Envirocheck Report¹ there are two active discharge consents to surface water within Route Section 2A, with a further 13 located within 500 m.

One of the discharge consents within Route Section 2A is located on Station Road to the east of Bicester and refers to the discharge of treated sewage effluent from a single residential property to a tributary of Launton Brook. The second discharge consent is located further to the east on Bicester Road and refers to the discharge of process waters from Southern Gas Networks from gas distribution and compressor stations into a tributary of a farm drain.

The additional 13 discharge consents relate to discharges of treated sewage, agricultural effluents, other matter surface water into Langford Brook, the River Ray, a tributary of Launton Brook, Launton Brook, Horsepond Ditch, a tributary of Little Marsh Ditch, a tributary of the River Ouse, a tributary of Padbury Brook and several unnamed ditches. Some of the consents are noted to be revoked and no longer in use.

3.7 Historical and Ecologically Important Sites

Route Section 2A is within 500 m of historically sensitive receptors including several listed buildings around Bicester, Launton, Poundon and Marsh Gibbon. The closest buildings are located in Launton approximately 50 m to 100 m from Route Section 2A and include a Church, Rectory, Memorial, Manor Farmhouse and Barn.

Sensitive ecological receptors have been identified within 500 m of Route Section 2A including several Priority Habitats along Route Section 2A including traditional orchard, good quality semi-improved grassland, deciduous woodland, lowland fens and lowland meadows. A number of these are located within the redline boundary.

3.8 Landfills

3.8.1 Recorded historical landfill sites

Environment Agency⁴ data identifies two historic landfills located within 500 m of Route Section 2A. One record is for Aylesbury Borough Tip located approximately 120 m to the east of Route Section 2A, to the west of Calvert Pit No3 (also known as Buckingham Rural District Council Refuse Tip). The Aylesbury Tip was operated by Aylesbury Borough Council until December 1963 and received commercial waste. Buckingham Rural District Council Refuse Tip is located approximately 200 m to the southeast of Route Section 2A and received industrial and commercial waste from 31 December 1957 and was operated by Buckingham Borough Council. The majority of both sites are now lakes.

3.8.2 Recorded Operating landfill sites

Environment Agency⁴ data identifies no operational landfill sites located within 500 m of Route Section 2A. The closest recorded operational landfill is Calvert Landfill Site located approximately 1.8 km to the south east of the redline boundary, beyond which is Calvert Landfill Site Pit 6. Both of these facilities are operated by FCC Waste Services Limited.

3.8.3 Waste management sites

There are no waste management sites located within 500 m of Route Section 2A.

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3.9 Contemporary Potentially Contaminative Land Uses

3.9.1 Trade Directory Information

Contemporary potentially contaminative land uses identified within 500 m of Route Section 2A from contemporary trade directory information and digital mapping are summarised in Table 3.6. Most of the industrial and commercial activity is located to the west of Route Section 2A, around Bicester.

Table 3.6- Contemporary Potentially Contaminative Land Uses within 500 m of Route Section 2A

Process / Land use	Location	Contaminant Groups Potentially Present
Coal and Smokeless Fuel Merchants and Distributors.	Adjacent to Route Section 2A at the Old Station in Marsh Gibbon.	PAHs, oils, acids and metals.
A Petrol Filling Station	Approximately 90 m to the north of Route Section 2A.	Petroleum hydrocarbons, petrol additives, diesel and other organic compounds.
MOT Testing Centres and Repair Garages	Numerous; the closest being approximately 50 m to the north of Route Section 2A.	Metal and metal compounds, waste oil, anti- freeze, brake fluids, solvents (non-chlorinated), solvents (chlorinated), paints, thinners, inorganic compounds, asbestos and detergents.
Pest Control	Numerous buildings located approximately 8 m to the south east.	Potentially pesticides.
Agricultural land use	Surrounding Route Section 2A to the east and south of Bicester.	Hydrocarbons and lubricating oils associated with machinery. Potential pesticides and herbicides.
Engineering works	Closest approximately 145 m to the north.	Metals for solders, metal salts, inorganic compounds, organic compounds, solvents, lubricants, fuel oils, acids, alkalis, detergents, ash, asbestos, PCBs.
Lighting Manufacturers	Approximately 175 m to the north west at its closest point.	Potentially metals, electrodes and phosphors and PCBs.
Printers	Approximately 290 m to the north west and 450 m south of Route Section 2A.	Pigments, dyes, extenders and binders, organic solvents, additives, fuels and effluent treatment chemicals.
Rubber and Plastics Manufacturing	Approximately 304 m to the north of Route Section 2A.	Rubber product ingredients, general contaminants including solvents, PAHs, phenols, amines, oils, acids and alkalis, metals and metal compounds, plating chemicals, PCBs and asbestos.
Electronic Equipment Manufacturers	Closest approximately 450 m to the south of Route Section 2A	Metals, oils, solvents, acids and alkalis, PCBs and asbestos.

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Process / Land use	Location	Contaminant Groups Potentially Present
	around Launton.	
Metal works	Approximately 480 m to the north of Route Section 2A to the west of Marsh Gibbon.	Metals, oils, solvents, lubricants, acids and alkalis, PCBs and asbestos.
Furniture Manufacturers	Approximately 460 m to the north of Route Section 2A to the west of Marsh Gibbon.	Metals, hydrocarbons, solvents, acids and alkalis, PCBs and asbestos.
Gas distribution and compressor station	Adjacent to the north of Route Section 2A in Bicester.	Natural gas processing, fuels. Inorganic chemicals acids and alkalis, other inorganic compounds, metals and metal compounds and asbestos.

3.9.2 Pollution controls

In addition to the petrol filling station located approximately 90 m to the north, Joblings Garage is located in Bicester, approximately 400 m to the west of the western extent of Route Section 2A.

Thirteen Local Authority Pollution Prevention and Control (LAPC) permits were also identified within 500 m of Route Section 2A to the east of Bicester. The closest permit to Route Section 2A is located approximately 40 m to the north of Route Section 2A, to the west of Charbridge Lane and permits metal decontamination processes.

The other LAPC permits are for burning of waste oil; a print works; general coating processes; coating of plastic and metal; blending packing, loading and use of cement; combustion of fuel manufactured from solid waste; manufacture of timber and wood-based products; respraying of road vehicles and burning of waste oil.

3.9.3 Recorded pollution incidents

According to the Envirocheck Report¹ there has been one recorded pollution incident to air, land and water within 500 m of Route Section 2A. The incident was located approximately 270 m to the south of Route Section 2A in Launton and designated as a Category 3 - Minor Incident to air and land and a Category 2 significant incident to water. Details of the receiving watercourse, dates and details of the pollutants are not provided.

3.10 Potential for Unexploded Ordnance

A third-party Preliminary Unexploded Ordnance (UXO) Risk Assessment¹⁶ undertaken in accordance with CIRIA 681 "Unexploded Ordnance (UXO) – A guide for the Construction Industry"¹⁷ indicated that Route Section 2A has been rated as 'low risk' for UXO. .

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¹⁶ Bomb Search (2014) Preliminary Unexploded Ordnance (UXO) Risk Assessment: East West Rail Phase 2.

¹⁷ CIRIA (2009) Unexploded Ordnance (UXO) A guide for the Construction industry. London.



4. Preliminary Conceptual Site Model (PCSM)

4.1 Approach to PCSM

Under the National Planning Policy Framework (NPPF) 2018¹⁸, land contamination is assessed through the identification of risk presented by potential contaminant linkages (PCLs), i.e. Source – Pathway – Receptor relationships, and the development of a Conceptual Site Model (CSM). Guidance provided by the Environment Agency in CLR11¹⁹ and the Guiding Principles for Land Contamination²⁰ (GPLC) documents provide the technical framework for the development of such CSMs and the application of risk assessment (qualitative or quantitative) to consider whether potential pollutant linkages are significant and hence require management or mitigation.

The NPPF18⁸ states that to prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is suitable for its proposed use and appropriate for its location, taking account of ground conditions and any risks arising from land instability and contamination. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of an area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner. The basis of CLR11 and GPLC is the development of the CSM which is the representation of the source-pathway-receptor (pollutant) linkages on which the assessment of risk can be based.

The basic approach to the human health and controlled waters risk assessment reported here follows the principles given in CLR11 and GPLC20, i.e. application of the following assessment hierarchy:

- Tier 1 risk screening by establishment of potential pollutant linkages, i.e. the PCSM;
- Tier 2 GQRA using generic assessment criteria (GAC) that represent 'minimal' or 'tolerable' risk; and
- Tier 3 DQRA using site specific assessment criteria (SSAC) that represent 'unacceptable risk', or where generic assessment criteria are not available, or they are not applicable to the CSM.

The following PCSM has been developed using the proposed scheme details and desk study information summarised in the preceding sections of this report, i.e. a Tier 1 assessment.

It should be noted that under current health and safety legislation, construction and maintenance workers are required to carry out appropriate risk assessments and instigate appropriate mitigating measures to protect themselves, other human receptors and the environment from contamination which may be present. Such risks must be adequately mitigated by the measures required under current legislation, specifically the Construction Design Management (CDM) Regulations²¹ which requires that potential risks to human health and the environment from construction activities are appropriately identified and all necessary steps taken to eliminate / manage that risk. On this basis, it been assumed that personal protective equipment (PPE) and health and safety best practices will be adopted during the construction works and acute risks to construction workers / site visitors have therefore not been considered as part of this assessment.

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¹⁸ Department for Communities and Local Government, 2018. National Planning Policy

¹⁹ Environment Agency in Contaminated Land Report-11 - Model Procedures for the Management of Land Contamination. 2004

²⁰ Environment Agency. GPLC1 - Guiding Principles for Land Contamination. March 2010

²¹ United Kingdom Parliament, 2015. Construction (Design & Management) Regulations (SI 2015/51).



4.2 Risk Estimation

Through consideration of the potential consequence and likelihood of exposure occurring, a potential risk rating for each PCL has been assigned and is presented in Section 4.3. The purpose of this assessment is to focus upon the potential risks present based on the proposed development. The definitions of estimated risk are taken from CIRIA report C552²² and have been summarised in Table 4.1 below.

Table 4.1 - Definitions of estimated risk

Risk Level	Definition
Very High Risk	There is a high probability that severe harm could arise to a designated receptor or there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not already undertaken) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not already undertaken) is required and remedial works may be necessary in the short term and are likely over the long term.
Medium Risk	It is possible that harm could arise to a designated receptor. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the long term.
Low Risk	It is possible that harm could arise to a designated receptor, but it is likely that this harm, if realised, would be mild. Further investigation is not necessarily required, however should be considered to confirm that there is no unanticipated contamination present.
Very Low Risk	The possibility of harm to the designated receptor is either not plausible or, if the possibility of harm is plausible, risk is considered to be very unlikely with attenuation along the exposure pathway. Further investigation is not necessarily required, however may be considered to confirm that there is no unanticipated contamination present.

The risk is evaluated through the probability matrix presented in Table 4.2. The definitions of probability and consequence are given in Appendix B.

Table 4.2 - Estimation of the level of risk by comparison of consequence and probability

		Consequence					
		Severe	Severe Medium Mild		Minor		
7 G	High Likelihood	Very High	High	Moderate	Moderate/Low		
bility hood)	Likely	High	Moderate	Moderate/Low	Low		
Probab (Likeliho	Low Likelihood	Moderate	Moderate/Low	Low	Very Low		
P []	Unlikely	Moderate/Low	Low	Very Low	Very Low		

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²² Construction Industry Research and Information Association (CIRIA) C552 – Contaminated Land Risk Assessment – A Guide to Good Practice 2001



4.3 PCSM

Based upon the historical and present land uses identified in Section 3, a PCSM has been produced, identifying potential sources of contamination, migration or exposure pathways and receptors PCLs for the site. These PCLs are based on details of the proposed development, correct at the time of writing.

4.3.1 Potential contaminants

Potential sources of contamination have been identified and assessed from the current and historical land use within Route Section 2A (on-site) and within 500 m (off-site) and are summarised in Table 4.3.

Table 4.3 - Potential sources of contamination identified for Route Section 2A

	Potential source of contamination	Potential contaminants
On- site	The operation of, and Made Ground associated with the railway line and stations	Possible organic contaminants including hydrocarbons, diesel, lubricating oils, paraffin, Polychlorinated Biphenyls (PCBs), solvents, ethylene glycol, creosote, herbicides, metals. Other potential contaminants include asbestos and ash used as fill material (metals, phenols, sulphates and PAHs).
	Agricultural activities	A range of inorganic and recalcitrant organic contaminants including heavy metals, fuels / oils from machinery, herbicides and pesticides.
	Possible Made Ground associated with roads intersecting Route Section 2A	A range of inorganic and recalcitrant organic contaminants including heavy metals, hydrocarbons, PAHs, PCBs, solvents, creosote, asbestos.
	Alluvium	Potential for ground gas generation.
Off- site	Agricultural activities within the surrounding area.	A range of inorganic and recalcitrant organic contaminants including heavy metals, fuels / oils from machinery, asbestos, herbicides and pesticides.
	Allotments adjacent to the north of Route Section 2A.	Pesticides and herbicides. Hydrocarbons and lubricating oils associated with machinery and asbestos.
	Commercial and Industrial units to the west of Route Section 2A in Bicester including petrol station, garages, engineering works, printers, electronic manufacturers and metal works.	Metals, pigments, dyes, additives, oils, solvents, anti- freeze, brake fluids, petroleum hydrocarbons, acids and alkalis, PCBs and asbestos.
	Coal yard and Smokeless Fuel Merchants and Distributors (Old Station Marsh Gibbon).	Coal yard and Smokeless Fuel Merchants and Distributors (Old Station Marsh Gibbon).
	Gas distribution and compressor station adjacent to the north of Route Section 2A in Bicester.	Gas distribution and compressor station adjacent to the north of Route Section 2A in Bicester.
	Natural gas processing, fuels. Inorganic chemicals acids and alkalis, other inorganic compounds, metals and metal compounds and asbestos.	Natural gas processing, fuels. Inorganic chemicals acids and alkalis, other inorganic compounds, metals and metal compounds and asbestos.
	The operation of and Made Ground, infilled ground and worked ground associated with	A range of inorganic and recalcitrant organic contaminants including heavy metals, asbestos, leachate, nitrates, and the potential for ground gas generation.

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Potential source of contamination	Potential contaminants
the former clay pits and historic landfills around Calvert.	
Sewage Works.	A range of inorganic and organic contaminants including heavy metals, leachate, nitrates, and the potential for ground gas generation. Total Viable Colonies, E. Coli, Faecal coliform and Faecal streptococci.
Graveyard	A range of inorganic and organic contaminants.

4.3.2 Potential receptors

The following receptors were identified for Route Section 2A:

4.3.2.1 Human receptors

On-site:

• Members of the public using public right of way to cross the railways, level crossing, stations, bridges, agriculture land and public footpath/cycle tracks along the railways corridor.

Off-site:

- Residents living adjacent to Route Section 2A in Bicester, Launton, Charndon and Twyford.
- Farmers working on nearby agricultural land.
- Workers in adjacent commercial / industrial properties in Bicester.
- Members of the public accessing the surrounding area adjacent to Route Section 2A including station and road users.

4.3.2.2 Controlled waters

Aquifers (on- and off-site):

- Secondary A Aquifers Alluvium, Kellaways Sand Member and Cornbrash Formation.
- Principal Aquifer White Limestone Formation.

Surface watercourses (on-site):

• Langford Brook and its tributaries, Launton Brook, two unnamed drains flow to the Launton and Cutters Brook (from north of Marsh Gibbon)and an unnamed drain flows to the Padbury Brook (north of Charndon).

Surface watercourses (off-site):

Cutters Brook, Summerstown Ditchand Grebe Lake.

4.3.2.3 Property receptors

On- and off-site:

- Existing on-site structures and services and track drainage.
- Future on-site structures and services.
- Existing off-site residential houses and commercial properties.

4.3.3 Potential migration / exposure Pathways

The following potentially viable pathways have been identified:

4.3.3.1 Human receptors

On-site:

• Dermal contact with and/or ingestion of contaminants in soil, soil-derived dusts and water.

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- Inhalation of contaminants in soils/dust including asbestos fibres.
- Inhalation of ground gases and/or vapours.

Off-site:

- Dermal contact with and / or ingestion of contaminants in windblown soil-derived dusts and water which may have migrated off-site.
- Inhalation of contaminants in windblown dust including asbestos fibres which may have migrated offsite.
- Inhalation of ground gases and / or vapours which may have migrated off-site.

4.3.3.2 Controlled waters

- Leaching and migration of contaminants (free and dissolved phase) from soils in the unsaturated zone into groundwater in underlying aquifers.
- Migration of contaminants via preferential pathways such as via piles and track drainage to deeper groundwater.
- Discharge of contaminants entrained in surface water runoff followed by overland flow and discharge.
- Leaching and migration of contaminants (free and dissolved phase) from soils in the unsaturated zone into groundwater then lateral migration into surface water features.
- Migration of contaminants via preferential pathways such as service runs and track drainage to surface water.

4.3.3.3 Property receptors

- Direct contact of new and existing structures with contaminants in soils and/or groundwater.
- Migration of ground gases or vapours along preferential pathways including permeable ground, track drainage, service trenches and service entry points and accumulation in enclosed spaces such as buildings, service ducts or access points.

4.3.3.4 Ecological receptors

 Direct contact with and / or ingestion of contaminants in windblown soil-derived dusts and water which may have migrated off-site.

4.3.4 PCSM

The PCSM is presented in Table 4.4 below.

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Table 4.4 - PCSM for Route Section 2A

Source	Receptor	Pathway	Probability	Consequence	Risk Classification
On-site The historical and current use of the railway line and stations, including trains / goods vehicles	Human (on-site) Members of the public using public rights of way to cross the railway, level crossings, stations, bridges,	Dermal contact with and/or ingestion of contaminants in soil, soil-derived dusts and water.	Low likelihood	Medium	Moderate/Low risk
using the railway line. Made Ground of unknown	agricultural land and public footpath/cycle tracks along the	Inhalation of contaminants in soils/dust.	Likely	Medium	Moderate risk
provenance associated with the construction of the railway line	railway corridor.	Inhalation of asbestos fibres.	Likely	Severe	High risk
and roads intersecting Route Section 2A and spills / leaks of oil and fuel and use of herbicides		Inhalation of ground gases and/or vapours.	Likely	Medium	Moderate risk
and fuel and use of herbicides associated with railway activities. Agricultural activities Alluvium (A range of inorganic and	Human (off-site) Residents living adjacent to Route Section 2A in Bicester, Launton and Charndon. Workers in adjacent commercial / industrial properties in Bicester. Members of the public accessing the surrounding area adjacent to Route Section 2A including station and road users. Farmers working on nearby agricultural land.	Dermal contact with and / or ingestion of contaminants in windblown soil-derived dusts and water which may have migrated off-site.	Low likelihood	Medium	Moderate/Low risk
recalcitrant organic contaminants including heavy metals, hydrocarbons, pesticides, herbicides, fuels / oil, Polycyclic		Inhalation of contaminants in windblown dust which may have migrated off-site.	Low Likelihood	Medium	Moderate / Low risk
Aromatic Hydrocarbons (PAH), Total Petroleum Hydrocarbons (TPH), Polychlorinated Biphenyls (PCBs), solvents, creosote, asbestos).		Inhalation of contaminants in windblown asbestos fibres which may have migrated offsite.	Low likelihood	Severe	Moderate risk
		Inhalation of ground gases and / or vapours which may have migrated off-site.	Low likelihood	Medium	Moderate/Low risk
	Controlled Waters – Aquifers (on and offsite) Secondary A Aquifers Principal Aquifer	Leaching and migration of contaminants (free and dissolved phase) from soils in the unsaturated zone into groundwater in underlying aquifers.	Likely	Medium	Moderate risk

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Source	Receptor	Pathway	Probability	Consequence	Risk Classification
		Migration of contaminants via preferential pathways such as via piles and track drainage to deeper groundwater.	Likely	Medium	Moderate risk
	Controlled Waters – Surface Waters (on- and off-site) Langford Brook, Launton Brook and Summerstown Ditch, unnamed	Discharge of contaminants entrained in surface water runoff followed by overland flow and discharge.	Likely	Medium	Moderate risk
	drains to Launton Brook and Padbury Brook.	Leaching and migration of contaminants (free and dissolved phase) from soils in the unsaturated zone into groundwater then lateral migration into surface water features.	Likely	Medium	Moderate risk
		Migration of contaminants via preferential pathways such as service runs and track drainage to surface water.	Likely	Medium	Moderate risk
	Controlled Waters – Surface Waters (off-site) Cutters Brook and Grebe Lake	Discharge of contaminants entrained in surface water runoff followed by overland flow and discharge.	Low Likelihood	Medium	Moderate / low risk
		Leaching and migration of contaminants (free and dissolved phase) from soils in the unsaturated zone into groundwater then lateral migration into surface water features.	Low Likelihood	Medium	Moderate / low risk
		Migration of contaminants via preferential pathways such as service runs and track drainage to surface water.	Low Likelihood	Medium	Moderate / low risk



Source	Receptor	Pathway	Probability	Consequence	Risk Classification
	Property (on-site) Existing structures and services, including track drainage. Future structures and services.		Likely	Medium	Moderate risk
Future structures and services.		Migration of ground gases or vapours along preferential pathways including permeable ground, track drainage, service trenches and service entry points and accumulation in enclosed spaces such as buildings, service ducts or access points.	Likely	Medium	Moderate risk
	Property (off-site) Existing residential houses and commercial properties.	Direct contact of new and existing structures with contaminants in soils and/or groundwater that has migrated off-site.	Low likelihood	Medium	Moderate/Low risk
		Migration of ground gases or vapours along preferential pathways including permeable ground, track drainage, service trenches and service entry points and accumulation in enclosed spaces service ducts or access points.	Low likelihood	Medium	Moderate/Low risk
Off-site Agricultural activities within the surrounding area. The operation of and Made Ground, infilled ground and	Human (on-site) Members of the public using public rights of way to cross the railway, level crossings, stations, bridges, agricultural land and public	Dermal contact with and/or ingestion of contaminants in soil-derived dusts and water which have migrated onto site.	Low likelihood	Medium	Moderate/Low risk
worked ground associated with historical landfills located adjacent	footpath/cycle tracks along the railway corridor.	Inhalation of contaminants in soil-derived dust which have migrated onto site.	Likely	Medium	Moderate risk

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Source	Receptor	Pathway	Probability	Consequence	Risk Classification
to the east and south east of Route Section 2A around Calvert. Activities relating to the former		Inhalation of asbestos fibres which have migrated onto site.	Low likelihood	Severe	Moderate risk
brick and tile works located to the south west of Route Section 2A. Allotments adjacent to the north of		Inhalation of ground gases and/or vapours which have migrated onto site.	Low likelihood	Medium	Moderate/Low risk
Route Section 2A. Commercial and Industrial units to the west of Route Section 2A in Bicester including petrol station, garages, engineering works, printers, electronic manufacturers and metal works.	Controlled Waters – Aquifers (onsite) Secondary A Aquifers Principal Aquifer.	Leaching and migration of contaminants (free and dissolved phase) from soils in the unsaturated zone into groundwater in underlying aquifers.	Low likelihood	Medium	Moderate/Low risk
Coal yard and Smokeless Fuel Merchants and Distributors (Old Station Marsh Gibbon) adjacent to	Controlled Waters – Surface Waters (on-site) Langford Brook, Launton Brook and Summerstown Ditch, unnamed drains to Launton Brook and Padbury Brook.	Migration of contaminants via preferential pathways such as track drainage.	Low likelihood	Medium	Moderate/Low risk
the south of Route Section 2A. Gas distribution and compressor station adjacent to the north of		Lateral migration of contaminants in groundwater.	Low likelihood	Medium	Moderate/Low risk
Route Section 2A in Bicester. Former quarries, brick and tile works, brick works and associated clay pits.		Discharge of contaminants entrained in surface water runoff followed by overland flow and discharge.	Low likelihood	Medium	Moderate/Low risk
Sewage works Graveyard (A range of inorganic and recalcitrant organic contaminants including heavy metals, hydrocarbons, fuels / oil, PAH,		Leaching and migration of contaminants (free and dissolved phase) from soils in the unsaturated zone into groundwater in underlying aquifers.	Low likelihood	Medium	Moderate/Low risk
TPH, PCB, coal tar, asbestos, pesticides, herbicides, Total Viable Colonies, E. Coli, Faecal coliform and Faecal streptococci, leachate and the potential for ground gas generation (methane,		Migration of contaminants via preferential pathways. Lateral migration of contaminants in groundwater with discharge to surface water as base flow.	Low likelihood	Medium	Moderate/Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk Classification
carbon dioxide, hydrogen sulphide and carbon monoxide).			Low likelihood	Medium	Moderate/Low risk
	Future structures and services.	Migration of ground gases or vapours along preferential pathways including permeable ground, track drainage, service trenches and service entry points and accumulation in enclosed spaces, service ducts or access points.	Low likelihood	Medium	Moderate/Low risk



5. Ground Investigation

5.1 Ground Investigation Design

Two geo-environmental intrusive GIs have been carried out along the route including a GI undertaken in 2016 by WSP for GRIP 3 and a GI which was undertaken by the Alliance between 2017 and 2018 for GRIP 4.

The aims of the GIs were to:

- Characterise the ground and groundwater conditions along the route (including the soil type, composition, depth, thickness and groundwater flow direction); and
- Characterise the contamination status of the soils and groundwater and the ground gas regime along Route Section 2A.

The design of the investigations was based on the development proposals at the time they were undertaken.

The GIs were undertaken in general accordance with BS:10175 'Code of Practice: Investigation of Potentially Contaminated Sites'²³ and BS:5930²⁴ 'Code of practice for site investigations' and 'Site Investigation in Construction, UK Specification for Ground Investigation, Second Edition'²⁵.

It is noted that although geotechnical data was collected as part of the GI a geotechnical assessment is outside of the scope of this assessment and the geotechnical information will be provided as a separate report.

5.2 Scope of Works

5.2.1 Intrusive ground investigation

During the GRIP 3 stage a GI for Route Section 2A was undertaken by BAM Ritchies Ltd (BAM) on behalf of WSP Parsons Brinckerhoff between May and September 2015. This work is documented in the East West Rail Phase 2A Ground Investigation Report (GIR), Document No.: 133735-PBR-REP-EGE-000002 – Revision 1 (June 2016)⁹.

The GRIP 3 Phase 2A GI consisted of 18 No. investigation locations spaced at approximately 500 m intervals along the route. Each investigation location consisted of three boreholes, drilled using windowless sampling techniques combined with dynamic probing. At each location generally one exploratory hole was positioned on either side of an earthwork and one in the centre of the track. A further 15 No. two-hole locations were added to the scope for the purposes of investigating the ground conditions at the location of new structures or backfill to existing structures. These holes were drilled using a combination of cable percussion, window sampling techniques and standard penetration testing.

A GRIP 4 stage GI was undertaken by the EWR Alliance. The GI was undertaken by CC Ground Investigation between July 2017 and October 2018 and included exploratory locations both within the railway corridor and adjacent to the railway on third party land in Route Section 2A. The GI included the drilling / excavation of 139 No. exploratory locations in Section 2A comprising trial pits, dynamic probing, window sampling and dynamic sampling with rotary follow on. This GI is documented in East West Rail Phase 2 Factual Report, Document No.: C5759-EWR2-2A-GI-A²⁶.

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²³ British Standards: BS:10175 Code of Practice: Investigation of Potentially Contaminated Sites, 2011.

²⁴ British Standards: BS 5930 Code of Practice for site investigations, 2015.

²⁵ Site Investigation in construction, UK Specification for Ground Investigation, Second Edition, 2012.

²⁶ CC Ground Investigations (2019) East West Rail Phase 2 Factual Report, Document No.: C5759-EWR2-2A-GI-A.



Exploratory hole locations are presented on Drawings Nos. 13375-EWR-REP-EEN-000137, 13375-EWR-REP-EEN-000137_1, 13375-EWR-REP-EEN-000137_2 and 13375-EWR-REP-EEN-000137_3 included in Appendix A and logs are presented in Appendix C.

5.2.2 Soil sampling

Environmental soil samples were collected as part of the GIs and submitted to an Environment Agency Certification Scheme (MCERTS) and UK Accreditation Services (UKAS) accredited laboratory for analysis.

5.2.3 Ground gas and groundwater monitoring and sampling

5.2.3.1 Installation Details

Details of the ground gas and groundwater monitoring standpipes installed within boreholes drilled during the GIs are summarised in Table 5.1:

Table 5.1 - Standpipe Installation Details

Monitoring Well	Approx. Chainage	Final D	rilled	Respons	se Zone	Geology
		m bgl	m AOD	m bgl	m AOD	
CP2ALLCDE	107070	10.5	59.12	2.5- 10.5	67.12- 59.12	Alluvium and Oxford Clay - Peterborough Member
CP2AMFOB_2 U	108390	30.5	38.93	2.0- 30.0	67.43- 39.43	Oxford Clay - Peterborough Member, Kellaways Sand Member, Kellaways Clay Member, Cornbrash Limestone, Forest Marble Formation, While Limestone Formation
CP2AMG-U	105430	21.0 0	59.28	16.5- 18.0	63.78- 62.28	Kellaways Sand Member
CP2AOB29C	101300	17.0	74.77	1.0-4.0	90.77- 87.77	Glacial Deposits Cohesive, Oxford Clay – Stewartby Member
CP2APOOB_1 D	105230	20.0	65.70	1.4- 19.6	84.33- 66.13	Made Ground, Oxford Clay – Peterborough Member, Kellaways Sand Member
CP2AUB32CE	103800	19.0	67.90	17.0- 19.0	69.90- 67.90	Oxford Clay - Peterborough Member
WS2A100_U	101400	5.6	85.90	1.0-5.6	90.50- 85.90	Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
WS2A103_U	101785	4.7	82.91	1.0-4.7	86.61- 82.91	Subgrade Fill, Weathered Oxford Clay - Peterborough Member
WS2A106_D	103940	6.0	78.40	1.0-6.0	83.40- 78.40	Oxford Clay - Peterborough Member
WS2A109_U	104300	6.45	83.25	1.45- 6.45	88.25- 83.25	Oxford Clay - Peterborough Member

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Monitoring Well	Approx. Chainage	Final Drilled Depth		Response Zone		Geology	
		m bgl	m AOD	m bgl	m AOD		
WS2A10U	103650	6.0	81.50	5.0-6.0	82.50- 81.50	Oxford Clay - Stewartby Member	
WS2A123_D	107425	6.25	59.43	1.25- 6.25	64.43- 59.43	Alluvium, Kellaways Sand Member, Kellaways Clay Member	
WS2A124_U	107575	6.4	59.29	1.0-4.0	64.69- 61.69	Alluvium, Oxford Clay - Peterborough Member, Kellaways Sand Member, Kellaways Clay Member	
WS2A12U	104650	6.0	73.60	4.0-5.0	75.60- 74.60	Oxford Clay - Peterborough Member	
WS2A13C	101785	4.0	78.70	3.0-4.0	79.70- 78.70	Oxford Clay – Stewartby Member	
WS2A14D	101785	4.7	73.25	1.0-4.7	76.95- 73.25	Weathered Oxford Clay - Peterborough Member	
WS2A16U	103940	4.0	69.26	3.0-4.0	70.26- 69.26	Weathered Oxford Clay - Peterborough Member	
WS2A17U	103940	4.0	64.50	2.0-4.0	66.50- 64.50	Oxford Clay – Peterborough, Member, Kellaways Sand Member	
WS2A1C	103940	6.0	80.49	3.0-4.0	83.49- 82.49	Oxford Clay - Peterborough Member	
WS2A20D	104200	4.3	64.30	1.0-4.3	67.60- 64.3	Made Ground, Alluvium, Kellaways Clay Member, Cornbrash Limestone	
WS2A2D	104200	5.0	79.96	4.0-5.0	80.96- 79.96	Oxford Clay - Peterborough Member	
WS2A3U	104300	4.0	80.10	1.0-4.0	83.10- 80.10	Alluvium, Glacial Deposits Cohesive	
WS2A5U	100970	5.0	82.00	4.0-5.0	83.00- 82.00	Oxford Clay - Peterborough Member	
WS2A6U	104650	6.0	85.00	1.0-6.0	90.00- 85.00	Weathered Oxford Clay - Peterborough Member, Kellaways Clay Member, Oxford Clay - Stewartby Member	
WS2A7U	104700	4.0	86.00	3.0-4.0	87.00- 86.00	Oxford Clay - Stewartby Member	
WS2A9C	105780	3.7	85.40	2.2-3.7	86.90- 85.40	Oxford Clay – Peterborough Member, Kellaways Clay Member	



Monitoring Well	Approx. Chainage	Final D Depth	rilled	Response Zone		Geology	
		m bgl	m AOD	m bgl	m AOD		
WS2AFCGF15 U	105780	5.0	63.78	2.0-5.0	66.78- 63.78	Oxford Clay – Peterborough, Member, Kellaways Sand Member	
WS2AFCMGD	105780	7.6	72.26	2.0-7.6	77.86- 72.26	Oxford Clay - Peterborough Member, Kellaways Sand Member	
WS2AFCT2D	106320	7.0	82.96	2.0-6.0	87.96- 83.96	Oxford Clay - Stewartby Member, Oxford Clay - Peterborough Member	
WS2ALOB_1D	107010	7.0	60.21	1.0-4.3	66.21- 62.91	Alluvium, Oxford Clay Peterborough Member, Kellaways Sand Member Kellaways Clay Member,	
WS2A121_U	107425	3.5	62.21	1.0-3.5	64.71- 62.21	Alluvium, Kellaways Sand Member	

5.2.3.2 Groundwater

No groundwater monitoring or testing was carried out as part of the GRIP 3 investigation.

As part of the GRIP 4 GI, several rounds of groundwater level monitoring and sampling have been carried out between December 2017 and October 2018.

At the time of reporting a number of the boreholes were yet to be drilled, however, the boreholes were selected in order to provide a good overall coverage of the different aquifers and soils types across Route Section 2A. Groundwater samples have been taken from locations where piled foundations are proposed so that the data can be used in the Piling Risk Assessments. It is noted that not all of the GRIP 3 boreholes could be located and were therefore these were unable to be monitored. A summary of the groundwater level monitoring and sampling is outlined in Table 5.2:

Table 5.2 - Groundwater Monitoring and Sampling

Location	Groundwater Level Monitoring & Sampling				
	Round 1	Round 2	Round 3	Round 4	
CP2AMFOB_2U	01/08/18	03/09/18	24/09/18	23/10/18	
CP2APOOB_1D	01/08/18*	03/09/18	25/09/18*	22/10/18	
WS2A100_U	01/08/18	04/09/18	27/09/18	22/10/18	
WS2A103_U	31/07/18*	04/09/18	27/09/18	22/10/18	
WS2A106_D	06/09/18	27/09/18*	-	22/10/18	
WS2A109_U	-	-	28/09/18	-	
WS2A121_U	03/09/18	-	24/09/18*	23/10/18	
WS2A123_D	01/08/18*	03/09/18	24/09/18	23/10/18	
WS2A124_U	01/08/18*	03/09/18*	24/09/18	23/10/18	

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Location	Groundwater Level Monitoring & Sampling					
	Round 1	Round 2	Round 3	Round 4		
WS2A14D	06/09/18	-	26/09/18*	22/10/18		
WS2A16U	-	06/09/18*	27/09/18*	22/10/18*		
WS2AFCGF15U	06/09/18*	-	-	23/10/18*		
WS2ALOB_1D	01/08/18*	03/09/18	24/09/18	22/10/18		
CP2ALLCDE	-	-	24/09/18	22/10/18		
WS2A12U	-	-	27/09/18	22/10/18		

^{*}Denotes groundwater level monitoring only.

5.2.3.3 Ground Gas

No ground gas monitoring was carried out as part of the GRIP 3 investigation.

In order to establish baseline conditions from the GRIP 4 GI, four rounds of gas monitoring have been carried out between July 2018 and October 2018 as outlined Table 5.3.

Table 5.3 - Ground Gas Monitoring

Location	Ground Gas Monitoring					
	Round 1	Round 2	Round 3	Round 4		
CP2ALLCDE	24/09/2018	22/10/2018	-	-		
CP2AMFOB_2U	01/08/2018	03/09/2018	24/09/2018	-		
CP2APOOB_1D	01/08/2018	03/09/2018	25/09/2018	-		
WS2A100_U	01/08/2018	04/09/2018	27/09/2018	22/10/2018		
WS2A103_U	31/07/2018	04/09/2018	27/09/2018	22/10/2018		
WS2A106_D	06/09/2018	27/09/2018	-	-		
WS2A121_U	03/09/2018	24/09/2018	-	-		
WS2A123_D	01/08/2018	03/09/2018	24/09/2018	-		
WS2A124_U	01/08/2018	03/09/2018	24/09/2018	-		
WS2A12U	27/09/2018	-	-	-		
WS2A14D	06/09/2018	26/09/2018	22/10/2018	-		
WS2A16U	06/09/2018	27/09/2018	-	-		
WS2AFCGF15U	06/09/2018	24/09/2018	-	-		
WS2ALOB_1D	03/09/2018	24/09/2018	-	-		

Concentrations of carbon dioxide, carbon monoxide, hydrogen sulphide, methane and oxygen were recorded on each monitoring round together with flow rates and atmospheric pressure using a calibrated Geotechnical Instruments GA2000 Gas Analyser.

5.2.3.4 Volatiles

Soil samples taken during the GI were screened on site by the Contractor using a photo-ionisation detector (PID) to measure the concentration of total volatile organic compounds (VOCs).

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5.2.3.5 Surface water sampling

No surface water sampling was carried out as part of the GRIP 3 investigation.

As part of the GRIP 4 GI, two rounds of surface water sampling were carried out between August and October 2018 at five locations (2ASW1(E), 2ASW2(S), 2ASW3(S), 2ASW4(S) and 2ASW5(N)) from the Langford Brook, Summerstown Ditch and Launton and Cutters Brook, an unnamed drain/watercourse to the Summerstown Ditch, Launton and Cutters Brook and an unnamed drain into Padbury Brook. These watercourses were selected to provide a good spread of data across the Route Section. The surface water sampling locations are presented on Drawing Nos. 13375-EWR-REP-EEN-000137, 13375-EWR-REP-EEN-000137_1, 13375-EWR-REP-EEN-000137_2 and 13375-EWR-REP-EEN-000137_3 included in Appendix A.

Two of the sampling locations including 2ASW4(S) from the Summerstown Ditch and Launton and Cutters Brook and 2ASW5(N) from the unnamed drain into Padbury Brook were dry and could not be monitored. Three sampling locations were monitored from the western end of the route including 2ASW1(E) from Langford Brook, 2ASW4(S) from the Summerstown Ditch, Launton and Cutters Brook and 2ASW3(S) from an unnamed drain/watercourse to the Summerstown Ditch, Launton and Cutters Brook

5.3 Chemical Analysis

Chemical analysis of the soils was scheduled by WSP for the GRIP 3 GI and carried out by Chemtest. No leachate, groundwater or surface water testing was undertaken. Chemical analysis was scheduled by the Alliance for the GRIP 4 GI and carried out by i2 Analytical. Chemical analysis was carried out in accordance with MCERTS and UKAS accredited procedures.

5.3.1 Soil testing

A total of 16 No. samples of Made Ground and nine samples of natural ground were tested during the GRIP 3 GI for the following suite of determinands:

- Arsenic, cadmium, boron, chromium (total), lead, mercury, selenium, copper, nickel, zinc;
- Cyanide (total);
- Total Petroleum Hydrocarbons (TPH) (C6-C40);
- Soil organic matter;
- Polycyclic Aromatic Hydrocarbons (PAH) (Speciated 16 USEPA);
- Total phenols;
- pH; and
- Asbestos (presence).

It is noted that some of the exploratory holes included in the GRIP 3 GI are no longer located within the Project area, and these have therefore not been included in this assessment.

As part of the GRIP 4 Alliance GI, a total of 21 No. of samples comprising various material types, including Ballast, Made Ground and Subgrade/Engineered Fill and natural ground were tested for the following suites of determinands which included:

- Arsenic, cadmium, boron, vanadium, chromium (total), chromium hexavalent, lead, mercury, selenium, copper, nickel, and zinc;
- Cyanide (free and total);
- Water soluble sulphate and sulphide;
- Soil organic matter;



- Loss on ignition;
- Fraction organic carbon.
- PAH (Speciated 16 USEPA);
- pH;
- TPH (C10-C40);
- TPH (CWG) (C5-C35);
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
- Methyl Tertiary Butyl Ether (MTBE);
- Total phenols;
- Ammonium;
- Asbestos (presence); and
- Asbestos quantification (where asbestos was identified).

Selected soil samples were also tested for:

- Pesticides and herbicides;
- Polychlorinated biphenyls (PCBs); and
- VOCs.

Leachate tests were also scheduled on soil samples and tested for:

 Arsenic, cadmium, boron, vanadium, chromium (total), chromium hexavalent, lead, mercury, selenium, copper, nickel and zinc;

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- Cyanide (free and total);
- Iron, calcium, manganese and nitrate;
- Dissolved organic carbon;
- Ammonia, ammonium and ammoniacal nitrogen;
- Sulphate, sulphide; and
- PAHs (Speciated 16 USEPA).

Selected leachate samples were also tested for:

- pH;
- Chloride aqueous;
- Nitrate aqueous;
- Sulphate aqueous;
- · Total sulphur and total sulphate; and
- Pesticides and herbicides.



5.3.2 Groundwater

Groundwater samples were collected from 13 boreholes as part of the Alliance GRIP 4 GI and tested for the following determinands:

- Arsenic, cadmium, boron, vanadium, chromium (total), chromium hexavalent, lead, calcium, iron, manganese, mercury, vanadium, selenium, copper, nickel, and zinc;
- Cyanide (free and total);
- Water soluble sulphate and sulphide;
- pH;
- Dissolved organic carbon;
- TPH (C5-C35);
- TPH (CWG);
- Total Phenols;
- PAHs:
- BTEX:
- MTBE;
- Ammoniacal Nitrogen and Ammonium;
- Nitrate:
- VOCs; and
- Semi Volatile Organic Compounds (SVOCs).

5.3.3 Surface water

Surface water samples were collected from four locations including Langford Brook, Summerstown Ditch and Launton and Cutters Brook as part of the Alliance GRIP 4 GI and tested for the following determinands:

- Arsenic, cadmium, calcium, boron, vanadium, chromium (total), chromium hexavalent, lead, mercury, selenium, iron, copper, manganese, nickel, and zinc;
- Cyanide (free and total);
- Water soluble sulphate and sulphide;
- Nitrate
- PAH (Speciated 16 USEPA);
- pH;
- TPH (C5-C35);
- BTEX;
- MTBE;
- Total Petroleum Hydrocarbons (CWG);
- Total Phenols;
- Ammoniacal Nitrogen and Ammonium;
- Dissolved Organic Carbon (DOC)

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- VOCs; and
- SVOC.

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6. Ground Conditions

6.1 Ground Investigation Design

This section provides a summary of the ground conditions encountered during the investigations. The depths quoted are relative to the ground levels prevailing at the time of the GIs.

Full details of the ground conditions encountered at each exploratory hole location are provided in the exploratory hole logs included within Appendix C. The exploratory hole locations are presented on Drawing Nos. 13375-EWR-REP-EEN-000137, 13375-EWR-REP-EEN-000137_1, 13375-EWR-REP-EEN-000137_2 and 13375-EWR-REP-EEN-000137_3 in Appendix A.

6.2 Summary of Ground Conditions

The ground conditions along the route broadly reflect those anticipated from the published geology.

The route comprises railtrack at grade, on embankments and in cuttings and the thickness of the underlying railway substructure reflects the previous development of the site as a railway. Underlying the railway substructure, and Topsoil where present, the natural ground comprises Alluvium associated with watercourses around Station Road in Launton. Glacial Till was not previously identified on BGS maps, however, it was identified locally in areas of higher topography in the eastern section of the Route.

The superficial deposits and railway substructure overlay the solid strata of the Oxford Clay Formation across much of Route Section 2A. The Kellaways Formation (sand and clay Member) subcropping below the superficial soils towards the western (Bicester) end of Route Section 2A from Marsh Gibbon. The Cornbrash, Forest Marble, White Limestone and Rutland Formations were encountered underlying the Kellaways Formation in the west end of Route Section 2A.

A summary of the encountered geology along the route is provided in Table 6.1 below:

Table 6.1 - Ground Conditions Summary

Geology	Description	Top of Stratum (m bgl)	Range of thickness (m bgl)
Topsoil	Soft/stiff/firm grey dark brown slightly sandy clay with frequent roots (<2 mm).	0.00-1.70	0.05-1.00
Ballast	Grey angular to sub-angular medium to coarse gravel of igneous material. Angular to sub-angular fine to coarse gravel of igneous material, clinker, slag. Approximately 50-70 % undersized with fines of ash and degraded ballast.	0.00-0.50	0.02-0.60
Trackbed Layers	Yellow/light orangish/orangish/light brown gravelly slightly clayey sand. Gravel is angular to rounded fine to coarse of igneous material, chalk and siliceous material.	0.00-0.70	0.12-0.8
Engineered Ground	Light orangish brown gravelly slightly clayey fine to coarse sand. Gravel is angular to rounded fine to coarse of chert and clinker.	0.00-0.20	0.20-0.40
Made Ground	Firm to stiff friable dark brown slightly sandy slightly gravelly clay with occasional roots (<2 mm). Gravel is angular to sub-rounded fine	0.00-1.00	0.05-1.70

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Geology	Description	Top of Stratum (m bgl)	Range of thickness (m bgl)
	to coarse of brick, ash, clinker, concrete, limestone and sandstone. Further comments in text below.		
Subgrade Fill	Soft light grey and bluish grey slightly gravelly slightly sandy clay with rare gypsum crystals (<5 mm). Gravel is angular to rounded fine to coarse of siliceous material, limestone and red brick.	0.00-5.40	0.10-5.10
Glacial Deposits Cohesive	Soft to firm greenish brown mottled brown slightly gravelly silty clay with rare rootlets. Gravel is sub-angular to rounded fine chalk.	0.00-4.20	0.10-1.90
Alluvium	Firm grey mottled dark grey locally orangish brown slightly sandy clay. Occasional partially decomposed organic material (<5 mm).	0.15-6.00	0.10-1.60
Oxford Clay - Peterborough member	Very stiff thinly laminated dark grey silty clay locally tending to extremely weak mudstone with occasional shells (<20 mm).	0.10-19.80	0.15-12.50
Oxford Clay - Stewartby Member	Stiff to very stiff /Hard greyish to dark brown silty friable clay with shell fragments	0.20-5.00	0.10-3.30
Kellaways Clay Member	Stiff dark grey sandy clay with rare pockets (<10 mm) of iron pyrite.	0.40-18.20	0.1-3.45
Kellaways Sand Member	Firm to stiff dark grey silty / clayey fine to medium sand with occasional shell fragments.	0.6-21.40	0.05-4.60
Cornbrash Limestone	Medium strong thinly bedded light grey fossiliferous Limestone. Discontinuities are closely spaced stepped rough with fine sand infill (<6 mm).	3.00-19.30	0.10->3.50
Forest Marble Formation	Weak to medium strong very thinly to thinly bedded light grey fine grained slightly shelly Limestone with medium interbeds of very stiff dark brownish grey clay. Discontinuities are sub-horizontal very closely to medium spaced undulating rough occasionally infilled (<3 mm) with clay.	6.00-20.00	0.43->3.20
White Limestone Formation	Weak to medium strong dark grey fossiliferous Limestone. Discontinuities are sub-horizontal undulating rough and infilled with dark grey silt	9.40-26.29	0.5->11.7
Rutland Formation	Weak dark grey Mudstone. Discontinuities are sub-horizontal undulating medium closely spaced rough.	29.60	>0.90

A summary of the categories applied to the anthropogenic soils and the railway substructure are presented in Table 6.2 below and Made Ground is discussed further in the following sections.



Table 6.2 - Anthropogenic Soil Categories

Geology	Description
Topsoil	Topsoil is the top-most strata present, however it can be present in 'relic' form where it has been buried by artificial ground (beneath embankments).
Ballast	Ballast is encountered in areas which lie within the railway corridor, which were currently or previously part of the trackbed immediately beneath the rails and sleepers.
Trackbed	Trackbed describes material immediately below the ballast, forming part of the existing or former trackbed within the railway corridor.
Made Ground	Made Ground is defined as anthropogenic materials which have not been classified as trackbed or subgrade fill for earthworks, although both of these are still Made Ground.
Subgrade Fill / Embankment Fill	Subgrade Fill and Embankment Fill are used to describe material typically forming the bulk fill of railway embankments, below the trackbed layers, although this material is classed as Made Ground as it has been placed at this location by man. It is likely to include locally occurring geology in re-worked form.

Topsoil was encountered across Route Section 2A offline and occasionally underlying the embankment. Made Ground was encountered locally offline in fifteen locations. The deepest Made Ground was recorded offline (CP2APOOB_1D) in the location of the proposed Poundon Occupation New Overbridge. The Made Ground in this location is described as firm becoming stiff thinly laminated sandy clay with leaf matter.

6.3 Potential Evidence of Contamination

The railway ballast included clinker, ash and slag with hydrocarbon staining noted locally on the ballast. The Made Ground described in Table 6.1 and Sections 6.2.5 and 6.2.6 also included brick, ash, clinker and concrete.

Details of other visual and olfactory evidence of potential contamination within the soil and groundwater across Route Section 2A are presented in Table 6.3. Organic odours were frequently recorded in the Made Ground and underlying natural soils, but these have only been included in the risk assessment if they were accompanied by other evidence of contamination such as elevated PID readings. A strong sulphurous odour and a strong hydrocarbon odour were noted, each at one location within the groundwater during the GRIP 4 GI groundwater monitoring rounds.

Table 6.3 - Visual/Olfactory evidence of soil contamination

Location	Approx. Chainage	Depth (m bgl)	Comment
CP2AOB29_C	101275	8.0-9.0	Hydrocarbon odour in the Oxford Clay. All the natural soils noted to be 'slightly organic'. No PID results available.
WS2A101_C	101400	0.0-1.6	No olfactory or visual evidence of contamination in the Ballast (PID was 3.6 ppm at 0.5 m bgl). Moderate hydrocarbon odour and decomposed organic material in underlying Oxford Clay - Peterborough Member (PID was 31.7 ppm at 1.0 m bgl).

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Location	Approx. Chainage	Depth (m bgl)	Comment
			Slight hydrocarbon odour in Oxford Clay- Peterborough Member from 1.6 m bgl to base of exploratory hole
WS2A6U	101600	5.4	Moderate sulphurous odour in the groundwater (180 m southwest of WS2A101_U). Response zone in Oxford Clay – Stewartby Member and Kellaways Formation (Clay).
WS2A8C	102700	0.3-0.4	PID results from the Made Ground at this location ranged between less than LOD and 0.1 ppm between 0.3 m and 1.0 m bgl.
WS2AOB31U	103011	4.5-7.8	Black sandy flint gravel with sulphur odour in the Made Ground. PID results ranged between 0.1 ppm and 2 ppm between 0.3 m and 1.0 m bgl.
WS2A9U	103140	4.5-6.3	Strong hydrocarbon odour to the base of the hole at 7.8 m bgl in the Oxford Clay Formation. No PID results available.
WS2A10U	103560	5.0-6.0	Strong hydrocarbon odour in the Kellaways Clay, no PID results available at this depth. PID results from 0.3 m to 1.0 m bgl within Made Ground ranged between less than LOD and 1.0 ppm. Groundwater strike at 3.67 m bgl noted moderate hydrocarbon odour.
WS2A105_C	103940	0.0-0.45	Strong sulphurous odour noted in the groundwater when the well was developed. Response zone of this monitoring well was in the Oxford Clay – Stewartby Member between 5.0 and 6.0m bgl. PID results 0.6 ppm at 0.3 m and <0.1 ppm at 1.0 m bgl.
WS2A116_C	106320	0.75-3.0	Slight hydrocarbon odour in Ballast.
WS2A119_C	107280	0.95-1.8	PID was 0.1 ppm at 0.5 m bgl, 0.3 ppm at 1.0 m bgl and 2.5 ppm at 2.5 m bgl.
WS2A1C	103940	1.30-2.0	Slight hydrocarbon odour in Subgrade Fill with decomposed roots and rootlets. PID was 0.7 ppm at 0.5 m bgl, 0.5 ppm at 1.0 m bgl, 0.6 ppm at 2.0 m bgl and 0.4 ppm at 3.5 m bgl
WS2A2C	104200	3.40-3.70	Slight hydrocarbon odour in Subgrade Fill with decomposed roots and rootlets. PID was 0.1 ppm at 0.5 m bgl, 1.0 ppm at 1.0 m bgl, 0.8 ppm at 2.0 m bgl and1.4 ppm at 3.5 m bgl.
WS2A9U	105780	4.50-6.30	Slight hydrocarbon odour in Made Ground. PID results <0.1 ppm at 0.30 m and 1.0 m bgl.
WS2AOB31D WS2AOB31U	103020 103010	4.00-6.50	Strong hydrocarbon odour in Reworked Clay. PID results 0.3 ppm at 0.30 m bgl and <0.1 ppm at 1.0 m bgl.
		4.50-7.80	Strong hydrocarbon/ organic odour in Kellaways Clay. PID results 0.1 ppm at 0.3 m bgl and <0.1 at 1.0 m bgl.

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Location	Approx. Chainage	Depth (m bgl)	Comment
WS2A8C	102700	0.3 – 0.4	Moderate to strong organic/hydrocarbon odour in Oxford Clay - Peterborough Member. PID results 1.0 ppm at 0.3 m bgl and 0.2 ppm at 1.0 m bgl.
TPA11	102700	0.45 – 1.2	Strong organic/ hydrocarbon odour in Oxford Clay - Peterborough Member. PID results 0.5 ppm at 0.3 m bgl and 0.1 ppm at 1.0 m bgl.
TPA23	105600	0.35 – 0.75 0.75 – 1.2	Slight chemical odour in Trackbed layers. PID results 0.1 ppm at 0.5 m bgl. Slight chemical odour in possible Alluvium. PID results 0.5 ppm at 0.8 m bgl and 0.4 ppm at 1.2 m bgl.
TPA25	105960	0.25 – 0.6	Slight chemical odour in Trackbed layers. PID results <0.1 ppm at 0.5 m bgl.
TPA30	106840	0.6 – 1.25	Slight localised chemical odour in probable Oxford Clay Formation. PID results 0.1 ppm at 0.80 m bgl and 0.3 ppm at 1.1 m bgl.
TPA38	108400	0.6 – 1.2	Slight chemical odour in possible Alluvium. PID results 0.6 ppm at 0.5 m bgl, 0.5 ppm at 0.8 m bgl and 0.9 ppm at 1.1 m bgl.
TPA44	109400	0.08 - 0.33 0.33 - 0.9	Slight chemical odour in Trackbed layers. PID results <0.1 ppm at 0.5 m bgl and 1.0m bgl. Strong chemical odour in Trackbed layers. PID results 0.4 ppm at 0.5 m bgl and 0.2 ppm at 1.0 m bgl.

The results of the PID tests indicate that the majority of results were below or just above detection limits of the equipment used <0.1 ppm with the most elevated results (31.7 ppm) recorded in WS101_C, associated with a hydrocarbon odour in the Oxford Clay Formation at 1.0m bgl.

Slight hydrocarbon odours in the soil were noted in the Made Ground, Trackbed layers and Ballast. Within the natural strata hydrocarbon odours were identified within the Oxford Clay Formation (Peterborough Member and Stewartby Member) and Kellways Clay Member.

Visual/olfactory evidence of hydrocarbons were identified in groundwater from the eastern site boundary (Chainage 101120) to approximate Chainage 104000 (Station Road Marsh Gibbon) with no further evidence of hydrocarbons in groundwater recorded until Chainage 106320 and 107280 (in the general area of Launton Level Crossing) in the Subgrade Fill. A sulphurous odour was also noted in some of the soil and groundwater which can be an indication of the presence of degrading petroleum hydrocarbons or high organic content. The hydrocarbon odour in the groundwater in the eastern end of Route Section 2A could potentially be attributed to the landfills located further southeast.

Chemical odours were identified within both the Made Ground, Trackbed layers, Alluvium and Oxford Clay Formation in TPA25 between the depths of 0.08 m and 1.25 m bgl.



6.4 Groundwater

6.4.1 Groundwater strikes

Groundwater strikes were recorded during drilling at depths of between 0.3 m and 19.0 m bgl in the Ballast, Made Ground, Alluvium and Glacial Deposits and in the Oxford Clay, Kellaways Clay, Kellaways Sand and the White Limestone Formations as summarised in Table 6.4 below:

Table 6.4 - Water Strikes encountered during GIs

Location	Water Strike Details (m bgl)	Stratum
CP2AOB29C	2.1	Oxford Clay-Stewartby Member
CP2AUB32CE	19.0 – slight seepage	Oxford Clay-Peterborough Member
CP2AUB32CW	7.2	Oxford Clay-Peterborough Member
WS2A12U	0.3	Made Ground
WS2A14U	0.9 – seepage	Made Ground
WS2A1U	3.6	Oxford Clay-Peterborough Member
WS2A2D	3.0 - 3.45 -slight seepage	Made Ground
WS2A2U	4.7	Oxford Clay-Peterborough Member
WS2A3D	3.5 – seepage	Oxford Clay-Peterborough Member
WS2A3U	4.0	Glacial Deposits Cohesive
WS2A6U	1.0 – slight seepage	Glacial Deposits Cohesive
WS2AFCMGD	1.2 - 1.65 - seepage	Oxford Clay-Peterborough Member
WS2AOB29UA	3.0 - 4.0 - seepage	Oxford Clay-Stewartby Member
CP2AJLFB_2U	0.6	Kellaways Clay Formation
	12.5 – artesian groundwater rising to 2.85 m above ground level.	White Limestone Formation
TP A20	0.6-0.75	Trackbed Layers
TP A43	1.2	Subgrade Fill
WS2A101_C	2.2	Oxford Clay – Peterborough Member
WS2A107_C	0.45	Ballast
WS2A125_C	7.8	Kellaways Clay Member
WS2ACLOB_1U	4.15	Kellaways Sand Member
CP2ALOB_1D	1.2	Alluvium
	14.7– artesian groundwater rising to 0.3 m above ground level on 15/06/18 but had risen to 5.0m above ground level on 25/06/18.	Boundary between Forest Marble Formation and the While Limestone Formation.
CP2AMFOB_2U	4.45	Kellaways Sand Member
TP2ACLOB_1D	1.8 - seepage	Weathered Oxford Clay - Peterborough member

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Location	Water Strike Details (m bgl)	Stratum
TP2ALOB_1U	1.3 – slow seepage	Boundary between Alluvium and the Weathered Oxford Clay - Peterborough member
TP2ALOB_2D	0.9	Alluvium
TP2ALOB_2U	1.4 – slow seepage	Alluvium
TP2ALOB_4D	1.8	Boundary between Oxford Clay - Peterborough member and the Kellaways Sand Member
TP2ALTN_2U	0.9 – seepage 1.2 – 1.6m - heavy seepage	Alluvium
TP2AMFOB_2D	1.2 - 1.45 - seepage	Oxford Clay - Peterborough member
TP2AMFOB_3D	1.3	Oxford Clay - Peterborough member
TP2AMFOB_3U	1.8 - seepage	Oxford Clay - Peterborough member
WS2A118_U	0.6 - rose to 0.56	Alluvium
WS2A120_D	0.8	Alluvium
WS2A121_U	0.5 – rose to 0.39m	Alluvium
WS2A123_D	0.7 – seepage	Alluvium
	0.9	Alluvium
WS2A124_U	1.2	Boundary between Oxford Clay - Peterborough member and the Kellaways Sand Member
	4.0 – rose to 3.10m	Kellaways Clay Member
WS2A126_D	3.6	Kellaways Sand Member
WS2ALOB_1D	4.1	Kellaways Clay Member
WS2ALOB_1U	0.71	Alluvium
	3.91 – rose to 3.30m	Kellaways Sand Member
WS2AMFOB_1D	5.0 – rose to 4.60m	Kellaways Sand Member
WS2AMFOB_1U	4.0 – rose to 3.91m	Oxford Clay - Peterborough member

6.4.2 Groundwater level monitoring results

Groundwater levels were recorded from 11 of the boreholes during the groundwater monitoring rounds undertaken between July and October 2018. Boreholes WS2A109_U, WS2A12U, WS2A16U and CP2ALLCDE were not dipped during the monitoring rounds. Groundwater levels were recorded between 0.99 m and 4.92 m bgl as summarised in Table 6.5.



Table 6.5: Summary of Groundwater Level Monitoring

Location	Response Zone		Groundwater Depth	Groundwater Level	
	Geology	Depth (m bgl)	Range (m bgl)	Range (m AOD)	
CP2AMFOB_2U	Oxford Clay - Peterborough Member, Kellaways Clay Member, Cornbrash Limestone, Forest Marble Formation	2.0 – 30.0	1.48 – 1.81	67.95 – 67.62	
CP2APOOB_1D	Oxford Clay – Peterborough Member, Kellaways Sand Member	1.4 – 19.6	4.92 – 5.4	80.81 – 80.33	
WS2A100_U	Glacial Deposits Cohesive, Oxford Clay - Peterborough Member	1.0 – 5.6	3.84 – 4.5	87.66 – 87.00	
WS2A103_U	Subgrade Fill, Weathered Oxford Clay - Peterborough Member	1.0 – 4.7	1.8 – 2.3	85.81 – 85.31	
WS2A106_D	Oxford Clay - Peterborough Member	1.0 – 6.0	1.0	83.40	
WS2A121_U	Alluvium, Kellaways Sand Member	1.0 – 3.5	2.0	63.71	
WS2A123_D	Kellaways Clay Member	1.25 – 6.25	1.96 – 2.28	63.72 – 63.40	
WS2A124_U	Kellaways Clay Member	1.0 – 4.0	1.91 – 3.31	63.78 – 62.38	
WS2A14D	Weathered Oxford Clay - Peterborough Member	1.0 – 4.7	2.57	75.38	
WS2AFCGF15U	Oxford Clay – Peterborough, Member Kellaways Sand Member	2.0 – 5.0	1.87	66.91	
WS2ALOB_1D	Alluvium, Oxford Clay	1.0 – 4.0	0.99 – 1.3	66.22 – 65.91	



Location	Response Zone		Groundwater Depth	Groundwater Level	
	Geology Depth (m bg		Range (m bgl)	Range (m AOD)	
	Peterborough Member, Kellaways Clay Member, Kellaways Sand Member				

Groundwater levels ranged from 87.66 m AOD (WS2A100_U, August 2018) to 62.38m AOD (WS2A124_U, September 2018).

Two boreholes (CP2AJLFB_2U and CP2ALOB_1D) recorded artesian water. Borehole CP2AJLFB_2U struck water at 12.5 m bgl which rose to 2.85 m above ground level. The water strike occurred when the borehole entered the White Limestone Formation. Borehole CP2ALOB_1D struck groundwater at 14.7m bgl. There was an initial water rise to 0.3 m above ground level and after 10 days water had risen to 5.0m above ground level. This water strike occurred at the boundary between the Forest Marble and White Limestone Formations. The White Limestone Formation is a Principal Aquifer, the groundwater is confined by the overlying Forest Marble Formation, unproductive strata which also separates the White Limestone aquifer from the overlying Cornbrash Formation (Secondary A Aquifer).

Groundwater level monitoring data shows that groundwater is most likely flowing in an easterly / north easterly direction west of Bicester towards a small pond feature north of station road, Launton (chainage 107450), with a westerly/south westerly flow direction in line with topography from Grebe Lake at the eastern boundary towards Launton. However, it is noted that there is a significant distance between the groundwater monitoring locations, and in some cases only one recorded groundwater level, therefore there is insufficient data to determine groundwater flow direction with any accuracy. Further data is needed to inform this assessment.

6.5 Ground Gas Monitoring Results

Four rounds of ground gas monitoring were undertaken along the route between July and October 2018. A summary of peak concentrations is provided in Table 6.6.

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Table 6.6 - Summary of Ground Gas Monitoring

Location	Response Zone		Date	Minimum	Maximum	Maximum	Maximum	Maximum	Maximum	Atmospheric	Rising/
	Geology	Depth (m bgl)	-	Oxygen (% v/v)	Carbon Dioxide (% v/v)	Methane (% v/v)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	flow rate (I/hr)	Pressure (mb)	Falling Atmospheric Pressure*
CP2ALLCDE	Alluvium and Oxford Clay -	2.5- 10.5	24/09/201 8	2.6	14.5	<0.1	<1.0	<1.0	0.2	1032	Rising
	Peterborough Member		22/10/201 8	19.4	0.3	<0.1	<1.0	<1.0	0.2	1032	Rising
CP2AMFOB_2 U	Oxford Clay - Peterborough	2.0- 30.0	01/08/201 8	19.3	1.4	19.3	5.0	<1.0	<0.1	1016	Rising
	Member, Kellaways Clay		03/09/201	21.0	0.6	<0.1	<1.0	<1.0	0.2	1015	Falling
Member, Cornbrash Limestone, Forest Marble Formation	Member, Cornbrash Limestone, Forest Marble		24/09/201 8	19.3	0.6	<0.1	<1.0	<1.0	0.3	1032	Rising
CP2APOOB_1 D	Oxford Clay - Peterborough	eterborough 19.6	01/08/201 8	9.1	5.8	<0.1	1.0	<1.0	0.4	1016	Rising
	Member, Kellaways Sand		03/09/201 8	16.5	4.0	<0.1	1.0	<1.0	<0.1	1015	Falling
	Member		25/09/201 8	18.1	3.5	<0.1	<1.0	<1.0	0.5	1031	Steady
WS2A100_U	Glacial Deposits	eposits ohesive, xford Clay -	01/08/201 8	20.3	1.4	0.4	1.5	<1.0	<0.1	1016	Rising
	Cohesive, Oxford Clay - Peterborough		04/09/201 8	20.4	1.9	<0.1	<1.0	<1.0	0.3	1013	Steady
	Member		27/09/201 8	20.0	0.5	<0.1	<1.0	<1.0	<0.1	1018	Falling
			22/10/201 8	18.3	2.5	<0.1	<1.0	<1.0	Not measured	1028	Rising

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Location	Response Zor	ne	Date	Minimum	Maximum	Maximum	Maximum	Maximum	Maximum	Atmospheric	Rising/	
	Geology	Depth (m bgl)		Oxygen (% v/v)	Carbon Dioxide (% v/v)	Methane (% v/v)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	flow rate (I/hr)	Pressure (mb)	Falling Atmospheric Pressure*	
WS2A103_U	Subgrade Fill, Oxford	1.0-4.7	31/07/201 8	19.0	1.5	<0.1	<1.0	1.0	0.2	1007	Falling	
	Clay - Peterborough Member		04/09/201 8	21.1	0.8	<0.1	<1.0	<1.0	0.3	Not measured	Steady	
			27/09/201 8	19.4	0.6	<0.1	<1.0	<1.0	<0.1	1018	Falling	
			22/10/201 8	18.5	1.7	<0.1	<1.0	<1.0	<0.1	1028	Rising	
WS2A106_D	Oxford Clay - Peterborough	1.0-6.0	06/09/201 8	20.4	0.7	<0.1	<1.0	<1.0	0.2	1009	Falling	
	Member		27/09/201 8	20.3	0.3	<0.1	<1.0	<1.0	<0.1	1019	Falling	
WS2A121_U	Alluvium, Kellaways	1.0-3.5	03/09/201 8	20.7	1.0	<0.1	<1.0	<1.0	<0.1	1015	Falling	
	Sand Member			24/09/201 8	18.6	2.1	<0.1	<1.0	<1.0	0.3	1032	Rising
WS2A123_D	Kellaways Clay Member		1.25- 6.25	01/08/201 8	15.4	5.8	<0.1	1.0	<1.0	0.1	1016	Rising
			03/09/201	17.2	4.7	<0.1	<1.0	<1.0	0.1	1015	Falling	
			24/09/201 8	17.0	4.3	<0.1	<1.0	<1.0	0.4	1034	Rising	
WS2A124_U	Kellaways Clay Member	1.0-4.0	01/08/201 8	19.6	3.6	<0.1	1.0	<1.0	<0.1	1016	Rising	
			03/09/201	19.9	2.7	<0.1	1.0	<1.0	0.1	1015	Falling	
			24/09/201 8	18.4	2.7	<0.1	<1.0	<1.0	0.4	1044	Rising	



Location	Response Zor	ne	Date	Minimum	Maximum	Maximum	Maximum	Maximum	Maximum	Atmospheric	Rising/
	Geology	Depth (m bgl)		Oxygen (% v/v)	Carbon Dioxide (% v/v)	Methane (% v/v)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	flow rate (I/hr)	Pressure (mb)	Falling Atmospheric Pressure*
WS2A12U	Oxford Clay - Peterborough Member	4.0-5.0	27/09/201 8	19.5	0.9	<0.1	<1.0	<1.0	<0.1	1017	Falling
WS2A14D	Oxford Clay - Peterborough	1.0-4.7	06/09/201 8	20.3	0.5	<0.1	<1.0	1	-0.1	1010	Falling
	Member		26/09/201 8	19.6	0.3	<0.1	<1.0	<1.0	0.6	1037	Falling
			22/10/201 8	19.9	0.1	<0.1	<1.0	<1.0	<0.1	1030	Rising
WS2A16U	Oxford Clay - Peterborough	3.0-4.0	06/09/201 8	19.9	0.6	<0.1	<1.0	2.0	-0.2	1010	Falling
	Member		27/09/201 8	10.5	7.2	<0.1	2.0	<1.0	0.3	1021	Falling
WS2AFCGF15	Oxford Clay - Peterborough	2.0-5.0	06/09/201	20.3	0.9	<0.1	<1.0	1.0	-0.1	1015	Falling
	Member, Kellaways Sand Member		24/09/201 8	20.1	1.3	<0.1	<1.0	<1.0	0.5	1032	Rising
WS2ALOB_1D	Alluvium, Oxford Clay -	1.0-4.0	01/08/201 8	19.8	0.3	<0.1	1.0	<1.0	0.3	1016	Rising
	Peterborough Member, Kellaways		03/09/201	21.0	0.3	<0.1	1.0	<1.0	0.3	1015	Falling
	Clay Member, Kellaways Sand Member		24/09/201 8	20.5	0.2	<0.1	<1.0	<1.0	0.3	1032	Rising

*Atmospheric pressure falling / rising trends have been calculated based on the trend two days before and after the monitoring visit

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7. Contamination Assessment

7.1 Introduction

The following presents a summary of the soil, leachate and groundwater analytical data and ground gas monitoring data collected from the ground investigations and provides a preliminary assessment of the results based on the proposed end use for the site.

7.2 Human Health Risk Assessment

7.2.1 Generic assessment criteria

A Tier 2 human health GQRA has been undertaken for the receptors identified in the PCSM in Section 4. To evaluate the potential risks to human health, soil data have been screened against a Generic Assessment Criteria (GAC). Detailed guidance on human health risk assessment is available in Science Report SR2²⁷, SR3²⁸ and the CLEA Model. The GACs used in this assessment include the following:

- Soil Screening Values (SSVs) Atkins has produced SSVs based on minimal toxicological risk for a variety of standard land uses at 1 % Soil Organic Matter (SOM) (sand soil type) and 6 % SOM (sandy loam soil type) using CLEA v1.071 in accordance with Environment Agency guidance.
- Category 4 Screening Levels (C4SLs) A revision to the Statutory Guidance of Part 2A of the
 Environmental Protection Act 1990 was published in April 2012, introducing a new category-based
 system for assessing risks associated with land contamination including the assessment of the
 'significant possibility of significant harm' (SPOSH) whereby Category 1 sites are clearly
 contaminated and represent a high risk and Category 4 sites are clearly identifiable as low risk and
 as such would not be classified as Contaminated Land.
- C4SLs Six contaminants (arsenic, cadmium, hexavalent chromium, lead, benzene and benzo(a)pyrene) for a sandy loam soil with 6 % SOM were issued by Defra in December 2014²⁹ to provide an indication of "low risk" (i.e. the site is clearly within Category 4), whereas GAC, such as SGVs / SSVs, are based on "minimal risk". If soil concentrations exceed the C4SLs, then further assessment is required to confirm whether the site lies within Category 4 or may lie within Categories 1-3. The Department for Communities and Local Government has indicated the C4SLs can also be used under the planning regime. Therefore, for this site C4SLs have been used for those determinants that do not have a SSV.
- Suitable for Use Levels (S4ULs) The Land Quality Management Ltd (LQM) S4UL for nickel has been selected as a GAC because there is currently no SGV, SSV or C4SL for nickel. The S4UL is based on a sandy loam soil as defined in SR3³⁰ with 6 % SOM.
- Atkins Water Screening Values (WSVs) To assess potential risks from volatile contaminants in
 perched water to human health receptors, laboratory analytical data is screened against Atkins
 generic Water Screening Values (WSVs) for a commercial end use. Atkins WSVs are derived for
 commercial end uses, using the receptor exposure parameters provided in the CLEA framework.

GACs for a public open space (parks) and a commercial end use have been adopted for the assessment, as they are considered appropriate for the proposed end-use as a railway which will include both outdoor human health receptors (users crossing the railway) including potential for dust inhalation and indoor human health receptors (station users).

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²⁷ Environment Agency (2009) Human Health Toxicological Assessment of Contaminants in Soil. Science Report SC050021/SR2.

²⁸ Environment Agency (2009) Science Report SC050021/SR3; Updated Technical Background to the CLEA Model.

²⁹ CL:AIRE (2013) Category 4 Screening Levels (C4SLs):C4SL Project Methodology.

³⁰ Environment Agency (2009) Science Report SC050021/SR3; Updated Technical Background to the CLEA Model.



The public open space GACs are based on an outdoor scenario which assumes a critical receptor (female child, age 0 to 6 years) spending between 85 days (0-1 year olds) and 170 days (1-6 year olds) of the year outside, with a soil exposure rate of 50 %. The commercial GACs are based on an office scenario which assumes a critical receptor (female worker, age 16 to >65 years) working five days a week for 46 weeks of the year, with an exposure frequency of 230 days per year.

The GAC developed for a SOM content of 1 % have been adopted as this is a more conservative assessment.

Based on the ratio of genotoxic PAHs to benzo(a)pyrene, the surrogate marker approach for genotoxic PAHs as set out in the C4SL Project Methodology²⁹ has been adopted.

Potential acute risks resulting from short term exposure to contamination by construction/ maintenance workers involved with the proposed development cannot be assessed using these GAC because they relate to the long-term (chronic) risk. Risks to construction/maintenance workers should be managed with the use of appropriate safe systems of work including PPE.

It should be noted that the GACs are liable to change as new policy and technical guidance, including toxicological data, are published by the Environment Agency and other authoritative sources. Further to this, a Detailed Quantitative Risk Assessment (DQRA) may be required to review the level of conservatism in the screening values, depending upon the outcome of the generic data screening exercise at detailed design stage.

7.2.2 Soil Assessment

A total of 56 No. soil samples were tested as part of the GRIP 3 and GRIP 4 GIs. No exceedances of the commercial land use or public open space (parks) GAC were identified in the soil samples tested.

TPH was predominantly recorded below laboratory detection limits within the GRIP 3 Total TPH C6-C40 soil samples and the GRIP 4 TPH CWG aliphatic and aromatic range samples. PAHs were below the GAC but above the laboratory's limit of detection in all samples.

PCBs were also less than the limit of detection in all samples tested and the pesticides and herbicide screen did not detect evidence of these compounds within soil samples. An assessment table of the data including the GAC is included in Appendix D.

7.2.3 Asbestos

Asbestos screening in the laboratory was undertaken on 51 No. samples all of which were within the top 1.0 m of material collected from topsoil, Made Ground, ballast, trackbed layers, subgrade fill and Alluvium. No asbestos fibres or Asbestos Containing Material was identified within any of the samples.

7.2.4 Groundwater Vapour Assessment

Organic contaminants including PAHs, TPHs, VOCs and SVOCs were predominantly reported below the laboratory's limit of detection in all groundwater testing results, no exceedances of the Atkins Water Screening Values were identified. In addition, no enclosed structures are proposed to be constructed within Route Section 2A. Therefore, groundwater is considered unlikely to present significant risks to human health receptors via the vapour inhalation pathway.

7.3 Controlled Waters Assessment

7.3.1 Generic assessment criteria

A Tier 2 controlled waters GQRA has been undertaken to assess the potential risks posed to the identified controlled waters receptors from the migration of contaminants from identified on-site sources. To assess potential risks to the identified receptors, a comparison of soil-derived leachate and groundwater data against water quality standards (WQS) has been undertaken.

Soil-leachate tests give an indication of the concentrations at which contaminants may leach from soil and potentially migrate to groundwater or surface water receptors. Groundwater samples give an indication of the general groundwater quality underlying the site and which contaminants may have the potential to migrate to surface water and into aquifers.

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The screening criteria for the controlled waters assessment are dependent on the nature of the key receptor. Secondary A Aquifers underlying Route Section 2A comprise Alluvium (superficial deposits), Kellaways Sand Member (bedrock geology), Cornbrash Formation (bedrock geology) and Forest Marble Formation (bedrock geology). The White Limestone Formation (bedrock geology) underlying Route Section 2A is classified as a Principal Aquifer. It is indicated that there are no licensed groundwater abstractions within 500 m of Route Section 2A and the route is not located within 500 m of a Groundwater SPZ. However, there are 13 No. groundwater wells recorded by the BGS¹² located within 500 m of Route Section 2A with the nearest located within the Route Section 2A redline boundary, near station house to the north of Marsh Gibbon.

Langford Brook crosses the west of Route Section 2A, to the south east of Bicester and discharges to the River Ray located approximately 6.5 km to the south of Route Section 2A. Launton Brook crosses Route Section 2A to the east of Launton and north of Marsh Gibbon and along with the Summerstown Ditch discharges to Cutters Brook which discharges to the River Ray. Three tributaries of Langford Brook intersect with Route Section 2A and Grebe Lake a man-made lake in a disused clay pit located approximately 120 m east of Route Section 2A.

The primary controlled waters receptors are considered to be the Secondary A Aquifers and Principal Aquifer as a groundwater resource. However, the WFD watercourses (Langford Brook and Launton Brook), Summerstown Ditch and Grebe Lake within 500 m of Route Section 2A are also identified to be the key controlled waters receptors.

Soil leachate and groundwater data has therefore been screened against WQS based on both Drinking Water Standards (DWS)³¹ to assess the potential risk posed to the underlying Secondary A and Principal Aquifers and freshwater Environmental Quality Standards (EQS)³² to assess risks to the surface watercourses.

The Environment Agency Water Framework Directive bioavailability tool (M-BAT)³³ has been used to derive Tier 2 site specific WQS values for copper, lead, manganese, nickel and zinc based on the EQS 2015 Tier 1 long term bioavailability freshwater concentrations.

7.3.2 Soil Leachate Results

A total of 9 No. samples were tested for their leachability of contaminants. These samples were taken from 8 No. locations. Three samples were taken from the bedrock in error (these samples are CP2ATFB_2U (0.2m), CP2AMG-D (17m) and CP2AMG-U (2m). The bedrock results will not be discussed further.

Several exceedances of metals and inorganics against WQS were identified in the Trackbed Layers, Subgrade Fill and Alluvium from various locations within Route Section 2A as outlined in Table 7.1 below. A more detailed assessment table of the data including WQS is presented in Appendix E.

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 $^{{\}it 31\ Statutory\ Instruments\ (2016)\ The\ Water\ Supply\ (Water\ Quality\ Regulations)\ No.\ 614.}$

³² DEFRA (2015) Water Framework Directive

³³ Environment Agency (2013) Water Framework Directive bioavailability tool (M-BAT).



Table 7.1 - Summary of Leachate Exceedances

Determinand	Unit	Screening	Value	Min. Value	Max. Value	No. Exce	edances	Location
		EQS	DWS			EQS	DWS	
Sulphate	mg/l	400	250	8.7	1500	1	1	WS2A122_C (1.0 m – Subgrade Fill)
Selenium	mg/l	N/A	0.01	<0.01	0.015	0	1	WS2A122_C (1.0 m – Subgrade Fill)
Iron	mg/l	1	0.2	0.013	2.5	1	2	WS2ALOB_1D, (0.3 m - Alluvium) WS2A113_C (0.3 m, 0.5 m - Trackbed Layers)
Lead	mg/l	0.0012	0.01	<0.005	0.0095	3	0	WS2A102_C, 0.5 m - Trackbed Layers; WS2A104_U, 0.3 m - Subgrade Fill; WS2ALOB_1D, 0.3 m - Alluvium
Copper	mg/l	0.001	2	0.0044	0.034	6	0	WS2A102_C, 0.5 m - Trackbed Layers; WS2A104_U, 0.3 m - Subgrade Fill; WS2A113_C, 0.5 m - Trackbed Layers; WS2A122_C, 1 m - Subgrade Fill; WS2ALOB_1D, 0.3 m - Alluvium; WS2ALOB_1D, 1 m - Alluvium
Nickel	mg/l	0.004	0.02	<0.001	0.0079	1	0	WS2A122_C, 1 m - Subgrade Fill
Zinc	mg/l	0.0109	3	0.0032	0.019	2	0	WS2A122_C, 1 m - Subgrade Fill; WS2ALOB_1D, 1 m - Alluvium



7.3.3 Groundwater Results

A total of 35 No. groundwater samples were collected from 13 No. monitoring boreholes across Route Section 2A between August 2018 and October 2018.

Elevated concentrations of copper are recorded in all groundwater samples, with elevated sulphate, manganese, nickel and zinc recorded in the majority of samples when assessed against the EQS criteria. Elevated concentrations of sulphate, ammonium as NH4, iron and manganese are also recorded above the DWS assessment criteria. In addition to metals and inorganics there are four recorded TPH concentrations and one phenol EQS exceedance recorded across Route Section 2A.

A summary of the exceedances is provided in Table 7.2. A more detailed assessment of the data including WQS is included in Appendix F.

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Table 7.2 - Summary of Groundwater Exceedances

Determinand	Unit	Screenir	ng Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata
		EQS (mg/l)	DWS (mg/l)	_		EQS	DWS			
рН	pH unit	6-9	6.5-9.5	5.6	8.3	5	6	WS2A14D	26/09/2018 06/09/2018 22/10/2018	Weathered Oxford Clay - Peterborough Member
								WS2A106_D	27/09/2018 06/09/2018 22/10/2018	Oxford Clay - Peterborough Member
Sulphate	mg/l	400	250	83	4290	24	26	WS2A12U	22/10/2018	Made Ground, Oxford Clay - Peterborough Member
								WS2A124_U	24/09/2018 23/10/2018	Alluvium, Oxford Clay - Peterborough Member, Kellaways Sand Member Kellaways Clay Member
								WS2ALOB_1D	03/09/2018 24/09/2018 22/10/2018	Alluvium, Oxford Clay Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								CP2ALLCDE	24/09/2018 22/10/2018	Subgrade Fill, Alluvium, Kellaways Sand Member and Oxford Clay - Peterborough Member
								CP2APOOB_1D	03/09/2018 25/09/2018 22/10/2018	Made Ground, Oxford Clay – Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								WS2A14D	06/09/2018 26/09/2018 22/10/2018	Weathered Oxford Clay - Peterborough Member



Determinand	Unit	Screening	g Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata
		EQS (mg/l)	DWS (mg/l)			EQS	DWS			
								WS2A100_U	01/08/2018 04/09/2018 27/09/2018 22/10/2018	Made Ground, Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								WS2A103_U	04/09/2018 27/09/2018 22/10/2018	Subgrade Fill, Weathered Oxford Clay - Peterborough Member
								WS2A106_D	06/09/2018 27/09/2018 22/10/2018	Subgrade Fill, Oxford Clay - Peterborough Member
								WS2A109_U	28/09/2018	Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								CP2AMFOB_2U	01/08/2018	Made Ground, Weathered Oxford Clay - Peterborough Member, Kellaways Sand Member, Kellaways Clay Member, Cornbrash Limestone, Forest Marble Formation
Ammonium	mg/l	No WQS	0.5	0.2	6.8	-	25	WS2ALOB_1D	03/09/2018	White Limestone Formation Alluvium, Oxford Clay
	3.								24/09/2018 22/10/2018	Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								CP2AMFOB_2U	01/08/2018 24/09/2018	Made Ground, weathered Oxford Clay - Peterborough Member, Kellaways Sand Member, Kellaways Clay Member Cornbrash Limestone, Forest

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Determinand	Unit	Screenin	ng Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata
		EQS (mg/l)	DWS (mg/l)			EQS	DWS			
										Marble Formation, White Limestone Formation
								CP2ALLCDE	24/09/2018 22/10/2018	Subgrade Fill, Alluvium, Kellaways Sand Member and Oxford Clay - Peterborough Member
								CP2APOOB_1D	03/09/2018 25/09/2018 22/10/2018	Made Ground, Oxford Clay – Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								WS2A14D	06/09/2018 26/09/2018 22/10/2018	Weathered Oxford Clay - Peterborough Member
								WS2A100_U	01/08/2018 04/09/2018 27/09/2018 22/10/2018	Made Ground, Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								WS2A103_U	04/09/2018 27/09/2018 22/10/2018	Subgrade Fill, Weathered Oxford Clay - Peterborough Member
								WS2A106_D	06/09/2018 27/09/2018 22/10/2018	Subgrade Fill, Oxford Clay - Peterborough Member
								WS2A109_U	28/09/2018	Glacial Deposits Cohesive, Oxford Clay - Peterborough Member



Determinand	Unit	Screening	g Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata
		EQS (mg/l)	DWS (mg/l)			EQS	DWS			
								WS2A12U	22/10/2018	Made Ground, Oxford Clay - Peterborough Member
Cadmium	mg/l	0.00008	0.005	<0.00002	0.05	1	1	CP2APOOB_1D	22/10/2018	Made Ground, Oxford Clay - Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
Iron (dissolved)	mg/l	1	0.2	<0.004	430	7	15	WS2A14D	06/09/2018 26/09/2018 22/10/2018	Weathered Oxford Clay - Peterborough Member
								WS2A103_U	27/09/2018 22/10/2018	Subgrade Fill, Weathered Oxford Clay - Peterborough Member
								WS2A106_D	06/09/2018 27/09/2018 22/10/2018	Subgrade Fill, Oxford Clay - Peterborough Member
								WS2A109_U	28/09/2018	Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								WS2A100_U	01/08/2018 22/10/2018	Made Ground, Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								WS2A121_U	03/09/2018	Alluvium, Kellaways Sand Member
								WS2A12U	22/10/2018	Made Ground, Oxford Clay - Peterborough Member
								CP2ALLCDE	22/10/2018	Subgrade Fill, Alluvium, Kellaways Sand Member and Oxford Clay - Peterborough Member



Determinand	Unit	Screenir	ng Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata
		EQS (mg/l)	DWS (mg/l)			EQS	DWS			
								WS2A124_U	23/10/2018	Alluvium, Oxford Clay - Peterborough Member, Kellaways Sand Member Kellaways Clay Member
Manganese (dissolved)	mg/l	0.123	0.05	0.0046	3.6	31	31	WS2A121_U	03/09/2018 24/09/2018 23/10/2018	Alluvium, Kellaways Sand Member
								WS2A123_D	03/09/2018 24/09/2018 23/10/2018	Made Ground, Alluvium, Kellaways Sand Member, Kellaways Clay Member
								WS2A124_U	24/09/2018 23/10/2018	Alluvium, Oxford Clay - Peterborough Member, Kellaways Sand Member Kellaways Clay Member
								WS2ALOB_1D	03/09/2018 24/09/2018 22/10/2018	Alluvium, Oxford Clay Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								CP2ALLCDE	24/09/2018 22/10/2018	Subgrade Fill, Alluvium, Kellaways Sand Member and Oxford Clay - Peterborough Member
								CP2APOOB_1D	03/09/2018 25/09/2018 22/10/2018	Made Ground, Oxford Clay – Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								WS2A14D	06/09/2018 26/09/2018 22/10/2018	Weathered Oxford Clay - Peterborough Member



Determinand	Unit	Screenin	ng Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata
		EQS (mg/l)	DWS (mg/l)			EQS	DWS			
								WS2A100_U	01/08/2018 04/09/2018 27/09/2018 22/10/2018	Made Ground, Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								WS2A103_U	04/09/2018 27/09/2018 22/10/2018	Subgrade Fill, Weathered Oxford Clay - Peterborough Member
								WS2A106_D	06/09/2018 27/09/2018 22/10/2018	Subgrade Fill, Oxford Clay - Peterborough Member
								WS2A109_U	28/09/2018	Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								WS2A12U	22/10/2018	Made Ground, Weathered Oxford Clay - Peterborough Member
Nickel (dissolved)	mg/l	0.004	0.02	0.0013	0.35	25	10	CP2APOOB_1D	25/09/2018 03/09/2018 22/10/2018	Made Ground, Oxford Clay – Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								WS2A14D	06/09/2018 26/09/2018 22/10/2018	Weathered Oxford Clay - Peterborough Member
								WS2A100_U	01/08/2018 04/09/2018 27/09/2018 22/10/2018	Made Ground, Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								WS2A106_D	06/09/2018	Subgrade Fill, Oxford Clay - Peterborough Member



Determinand	Unit	Screening	g Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata
		EQS (mg/l)	DWS (mg/l)			EQS	DWS			
									27/09/2018 22/10/2018	
								WS2A121_U	24/09/2018 03/09/2018	Alluvium, Kellaways Sand Member
								WS2A123_D	24/09/2018 03/09/2018	Made Ground, Alluvium, Kellaways Sand Member, Kellaways Clay Member
								WS2A124_U	2409/2018 23/10/2018	Alluvium, Oxford Clay - Peterborough Member, Kellaways Sand Member Kellaways Clay Member
								WS2A103_U	27/09/2018 04/09/2018 22/10/2018	Subgrade Fill, Weathered Oxford Clay - Peterborough member
								WS2ALOB_1D	03/09/2018	Alluvium, Oxford Clay Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								WS2A109_U	28/09/2018	Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								WS2A12U	22/10/2018	Made Ground, Weathered Oxford Clay - Peterborough member
Selenium (dissolved)	mg/l	No WSV	0.01	<0.0006	0.016	0	2	WS2A103_U	27/09/2018	Subgrade Fill, Weathered Oxford Clay - Peterborough Member
								WS2A106_D	27/09/2018	Subgrade Fill, Oxford Clay - Peterborough Member



Determinand	Unit	Screenin	g Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata
		EQS (mg/l)	DWS (mg/l)			EQS	DWS			
Chromium (dissolved)	mg/l	0.0034	0.05	<0.0002	0.033	3	0	WS2A106_D	06/09/2018 27/09/2018 22/10/2018	Oxford Clay - Peterborough Member
Copper (dissolved)	mg/l	0.001	2	<0.0005	0.032	27	0	WS2A121_U	24/09/2018 03/09/2018	Alluvium, Kellaways Sand Member
								WS2A123_D	24/09/2018 03/09/2018 23/10/2018	Made Ground, Alluvium, Kellaways Sand Member, Kellaways Clay Member
								WS2A124_U	24/09/2018;	Alluvium, Oxford Clay - Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								WS2ALOB_1D	24/09/2018 03/09/2018	Alluvium, Oxford Clay Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								CP2AMFOB_2U	24/09/2018 03/09/2018 23/10/2018	Made Ground, Weathered Oxford Clay - Peterborough member, Kellaways Sand Member, Kellaways Clay Member Cornbrash Limestone, Forest Marble Formation, White Limestone Formation
								CP2ALLCDE	24/09/2018 22/10/2018	Subgrade Fill, Alluvium, Kellaways Sand Member and Oxford Clay - Peterborough Member
								CP2APOOB_1D	25/09/2018	Made Ground Oxford Clay - Peterborough member



Determinand	Unit	Screenin	ig Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata
		EQS (mg/l)	DWS (mg/l)			EQS	DWS			
									03/09/2018 22/10/2018	Kellaways Sand Member, Kellaways Clay Member
								WS2A14D	26/09/2018 06/09/2018	Weathered Oxford Clay - Peterborough Member
								WS2A100_U	27/09/2018 01/08/2018 04/09/2018	Made Ground, Glacial Deposits Cohesive, Oxford Clay - Peterborough Member
								WS2A103_U	27/09/2018 04/09/2018	Subgrade Fill, Weathered Oxford Clay - Peterborough member
								WS2A106_D	27/09/2018 22/10/2018	Oxford Clay - Peterborough Member
								WS2A109_U	28/09/2018	Glacial Deposits Cohesive, Oxford Clay - Peterborough member
								WS2A12U	22/10/2018	Made Ground, Weathered Oxford Clay - Peterborough member
Lead (Dissolved)	mg/l	0.0012	0.01	<0.0002	0.01	4	1	WS2A106_D	06/09/2018 27/09/2018 22/10/2018	Oxford Clay - Peterborough Member
								WS2A14D	06/09/2018	Weathered Oxford Clay - Peterborough Member
Zinc (dissolved)	mg/l	0.0109	3.0	<0.0005	0.16	14	0	WS2A14D	26/09/2018 06/09/2018 22/10/2018	Weathered Oxford Clay - Peterborough Member
								WS2A106_D	06/09/2018 27/09/2018 22/10/2018	Subgrade Fill, Oxford Clay - Peterborough Member



Determinand	Unit	Screening Value	Min. Value	Max. Value	No. of Excee	DWS dances	Locations of Exceedances	Monitoring Round	Strata	
		EQS (mg/l)	DWS (mg/l)			EQS	DWS			
								WS2A121_U	24/09/2018	Alluvium, Kellaways Sand Member
								WS2A123_D	24/09/2018	Made Ground, Alluvium, Kellaways Sand Member, Kellaways Clay Member
								WS2A124_D	24/09/2018	Alluvium, Oxford Clay - Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								CP2ALLCDE	24/09/2018	Subgrade Fill, Alluvium, Kellaways Sand Member and Oxford Clay - Peterborough Member
								CP2APOOB_1D	25/09/2018 03/09/2016	Made Ground, Oxford Clay – Peterborough Member, Kellaways Sand Member, Kellaways Clay Member
								WS2A109_U	28/09/2018	Glacial Deposits Cohesive, Oxford Clay - Peterborough member
								WS2A12U	22/10/2018	Made Ground, Weathered Oxford Clay - Peterborough member
Phenol	mg/l	0.0077	0.05	<0.00005	0.047	1	0	WS2A106_D	27/09/2018	Subgrade Fill, Oxford Clay - Peterborough Member



7.3.4 Leachate Exceedances

Five locations show leachate exceedances. The leachate exceedances appear to occur in discrete areas only copper exceeds the EQS at all leachate sample locations.

Samples WS2A122_C (1.0 m) and WS2ALOB_1D (0.3 m) record the largest number of exceedances with copper, nickel, zinc and sulphate exceeding the EQS at WS2A122_C while sulphate and selenium exceed the DWS. Copper, zinc, iron and lead exceed the EQS at WS2ALOB_1D, with iron also exceeding the DWS.

The sample from WS2A122_C is taken from subgrade fill located to the west of the track junction with Station road, Launton. This is also west of the former Launton Station and immediately south of a small surface water feature. This is the only exceedance of sulphate and selenium in leachate samples and there is no identified source for these substances. WS2ALOB_1D is taken from natural material (Alluvium) adjacent to Station road north of the former Launton Station junction.

Iron and copper also exceed the EQS at WS2A113_C located to the east of Bicester Road, while lead and copper exceed the EQS at WS2A102_C (in the eastern part of Route Section 2A) and WS2A104_U (taken from subgrade fill at rail embankments west of Station road, Marsh Gibbon).

The m-BAT tool was used to calculate the bioavailability for the metal exceedances of copper, zinc, manganese, nickel and lead for the leachate samples. The calculated bioavailability results show that all calculated bioavailability concentrations of copper, zinc, manganese and nickel are significantly below the EQS. Only one exceedance of lead recorded at WS2ALOB_1D still exceeded the EQS.

Considering the following lines of evidence, it is unlikely that exceedances of contaminants identified in soil leachate would represent a significant risk to identified controlled waters receptors:

Laboratory leachate testing is generally more aggressive than in-situ conditions and may not be representative of actual leaching conditions, potentially overestimating the concentrations;

All calculated bioavailability concentrations for the copper, zinc, nickel and manganese exceedances were within the EQS limit;

No licensed groundwater abstractions are present with 500 m of the route and the site is outside of a Gourndwater SPZ; and

The elevated concentrations of sulphate and iron, recorded in the soil-leachate samples are likely to be due to influences from the underlying geology and representative of background concentrations in the wider area.

7.3.5 Groundwater Exceedances

The 35 No. groundwater samples have been taken from 13 No, locations spread across Route Section 2A from the east of Bicester Road at approximate chainage 108400 (CP2AMFOB_2U) to the west of Main Street (connecting Marsh Gibbon with Twyford) and at approximate chainage 101400 (WS2A100_U). The samples were taken over four separate monitoring rounds from August to October 2018.

The data shows that copper exceeds the EQS at all monitored locations. Manganese exceeds both the EQS and DWS at all locations with the exception of CP2AMFOB_2U. Ammonium as NH4 exceeds the DWS at all monitored locations with the exception of WS2A121_U and WS2A123_D and WS2A124_U (which are located to the west of station road between chainages 107400 and 107600). Nickel and zinc also exceed the EQS at numerous locations across Route Section 2A.

The m-BAT tool was used to calculate the bioavailability of the metal exceedances of copper, zinc, manganese and nickel for the groundwater samples. The calculated bioavailability results show that only one copper concentration still exceeded the EQS at WS2A106_D (September 2018). The results for manganese show that at six locations (WS2A121_U, WS2A123_D, WS2ALOB_1D, WS2A109_U, WS2A12U, CP2ALLCDE) the bioavailable manganese concentration exceeded the EQS on all monitored occasions. Bioavailable zinc exceeds the EQS at three locations, WS2A106_D, WS2A14D and WS2A12U on all monitored occasions. Bioavailable nickel exceeds the EQS at WS2A106_D on all monitored occasions, with two exceedances at WS2A100_U and one exceedance at WS2A14D.

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The Environment Agency Water Framework Directive Lead Screening Tool was used to assess the four recorded EQS exceedances of lead recorded at WS2A106_D and WS2A14D. The calculation showed that the available lead concentrations do not exceed the EQS.

Sulphate exceeds both the EQS and the DWS at the majority of monitored locations with the exception of CP2AMFOB_2U, WS2A121_U and WS2A123_D (all located in the western part of Route Section 2A between Bicester Road and Station Road). While iron exceedance is frequently associated with sulphate, the two September monitoring rounds only showed three EQS iron exceedances with seven exceedances of DWS. The October monitoring round shows additional iron exceedances with the exceedances spread across the Route Section 2A; however, the reason for this increase is unclear.

The elevated concentrations of iron are generally identified within groundwater samples collected from exploratory hole locations with monitoring well response zones installed within the Oxford Clay Formation and Cohesive Glacial Deposits (unproductive strata). The Oxford Clay Formation and cohesive Glacial Deposits are low permeability strata and therefore will significantly reduce the lateral migration of contaminants to surface water receptors.

There is one recorded exceedance of phenol across Route Section 2A at WS2A106_D (0.047 mg/l on 27/09/18). This location recorded the highest number of metal exceedances in the same monitoring round with many metals exceedances above the calculated bioavailable EQS. This is also the only location for the two recorded chromium exceedances. It is located immediately west of Station Road, Marsh Gibbon. Adjacent to the east of this road is the site of a former coal yard, which may be the source of the metal exceedances. Although the exceedances may have an agricultural source, as prior to the use as a coal yard, this area was the location of a cattle pen.

There are two locations where TPH has been identified above MDL in groundwater across Route Section 2A. There are no suitable generic assessment criteria for TPH. Location WS2A100_U at the eastern end of the Section 2A (west of main street) at chainage 101400. This location is to the south of the Portway Farm and CP2APOOB_1D situated between Bicester Road and Station road at a section of rail embankment to the south of the former Rhonhill Barn approximate chainage 105250. The TPH concentrations are only recorded during one groundwater monitoring round at each location, no visual or olfactory evidence of hydrocarbons were recorded during the borehole installations or groundwater monitoring rounds. There are no obvious sources of TPH at these locations.

In addition to TPHs, groundwater monitoring location CP2APOOB_1D also recorded the only exceedance of cadmium in Route Section 2A. The environmental quality standard for cadmium is dependent on the water hardness. The EQS is categorised based on the calcium carbonate in the sample. While there is no measure of calcium carbonate in the sample results, the EQS value ranges from 0.08 μ g/l to 0.25 μ g/l. The recorded concentration of 5 mg/l on 22/10/18 exceeds the highest EQS value. Cadmium can be present in agricultural products, given this is the only recorded exceedance and the only location, the exceedance may stem from a localised agricultural source.

7.3.6 Discussion

Of the two locations recording TPH, phenol and cadmium concentrations, location CP2APOOB_1D comprises a thin band of Topsoil overlying Made Ground comprising very stiff, sandy gravelly clay to a depth of 2.70 m bgl below which is the Oxford Clay Peterborough Member. Location WS2A100_U comprises 0.3 m of Made Ground comprising silt and stiff clay to a depth of 0.30 m bgl below which glacial cohesive deposits of stiff to very stiff clay extending to a depth of 5.0 m bgl, underlying which is stiff to very stiff clay of the Oxford Clay Peterborough Member. The impermeable nature of the Glacial and Oxford clay geological strata at these locations is likely to result in limited hydraulic continuity between groundwater and any surface watercourse. The Oxford Clay Formation is classified as Unproductive Strata will act as a barrier to both the horizontal and vertical flow of contaminants leaching from soil and in shallow groundwater. Given the distance between both of these locations and the Summerstown Ditch and Launton/Cutters Brook, it is highly unlikely that the contaminants at these locations represent a significant risk to controlled waters.

Given the geographically widespread and ubiquitous nature of the ammonium as NH4, sulphate, copper, manganese, nickel and zinc exceedances and the absence of potential sources of these contaminants, they are more likely representative of naturally occurring metals within the Oxford Clay and therefore reflective of the wider background chemistry.

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The geological maps show a lack of superficial deposits in the area. The majority of the bedrock geology in Route Section 2A comprises Unproductive Strata. The Secondary A Aquifers are the Kellaways Sand Member and the Cornbrash Formation. The geological maps show the Kellaways Sand Member and Cornbrash Formation are located close to the surface in the west of Section 2A, however these units dip to the east and from Launton to the eastern boundary of Section 2A they occur at depth, overlain by impermeable strata of the Oxford Clay Formation. Shallow groundwater is unlikely to be in hydraulic continuity with groundwater in the principal aquifer of the White Limestone Formation due to the presence of impermeable clay layers that will act as barriers to vertical flow migration.

The Kellaways Sand Member is confined by both low permeable reworked Made Ground and by the Oxford Clay Formation. It is overlain by Made Ground in the Bicester area and directly overlain by the Oxford Clay Formation for most of Route Section 2A from Launton to the eastern section 2A boundary. This overlying clay forms a physical barrier, separating the Kellaways sand from any superficial deposits.

Directly underlying the Kellaways Sand is the Kellaways Clay Member, this serves as a physical impermeable barrier between the Kellaways Sand Secondary Aquifer and the Cornbrash Secondary Aquifer. The Cornbrash is itself separated from the Principal Aquifer at depth by the Forest Marble Formation. The aquifers are unlikely to be in hydraulic continuity with each other. Therefore, the potential for contaminants identified in shallow groundwater to migrate into the Secondary A Aquifer or to the Principal Aquifer at depth is considered to be low.

Two exploratory holes were extended to the Principal Aquifer (the White Limestone Formation). The groundwater encountered at these boreholes is artesian. The White Limestone is confined at depth by the overlying Forest Marble Formation. The Forest Marble is separated from the extensive Oxford Clay Formation by the Cornbrash Formation which is a Secondary A Aquifer. The lack of groundwater encountered in the Cornbrash Formation in some exploratory hole locations suggests this may not be a laterally hydraulically continuous aquifer. The Cornbrash Formation is a fractured limestone, geological logs state that the fractures have been infilled with clay at some locations, this may locally disrupt groundwater flow in the Cornbrash. Additionally, a couple of exploratory holes encounter the White Limestone Formation but do not contain artesian water. The yields from the Limestone Formation Aquifer may be variable and depend on whether a borehole intersects an interconnected system of water-filled openings/fractures. The artesian boreholes do not have groundwater monitoring installations, nor have they been sampled. However, due to the confined nature of this aquifer at depth, it is highly unlikely a viable pathway exists from the soils/leachate or groundwater to this aquifer, therefore there is no significant risk to this Principal Aquifer from the contaminant exceedances encountered in the groundwater samples.

7.3.7 Surface Water

A total of nine surface water samples were collected from three surface watercourse locations including the Langford Brook, the Summerstown Ditch and Launton and Cutters Brook and an unnamed drain/watercourse to the Summerstown Ditch, Launton and Cutters Brook located within Route Section 2A between August and October 2018. Surface water exceedances are outlined in Table 7.3. A more detailed assessment of the data is included in Appendix G.

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Table 7.3 - Summary of Surface Water Exceedances

Determinand	Unit	Screening Value EQS (mg/l)	Min. Value	Max. Value	No. of EQS Exceedances	Locations of Exceedances	Monitoring Round	geology
Manganese	mg/l	0.33249	0.00079	0.36	6	2ASW3(S)	17/08/2018 28/08/2018 24/09/2018	Unnamed drain/ watercourse to the Summerstown Ditch and Launton and Cutters Brook
						2ASW4(S)	28/08/208 15/08/2018 08/10/2018	Summerstown Ditch and Launton and Cutters Brook
Iron	mg/l	/I 1.0	<0.004	1.5	2	2ASW3(S)	24/09/2018	Unnamed drain /watercourse to the Summerstown Ditch and Launton and Cutters Brook
						2ASW4(S)	28/08/2018	Summerstown Ditch and Launton and Cutters Brook
Copper (dissolved)	mg/l	ng/l 0.001	<0.0005	0.0041	6	2ASW1(E)	25/09/2018 28/08/2018 15/08/2018	Langford Brook
						2ASW3(S)	28/08/2018 24/09/2018	Unnamed drain/ watercourse to the Summerstown Ditch and Launton and Cutters Brook
						2ASW4(S)	08/10/2018	Summerstown Ditch and Launton and Cutters Brook
Nickel (dissolved)	mg/l	0.004	<0.0005	0.0069	2	2ASW3(S)	28/08/2018 24/09/2018	Unnamed drain / watercourse to the Summerstown Ditch and Launton and Cutters Brook
Zinc (dissolved)	mg/l	0.0109	0.0035	0.031	1	2ASW1(E)	15/08/2018	Langford Brook



Elevated concentrations of manganese were identified within all surface water samples collected from the Summerstown Ditch, Launton and Cutters Brook (2ASW4(S)) and the unnamed drain/watercourse to the Summerstown Ditch, Launton and Cutters Brook (2ASW3(S)). This is consistent with the groundwater data which showed elevated concentrations of manganese at all monitoring locations with the exception of CP2AMFOB_2U (the most westerly groundwater monitored location, closest to the Langford Brook which also records no manganese exceedance). There were no recorded WQS exceedances of manganese in the leachate samples. Where there are exceedances of manganese they are within the same order of magnitude as the WQS and are therefore considered to be marginal.

Elevated concentrations of copper occur at all three monitoring locations. The samples from the Langford Brook exceeded the EQS for copper on every monitored occasion. Additionally, there was an exceedance of copper within the Summerstown Ditch, Launton and Cutters Brook (2ASW4(S)) and two exceedances in the unnamed drain/watercourse to the Summerstown Ditch, Launton and Cutters Brook (2ASW3(S)). A soil leachate sample taken upstream of (2ASW4(S)) at WS2ALOB_1D shows the copper to exceed the EQS. All leachate samples recorded EQS exceedances of copper as did all groundwater monitoring locations.

Given the ubiquitous nature of manganese and copper exceedances in surface water across Route Section 2A and the lack of any obvious sources, it would suggest that manganese and copper concentration is likely to be due to influences from the underlying geology and representative of background concentrations in the wider area.

Monitoring location 2ASW3(S) also recorded two EQS exceedances of nickel. The groundwater monitoring locations in the vicinity WS2A121_U and WS2A123_D both also record EQS exceedances on more than one occasion. The only leachate sample in this area does not record a nickel exceedance, given the wide geographical spread of nickel exceedances in the groundwater in the region, it is likely to be representative of background concentrations.

The Summerstown Ditch, Launton and Cutters Brook (2ASW4(S)) and the unnamed drain/watercourse to this brook (2ASW3(S)) each record one marginal EQS iron exceedance. The groundwater sample upgradient of these surface water locations (WS2ALOB_1D) does not record a WQS exceedance of iron. Therefore, it is unlikely that groundwater is the source of this iron exceedance and that a pathway exists from the groundwater to the surface waters in this area.

There are no exceedances of sulphate or ammonium as NH4 (which widely exceeds WQS in the groundwater samples). There are also no PAH, TPH, VOC or SVOC exceedances in the surface water samples.

The m-BAT tool was used to calculate the bioavailability for all metal exceedances of copper, zinc, manganese and nickel in the surface water samples. The calculated bioavailability results show that for copper, nickel and manganese, all calculated bioavailability concentrations are below the EQS. One zinc exceedance that occurred in the Langford Brook (2ASW1(E)) still exceeded the EQS.

Route Section 2A contains very limited coverage of superficial deposits, with the superficial geology confined to very narrow alluvial channels associated with small watercourses. At many locations Made Ground/subgrade fill and/or cohesive glacial clay deposits directly overly the Oxford Clay. Groundwater was not encountered in many of the shallower boreholes during drilling. Given the nature of the Oxford Clay as lower permeability strata (classified as hydraulically unproductive), and the glacial cohesive deposits frequently comprising stiff to very stiff clays, suitable viable pathways from groundwater to the nearest surface water receptor are extremely limited.

The Summerstown Ditch, Launton and Cutters Brook was classified by the Environment Agency as having an overall water body classification of 'bad' in 2016. Therefore, considering the above lines of evidence, it is unlikely that exceedances of contaminants identified in surface water samples would represent a significant risk to identified controlled waters receptors.

7.4 Ground Gas Assessment

The preliminary ground gas risk assessment has been undertaken in general accordance with BS 8485:2015³⁴ code of practice for design of protective measures for methane and carbon dioxide ground gases for buildings, which provides a semi-quantitative assessment methodology for assessing the risk of permanent ground gas generation to buildings.

34 BS 8485:2015 +A1: 2019 - Code of Practise for the design of protective measures for methane and carbon dioxide ground gases for new buildings.

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BS8485:2015 states that hazardous gas flow rates (Qhg) should be calculated for methane and carbon dioxide for every borehole for each visit and suggests the Qhgs be presented alongside the gas monitoring results in a database. Qhg is calculated using the maximum gas concentration recorded (unless lower values can be justified) and the steady state flow rate using the formula:

Qhg (I/hr) = flow rate (I/hr) x [gas concentration (%) / 100]

The Gas Screening Value (GSV) is the flow rate of a specific hazardous gas considered to be representative of a site, following assessment of all borehole concentrations and gas flow rates, whilst taking account of other influencing factors. Such factors being, for example, whether a response zone was completed flooded (which can compromise gas data), the temporal/spatial nature of the data set and the acute one-off nature of the risk.

BS8485:2015 indicates that a decision must be made to determine whether the maximum Qhg in the dataset is appropriate to represent the site (and thereby be selected as the GSV), or whether maximum gas concentrations and maximum steady state flow rates should be combined from any borehole/visit to derive a "worst case GSV".

The GSV considered representative for the site is then used to select a Characteristic Situation (CS), which is the ground gas regime assumed for design of gas protection measures for new buildings in accordance with BS8485:2015. The GSVs and CS are presented in Table 7.4

Adopting a GSV based on peak flow measurements (i.e. those measured initially after the gas tap is opened) might result in a disproportionately high gas hazard prediction and assignment of an over-precautionary GSV and Characteristic Situation (CS), leading to overly conservative gas protection measures being incorporated into the development.

BS8485:2015 does not include an approach for assessing carbon monoxide or hydrogen sulphide. The relevant Workplace Exposure Limits (WELs) as outlined within the HSE EH40/2015 (2011) document (Health and safety executive, 2011) have been adopted for use in a preliminary assessment of carbon monoxide and hydrogen sulphide. The WELs used for carbon monoxide and hydrogen sulphide have been provided below:

- Carbon monoxide: 30 parts per million (ppm) for long-term (eight hours) exposure limit and 200 ppm for short-term (15 minutes) exposure limit.
- Hydrogen sulphide: 5 ppm for the long-term exposure limit and 10 ppm for the short-term exposure limit

Table 7.4 - Site Characteristic GSV and Associated Characteristic Situation (CS)

cs	Risk Classification	GSV (I/hr)	Additional Factors
1	Very Low Risk	<0.07	Typical methane <1 % and/or carbon dioxide <5 %. Otherwise consider increase to characteristic Situation 2.
2	Low Risk	<0.7	Borehole air flow rate not to exceed 70 l/hr. Otherwise consider increase to Characteristic Situation 3
3	Moderate Risk	<3.5	-
4	Moderate to High Risk	<15	Quantitative risk assessment required to evaluate scope of protective measure
5	High Risk	<70	-
6	Very High Risk	>70	-

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7.4.1 Carbon dioxide and Methane Results

The Q_{hg} of each monitoring well has been calculated and a summary of the maximum gas concentrations and steady state flow rates for each monitoring location is presented in Table 7.5.

Table 7.5: Ground Gas Assessment

Location	Strata	Max. Peak Recorded conc. (% v/v)		Max. Steady State	Qhg (l/hr) calculated for each well*#		Gas Screening Value (I/hr)	Response Zone Flooded?
		Carbon Dioxide	Methane	Flow Rate (I/hr)	Carbon Dioxide	Methane		
CP2ALLC DE	Alluvium and Oxford Clay - Peterborough Member	14.5	0.1	0.2	0.029	0.0002	<0.07 (CS2)	Yes
CP2AMFO B_2U	Oxford Clay - Peterborough Member, Kellaways Clay Member, Cornbrash Limestone, Forest Marble Formation	1.4	19.3	0.3	0.0042	0.0579	<0.7 (CS2)	Yes
CP2APOO B_1D	Oxford Clay - Peterborough Member, Kellaways Sand Member	5.8	0.1	0.5	0.029	0.0005	<0.7 (CS2)	Yes
WS2A100 _U	Glacial Deposits Cohesive, Oxford Clay - Peterborough Member	2.5	0.4	0.3	0.0075	0.0012	<0.07 (CS1)	Yes
WS2A103 _U	Subgrade Fill, Oxford Clay - Peterborough Member	1.7	0.1	0.3	0.0051	0.0003	<0.07 (CS1)	Yes
WS2A106 _D	Oxford Clay - Peterborough Member	0.7	0.1	0.2	0.0014	0.0002	<0.07 (CS1)	Yes
WS2A121 _U	Alluvium, Kellaways Sand Member	2.1	0.1	0.3	0.0063	0.0003	<0.07 (CS1)	Yes
WS2A123 _D	Kellaways Clay Member	5.8	0.1	0.4	0.0232	0.0004	<0.7 (CS2)	Yes
WS2A124 _U	Kellaways Clay Member	3.6	0.1	0.4	0.0144	0.0004	<0.07 (CS1)	Yes
WS2A12U	Oxford Clay - Peterborough Member	0.9	0.1	0.1	0.0009	0.0001	<0.07 (CS1)	Yes
WS2A14D	Oxford Clay - Peterborough Member	0.5	0.1	0.6	0.003	0.0006	<0.07 (CS1)	Yes
WS2A16U	Oxford Clay - Peterborough Member	7.2	0.1	0.3	0.0216	0.0003	<0.7 (CS2)	Dry

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Location	Strata	Max. Peak Recorded conc. (% v/v)		Max. Steady State Flow	Qhg (I/hr) calculated for each well*#		Gas Screening Value (I/hr)	Response Zone Flooded?
		Carbon Dioxide	Methane	Rate (I/hr)	Carbon Dioxide	Methane		
WS2AFCG F15U	Oxford Clay - Peterborough Member, Kellaways Sand Member	1.3	0.1	0.5	0.0065	0.0005	<0.07 (CS1)	Yes
WS2ALOB _1D	Alluvium, Oxford Clay - Peterborough Member, Kellaways Clay Member, Kellaways Sand Member	0.3	0.1	0.3	0.0009	0.0003	<0.07 (CS1)	Yes

^{*}Maximum gas concentrations combined with maximum steady state flow recorded on any site visit

*Note: where gas concentrations have been recorded as <0.1 % v/v, a value of 0.1 % has been used in calculation of the Q_{hg} and where the maximum steady state flow rate is negative, the value has been converted to a positive flow rate.

The potential sources of ground gas along Route Section 2A are considered to be the landfills around Calvert approximately 120 m to 700 m to the south east of the redline boundary, the anthropogenic materials (Made Ground / Fill material) which are present with variable thicknesses (as listed in Table 6.1) from ground level up to 5.40 m bgl and localised areas of Alluvium associated with watercourses around Station Road in Launton which was recorded between the depths of 0.15 m and 6.0 m bgl (with a thickness of 0.10 - 1.60 m).

The response zones of the monitoring wells were flooded during the gas monitoring rounds, with the exception of WS2A16U which was dry on all monitoring occasions. It is noted that gas data collected from flooded response zones may not be representative of the site gas regime (e.g. methane could be dissociating from groundwater into the artificially created void of the well). In addition, it is noted that gas monitoring installations did not target the Made Ground. However, installations were located within the Alluvium and within the vicinity of the landfills.

Atmospheric pressures were found to be between 1009 mb and 1037 mb during the monitoring rounds, with pressures found to be falling on four visits (3 September 2018, 6 September 2018, 26 September 2018 and 27 September 2018). Steady state flow rates within all of the installations ranged between <0.2 l/hr and 0.5 l/hr, with slightly negative flow rates recorded occasionally. The highest negative flow rate was in WS2A16U installed within the Oxford Clay where a maximum steady state flow of -0.2 l/hr recorded. This negative flow was associated with falling atmospheric pressures. The highest positive flow rate of 0.6 l/hr was recorded in WS2A14D installed within the Oxford Clay Peterborough Member. This flow rate was recorded over a period of falling atmospheric pressure.

Recorded methane concentrations were generally less than 1% v/v, apart from CP2AMFOB_2U installed within the Oxford Clay, Kellaways Clay, Cornbrash Limestone, Forest Marble Formation, where methane was recorded at 19.3% v/v in the August 2018 monitoring round. During two subsequent gas monitoring rounds undertaken in September 2018 concentrations of methane were recorded at <0.1% v/v. CP2AMFOB_2U is located approximately 130 m west of Compound A1. It is noted that gas flow was recorded in this location (0.3 l/hr) and given the response zone in the Cornbrash and Marble Forest Formations, this may be due to changes in groundwater levels. Atmospheric pressures remained high, falling on the second monitoring round and rising on the final monitoring round. There are no obvious sources of methane (including no landfills) in the vicinity of this location either historical or current and it is therefore considered that the result is either the result of operator error when the monitoring was undertaken or potentially due to shale units within the Kimmeridge Clay in the vicinity of this borehole.

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Elevated concentrations of carbon dioxide greater than 5 % v/v were identified were identified within four monitoring wells CP2ALLCDE (80 m west of Compound A2), CP2APOOB_1D (244 m north west of Compound A2), WS2A123_D (242 m north west of Compound A2) and WS2A16U (357 m north east of Compound A2) installed within the Alluvium, Oxford Clay, Kellaways Sand and the Kellaways Clay. A maximum carbon dioxide concentration of 14.5% v/v was recorded within CP2ALLCDE. These elevated concentrations are considered to be naturally derived. In addition, none of these locations are located near (>500 m) to the historical landfills around Calvert or screened over Made Ground strata.

It is noted that low flow rates were recorded in the five monitoring wells where elevated concentrations of methane and carbon dioxide were identified on all monitoring rounds, with a maximum flow of 0.5 l/hr. Carbon dioxide concentrations were also recorded at concentrations below 5% v/v on subsequent monitoring rounds excluding WS2A16U.

In locations were elevated concentrations of methane and carbon dioxide were recorded no new permanent enclosed structures are proposed to be constructed within these areas as part of the works. The temporary site accommodation within Compounds A1 and A2 will be modular portacabins and/or shipping container type units raised with a ventilated void beneath and these structures have therefore been excluded as 'built environment' receptors.

Based on the results, the Characteristic Situation for Route Section 2A has been assessed as CS2 (low risk), which would require gas protection measures in accordance with BS8485:2015³⁴ to be incorporated within buildings / structures. It is noted that this is based on the results recorded to date and that gas monitoring is ongoing at the time of writing this report (November 2018). However, as there are no enclosed spaces it is unlikely that gas protection measures will be required to be installed.

7.4.2 Carbon Monoxide and Hydrogen Sulphide

Concentrations of carbon monoxide and hydrogen sulphide were recorded below the instrument's limit of detection in the majority of monitoring locations.

The maximum concentration of hydrogen sulphide was recorded at 2 ppm which does not exceed the short or long-term exposure limits for hydrogen sulphide. The maximum concentration of carbon monoxide was recorded at 5 ppm in CP2AMFOB_2U installed within the Oxford Clay, Kellaways Clay Member, Cornbrash Limestone, Forest Marble Formation which does not exceed the short or long term-exposure limits for carbon monoxide.

7.5 Structures and Embankments

Parts of the Route Section 2A are to be regraded and in some areas, earthworks will have a wider profile than the existing degraded and over-steep earthworks. As a result, several existing structures, including bridges and culverts, will require modification.

Piled foundations up to c. 20 m bgl are proposed for several of the structures along Route Section 2A including the level crossings at Charbridge Lane (and retaining wall), Manor Farm, Station Road (Launton) and the overbridge at Marsh Gibbon Farm. In addition, mini piled foundations (up to c.15-20 m bgl) are also to be used. The groundwater is important when considering structures where piled foundations are to be used, especially in Route Section 2A where artesian water has been identified and a qualitative and potentially quantitative foundation / piling risk assessment may be required to be produced for the proposed works.

A geotechnical assessment is outside of the scope of this report and aggressive ground conditions and the potential implications to buried structures will need to be considered separately as part of the geotechnical investigation report.

7.6 Earthworks and Material Re-use

The existing earthworks and trackbed are to be engineered in order to achieve a new profile. This will comprise widening embankments and cuttings, reengineering slopes, raising track levels in some areas and reducing track levels in other areas, and locally using retaining structures.

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Material can be re-used on-site if, among other criteria, it can be demonstrated that it does not pose a potential risk to human health or the environment. Based on the sampling and laboratory testing undertaken, there are not considered to be a significant risk to human health or controlled waters from contaminants detected in soils from the site. Whilst no asbestos has been recorded in Route Section 2A to date, the potential for asbestos to be present is still a significant risk and additional testing and assessment is required prior to reusing these materials.

Appropriate and representative geotechnical and environmental sampling and laboratory analysis of the material excavated will be required with detected concentrations compared to appropriate site specific re-use criteria to confirm suitability for re-use or otherwise prior to placement on-site, with material managed under the CL:AIRE Definition of Waste Code of Practice (DoWCoP). An MMP will need to be developed for the Project, including for each Route Section. A watching brief will need to be kept for any soils with visual/olfactory evidence of contamination during the earthworks.

In addition, the Code of Construction Practice (CoCP) and Construction Environment Management Plan (CEMP) will detail minimum requirements with respect to materials and waste management on site. This will include testing requirements, record keeping and reporting requirements relating to the movement, storage and placement of materials within the scheme.

The soils are likely to present a low risk to human health and Controlled Waters. However, the risk to Controlled Waters may need to be further assessed as part of a Piling Risk Assessment which is to be prepared for the proposed structures along the route. The Piling Risk Assessment will consider the potential for the creation of preferential pathways as part of the works and identify suitable mitigation measures if required.

7.7 Preliminary Classification of Waste

To classify materials that may potentially be excavated across the site during construction works and require disposal to landfill, a number of steps are required as part of the WM3 Regulations³⁵ and the current waste management legislation and guidance. The initial steps are to identify:

- If the materials are waste;
- Whether the waste is required to be classified at all;
- The relevant EU List of Waste codes;
- The chemical composition of the material; and
- If the substances in the waste are 'hazardous substances' or 'Persistent Organic Pollutants'.

Material that is surplus to requirements and where there is no clear strategy for reuse on-site is classified as waste and should be disposed of in accordance with Duty of Care as specified in the current waste management legislation and guidance³⁶. If material is destined for landfill, Waste Acceptance Criteria (WAC) analysis will be required to demonstrate to the landfill that the material is acceptable for disposal at the specific landfill.

A preliminary waste assessment has been undertaken based on analysed concentrations of contaminants in the soil samples obtained during the site investigations and using Atkins' on-line waste classification tool (CatWaste^{Soil})³⁷.

A total of 56 No. soil samples were assessed using CatWaste^{Soil}. The results of the assessment indicate that the majority of samples would be classified as non-hazardous waste. The waste assessment results are included in Appendix H.

This classification is based on a limited number of samples and any actual material to be removed offsite for disposal must be appropriately classified and agreed with the chosen landfill operator. It is the responsibility of the waste producer to classify, treat, manage and dispose of waste appropriately and to ensure the chosen landfill is licensed to accept such material. WAC testing will be required if the material is destined for landfill

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³⁵ Environment Agency (2015) Waste Classification - Guidance on the classification and assessment of waste. Technical Guidance WM3.

³⁶ DEFRA (2016) Waste Duty of Care Code of Practice.

³⁷ Atkins (2018) Cat-WasteSOIL. online www.catwastesoil.co.uk. Accessed October 2018.



8. Revised CSM

8.1 Introduction

The findings of the GIs, GQRA and gas assessment have been used to update the PCSM presented in Section 4. The risk categorisations presented are based on an assessment of the potential consequence of each PCL occurring along with the likelihood that each PCL will occur in accordance with the methodology outlined in Section 4.

The revised CSM has been developed taking into account the proposed final development upon completion of the works. It has also been assumed that the following mitigation measures will be implemented during the construction and operation of the Project:

- Implementation of measures in the CoCP such as good management of stockpiles, implementation of pollution incident control e.g. plant drip trays, dampening down of dust and spill kits;
- Implementing an appropriate Soils Management Plan (SMP), MMP and Site Waste Management Plan (SWMP) as required to provide assessment of the suitability of soils for re-use, storage, validation and the appropriate destination for waste;
- Implementation of a watching brief during site clearance and excavation works to identify any areas
 of suspected contamination and ensure appropriate management; and
- The Project will be operated in accordance with the relevant regulations and best practice guidance.

As with the preliminary CSM, future construction and ground maintenance workers are excluded from the revised CSM, as such risks should be addressed through their employers' health and safety risk assessments and work procedures. The revised CSM is presented in Table 8.1 below

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Table 8.1 - Revised CSM for Route Section 2A

Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
On-site Made Ground, Ballast, Trackbed Layers, Subgrade Fill and Embankment Fill Shallow groundwater (Metals, inorganics and TPH)	Members of the public using public rights of way to cross the railway, level crossings, stations, bridges, agricultural	Dermal contact with, inhalation and/or ingestion of contaminants in soil, soil-derived dusts and water	Low likelihood	Mild	Low risk	The results of the screening have indicated no exceedances of the human health GAC for a public open space or commercial end use in the soil samples analysed and no exceedances of the WSV for a commercial end use in the groundwater samples analysed. This indicates that there are unlikely to be significant risks to on-site and off-site human receptors from contaminants detected in soils and groundwater underlying the site.
		Inhalation of asbestos fibres	Unlikely	Severe	Moderate/Low risk	No asbestos fibres or Asbestos Containing Material were identified within any of the soil samples tested. Soil will be placed under compacted hardcover or vegetation so likelihood of dust generation following construction is low. However, the potential for asbestos to be present is still a significant risk and additional testing and assessment by a suitably qualified asbestos specialist is required prior to the re-use of materials to confirm the suitability of material for re-use on-site.
		Inhalation of ground gases and/or vapours	Low Likelihood	Mild	Low risk	The ground gas regime at the site has been initially classified as CS2 (low risk), which would require gas protection measures to be incorporated within buildings / structures in accordance with BS8485:2015. In addition, given the elevated concentrations of



Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
						methane and carbon dioxide recorded in natural soils across the site care should be taken when entering excavations during construction. However, no enclosed spaces are being proposed as part of the design, therefore the need for gas protection measures is considered to be unlikely.
						The results of the PID screening indicate that volatiles within soil samples are low. In addition, PAHs, TPH, VOC and SVOC results in soil and groundwater were either below detection limits or only trace concentrations were recorded. Volatiles in groundwater samples were found to be below the WSV. Therefore, it is considered that there are unlikely to be significant vapour risks to on-site human receptors from contaminants detected in soils from the site.
	Human (off-site) Residents living adjacent to Route Section 2A in Bicester, Launton and Charndon. Workers in adjacent commercial / industrial	Dermal contact with and / or ingestion of contaminants in windblown soil-derived dusts and water which may have migrated offsite. Inhalation of	Low likelihood	Minor	Very Low risk	There were no exceedances of the human health GAC for a public open space or commercial end use in the soil samples analysed. It is therefore considered that there are unlikely to be significant dermal contact risks to off-site human receptors from contaminants detected in soils from the site.
	properties in Bicester. Members of the public	contaminants in windblown dust which may have migrated offsite				The ground gas regime at the site has been initially classified as CS2 (low risk). Volatile compounds in soil and groundwater were identified at either at or just above detection



Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
	accessing the surrounding area adjacent to Route Section 2A including station and road users	Inhalation of ground gases and / or vapours which may have migrated off-site				limit. It is unlikely based on these results and the geology that significant migration of gas or vapour off site is likely, therefore there is a very low risk.
	Farmers working on nearby agricultural land	Inhalation of asbestos fibres which may have migrated off-site	Unlikely	Severe	Moderate/Low risk	No asbestos fibres or Asbestos Containing Material were identified within any of the soil samples tested. Soil will be placed under compacted hardcover or vegetation so likelihood of dust generation following construction is low. However, the potential for asbestos to be present is still a significant risk and additional testing and assessment by a suitably qualified person is required prior to the re-use of materials to confirm the suitability of material for re-use on-site.
	Controlled Waters (on- and off-site) Secondary A Aquifers Principal Aquifer	Leaching and migration of contaminants (free and dissolved phase) from soils in the unsaturated zone into groundwater in underlying aquifers Migration of contaminants via preferential pathways such as via piles or track drainage to deeper groundwater	Low likelihood	Mild	Low risk	Exceedances of metals and inorganics were recorded in leachate and groundwater samples tested. However, given the widespread nature of the exceedances and the lack of an identified source it is considered likely that these elevated concentrations are due to influences from the underlying geology and representative of background concentrations in the wider area. The underlying Secondary A Aquifer is not considered to be in hydraulic connectivity with the shallow groundwater sampled at site and the Alluvium Secondary A Aquifer is



Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
						considered to be of limited extent. The groundwater sampled at site is taken from boreholes with response zones in unproductive strata. Deeper groundwater within the Secondary A and Principal Aquifers is geologically separated by lower permeability Made Ground/stiff cohesive clays and the Oxford Clay. Additionally, there are no licenced groundwater abstractions within 500m of the site and the site is not within a groundwater SPZ. Therefore, it is highly unlikely the exceedances in the soil leachate and groundwater would present a risk to the Secondary A or Principal Aquifers.
						assessments may be required to be produced for the proposed works. Groundwater will be further assessed as part of the Piling Risk Assessment which will consider the potential for the creation of preferential pathways and identify suitable mitigation measures if required.
	Controlled Waters (on- and off-site) Surface Waters Langford Brook, Summerstown Ditch, Launton and Cutters Brook, Grebe Lake	Discharge of contaminants entrained in surface water runoff followed by overland flow and discharge Leaching and migration of contaminants (free and dissolved phase)	Low likelihood	Mild	Low risk	Exceedances of metals were recorded in surface water samples tested. However, it is considered likely that these elevated concentrations are due to influences from the underlying geology and representative of background concentrations in the wider area.



Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
		from soils in the unsaturated zone into groundwater then lateral migration into surface water features Migration of contaminants via preferential pathways such as track drainage or service runs to surface water				Route Section 2A contains very little coverage of superficial deposits, with the superficial geology confined to very narrow alluvial channels associated with small watercourses. At many locations Made Ground/subgrade fill and/or cohesive glacial clay deposits directly overly the Oxford Clay. Groundwater was not encountered in many of the shallower boreholes. Given the nature of the Oxford Clay as lower permeability unproductive strata, and the glacial cohesive deposits frequently comprising stiff to very stiff clays, suitable viable pathways to the nearest surface water receptor are extremely limited. Therefore, the exceedances identified in soil leachate and groundwater are considered
						unlikely to represent a significant risk to surface water receptors.
	Property (on-site) Existing structures and services and track drainage Future structures and services	Direct contact of new and existing structures with contaminants in soils and/or groundwater	Low Likelihood	Mild	Low risk	The results of the screening have indicated that concentrations of metals, PAHs and TPH were reported at low concentrations within soil samples. Slightly elevated concentrations of metals, TPH and inorganics were recorded in leachate and groundwater samples.
						This indicates that there are unlikely to be significant risks to on-site property receptors from contaminants detected in soils and groundwater underlying the route.



Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
						However, aggressive ground conditions (particularly sulphate) and the potential implications to buried structures will need to be assessed further as part of the geotechnical investigation report
		Migration of ground gases or vapours along preferential pathways including permeable ground, track drainage, service trenches and service entry points and accumulation in enclosed spaces such as buildings, service ducts or access points.	Low likelihood	Mild	Low risk	The ground gas regime at the site has been initially classified as CS2 (low risk), which would require gas protection measures to be incorporated within buildings / structures in accordance with BS8485:2015. In addition, given the elevated concentrations of methane and carbon dioxide recorded in natural soils across the site care should be taken when entering excavations during construction. However, no enclosed spaces are being proposed as part of the design, therefore the need for gas protection measures is considered to be unlikely.
						In addition, risks from vapours are considered to be low, as concentrations of volatile contaminants have been reported to be low within soil and groundwater samples along the route.
	Property (off-site) Existing residential houses and commercial properties	Direct contact of new and existing structures with contaminants in soils and/or groundwater that has migrated off-site	Low likelihood	Mild	Low risk	The results of the screening have indicated that concentrations of metals, PAHs and TPH were reported at low concentrations within soil samples. Therefore, there is unlikely to be significant risks to off-site property receptors from contaminants detected in soils and groundwater underlying the route.



Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
		Migration of ground gases or vapours along preferential pathways including permeable ground, track drainage, service trenches and service entry points and accumulation in enclosed spaces such as buildings, service ducts or access points	Low likelihood	Mild	Low risk	The ground gas regime at the site has been initially classified as CS2 (low risk). However, elevated concentrations of ground gas were recorded in natural strata. Low gas flow rates were also recorded ranging between <0.1 l/hr and 0.6 l/hr. Volatiles were identified at or just above detection limit in soil and groundwater samples. Therefore, there is low potential for ground gas and / or vapour to migrate off-site and risks to off-site property receptors are considered to be low.
Off-site Agricultural activities within the surrounding area. The operation of and Made Ground, infilled ground and worked ground associated with historical landfills located adjacent to the east and south east of Route Section 2A around Calvert. Activities relating to the former gas works and brick works located approximately 480 m to the south west of Route	Human (on-site) Members of the public using public rights of way to cross the railway, level crossings, stations, bridges, agricultural land and public footpath/cycle tracks along the railway corridor	Dermal contact with and/or ingestion of contaminants in soil, soil-derived dusts and water which have migrated onto site Inhalation of contaminants in soils/dust including asbestos fibres which have migrated onto site Inhalation of ground gases and/or vapours which have migrated onto site	Low Likelihood	Minor	Very low risk	The areas surrounding Route Section 2A are covered with hardstanding or vegetated, which will reduce dust generation and therefore limit the potential for dermal, inhalation and ingestion pathways. Also, the low permeability geology means that the potential for migration is low. Therefore, it is considered that there are unlikely to be a significant risk to on-site human receptors from off-site soils.
Section 2A. Allotments adjacent to the north of Route Section 2A.	Controlled Waters - Aquifers (On Site) Secondary A Aquifers	Leaching and migration of contaminants (free and dissolved phase)	Low Likelihood	Minor	Very low risk	Exceedances of metals were recorded in the leachate and groundwater samples tested. However, given the widespread nature of



Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
Commercial and Industrial units to the west of Route Section 2A in Bicester including petrol station, garages, engineering works, printers, electronic manufacturers and metal works Coal yard and Smokeless Fuel Merchants and Distributors (Old Station Marsh Gibbon) adjacent to the south of Route Section 2A. Gas distribution and	Principal Aquifer	from soils in the unsaturated zone into groundwater in underlying aquifers Migration of contaminants via preferential pathways such as track drainage Lateral migration of contaminants in groundwater.				the exceedances and the lack of an identified source it is considered likely that these elevated concentrations are due to influences from the underlying geology and representative of background concentrations in the wider area. The widespread extensive nature of the inorganic WQS exceedances in the groundwater (ammonium as NH4 and sulphate) across Section 2A and the lack of ammonium exceedance in the leachate samples (with only one recorded sulphate exceedance) suggest that the inorganic exceedances most likely originate from an off-site source potentially of an agricultural nature.
compressor station adjacent to the north of Route Section 2A in Bicester Graveyard (A range of inorganic and recalcitrant organic contaminants including heavy metals, hydrocarbons, fuels / oil, PAH, TPH, PCB, coal tar, asbestos, pesticides,						The underlying Secondary A Aquifers are unlikely to be in hydraulic connectivity with the shallow groundwater sampled at site. The Secondary A and Principal Aquifers are geologically separated by impermeable Made Ground/stiff cohesive clays and the Oxford Clay Formation. There will also be limited lateral migration between borehole locations. Given that there are no licensed groundwater abstractions present within 500 m of the route, it is considered unlikely that off-site contamination would present a risk to the underlying on-site Secondary A or Principal Aquifers.
herbicides, Total Viable Colonies, E. Coli, Faecal coliform and Faecal						However, foundation / piling risk assessments may be required to be produced for the proposed works.



Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
streptococci, leachate and the potential for ground gas generation (methane, carbon dioxide, hydrogen sulphide and carbon monoxide).	Controlled Waters— Surface Waters (on - site) Langford Brook, Launton Brook and Summerstown Ditch	Discharge of contaminants entrained in surface water runoff followed by overland flow and discharge Leaching and migration of contaminants (free and dissolved phase) from soils in the unsaturated zone into groundwater in underlying aquifers Migration of contaminants via preferential pathways. Lateral migration of contaminants in groundwater with discharge to surface water as base flow.	Low Likelihood	Minor	Very low risk	Limited exceedances of metals were recorded in surface water samples tested. However, the calculated bioavailability concentrations of the metal exceedances showed that only one concentration of zinc still exceeded the EQS. All other exceedances do not pose a significant risk to surface waters. It is considered likely that these elevated concentrations are due to influences from the underlying geology and representative of background concentrations in the wider area. Given the impermeable nature of the strata underlying the route, there are very limited viable pathways to the watercourses from off-site sources. Therefore, the risk to onsite surface water receptors from off-site contamination is considered to be low.
	Property (on-site) Existing structures and services and track drainage Future structures and services	Direct contact of new and existing structures with contaminants in groundwater Migration of ground gases or vapours along preferential pathways including permeable ground, track drainage, service trenches and	Unlikely	Minor	Very low risk	The areas surrounding Route Section 2A are covered with hardstanding or vegetated, which will reduce the potential for inhalation and vapour pathways. Limited flow rates have been identified during gas monitoring, therefore it is unlikely that there is a significant flow and migration of gas and vapour onto site. Therefore, it is considered that there are unlikely to be significant risks



Source	Receptor	Pathway	Probability	Consequence	Risk Classification	Comment
		service entry points and accumulation in enclosed spaces such as buildings, service ducts or access points				to on-site property receptors from off-site soils.



9. Conclusions and Recommendations

Route Section 2A is approximately 8.5 km in length running between Bicester in the west and Charndon in the east and has a general southwest-northeast orientation, along the existing OXD line. The existing single track OXD Line within Route Section 2A will be double tracked to current design standards as part of the proposed works.

This Contaminated Land Risk Assessment report has been prepared for Development Stages 2A1, 2A2, 2A3 and 2A4 including offline highways located within Oxfordshire County Council, Buckinghamshire County Council, Cherwell District Council and Aylesbury Vale District Council jurisdiction to provide a summary of the available ground investigation (GI) data for Route Section 2A of the East West Rail Phase 2 (EWR2) Project to support the proposed construction works along the route and to discharge Condition 11 of the Network Rail (East West Rail Bicester to Bedford Improvements) Order.

Two geo-environmental intrusive GIs have been carried out along Route Section 2A including a GI undertaken in 2016 by WSP for GRIP 3 and a GI which was undertaken by the Alliance between 2017 and 2018 for GRIP 4. The investigations comprised the drilling and excavation of 157 No. exploratory locations in total including trial pits, dynamic probing, window sampling and dynamic sampling with rotary follow on. Soil, leachate, groundwater and surface water samples were collected and tested as part of the GIs. Groundwater level and gas monitoring has also been undertaken.

The route comprises railtrack at grade, on embankments and in cuttings and the thickness of the underlying railway substructure reflects that change. Underlying the railway substructure, and Topsoil where present, the natural ground comprises Alluvium associated with watercourses around the Station Road Launton end of Route Section 2A and Glacial Till, which was locally present in areas of higher topography in the eastern section of the Route. The superficial deposits and railway substructure overlay the solid strata of the Oxford Clay Formation across much of Route Section 2A, with the underlying Kellaways Formation (comprising a sand and clay member) sub cropping below the superficial soils towards the western (Bicester) end of Route Section 2A from Marsh Gibbon. The Cornbrash, Forest Marble, White Limestone and Rutland Formations were encountered underlying the Kellaways Formation in the west end of Route Section 2A.

Groundwater strikes were recorded within the Ballast, Subgrade Fill, Trackbed Layers, Made Ground, Alluvium, Glacial Deposits, Oxford Clay, Kellaways Clay Member, Kellaways Sand Member, Cornbrash Limestone and Forest Marble Limestone and the White Limestone Formation. The majority of groundwater samples are taken from boreholes within response zones in the Alluvium, Oxford Clay Formation and Kellaways Sand Member.

The only groundwater level noted in the western most part of Section 2A is the artesian borehole encountered at CP2AJLFB_2U, chainage 109300 (south of the track line and immediately south west of Jarvis Lane, Bicester). Groundwater at this location rose to 2.85 m above ground level. There are no other groundwater dip levels data for the western part of Route Section 2A (the nearest dips are taken from borehole CP2AMFOB_2U at chainage 108400), however it can be inferred that groundwater flow is most likely in an easterly direction at location CP2AJLFB_2U towards Langford Brook. A second artesian borehole was encountered a third of the way along Route Section 2A at CPA2ALOB_1D (chainage 107000), immediately east of the junction between the track line and Station Road in Launton. The groundwater at this location initially rose to 0.30 m above ground level but had risen to 5.0 m above ground level approximately two weeks after borehole installation. Groundwater dip data in this area shows that groundwater is likely to flow in a westerly/south westerly direction. The artesian groundwater was encountered within the White Limestone Formation, this Principal Aquifer is encountered at depth below Section 2A and is confined by the Forest Marble Formation.

The results of the screening have indicated that there were no exceedances of the human health GAC and WSV for a commercial end use or public open space (parks) end use in the soil and groundwater samples analysed, indicating that there are unlikely to be significant risks to on and off-site human and property receptors from contaminants detected in soils and groundwater underlying the site.

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Leachate testing of soils identified limited exceedances of metals and inorganics in the five locations sampled along the route. Exceedances of metals, inorganics and TPH were also recorded in the groundwater samples tested. However, it is considered likely given the widespread geographical distribution of the exceedances that these elevated concentrations of metals and inorganics are due to influences from the underlying geology and representative of background concentrations in the wider area.

TPH concentrations exceedances were identified above the MDL in the groundwater at two monitoring locations across Section 2A (WS2A100_U and CP2APOOB_1D) on one monitoring round per location. The recorded concentrations are considered to be marginal and were not identified during later monitoring rounds. The geology at WS2A100_U comprises Made Ground of sandy silt and stiff friable clay overlying glacial cohesive deposits of stiff to very stiff clay. While the geology at CP2APOOB_1D comprises Made Ground of silty clay and very stiff clay overlying the stiff to very stiff clay of the Oxford Clay Peterborough Member. The nature of the geology at both locations is stiff lower permeability unproductive strata, therefore it is extremely unlikely that a suitable viable pathway exists from either of these locations to Secondary A or Principal Aquifers or to the nearest surface water receptor. Additionally, WS2A100_U is located over 500 m away from a surface receptor. It is considered unlikely that the concentrations identified in soil leachate and groundwater would represent a significant risk to identified groundwater receptors. Groundwater may be further assessed as part of the Piling Risk Assessments which will be produced for the proposed works to assess the potential for the creation of preferential pathways and identify suitable mitigation measures if required.

Surface water testing identified limited exceedances of metals within the Summerstown Ditch, Launton and Cutters Brook, the unnamed drain/watercourse to the Summerstown Ditch, Launton and Cutters Brook and within Langford Brook. However, it is considered likely that these elevated concentrations of metals are due to influences from the underlying geology and representative of background concentrations in the wider area. The calculated bioavailability of the copper, manganese and nickel exceedances did not exceed the EQS. Additionally, the lack of superficial deposits in the area and the underlying low permeability strata shows that the surface water courses will unlikely be in hydraulic continuity with the underlying Secondary A or Principal Aquifers. The lack of hydraulic continuity and the stiff to very stiff lower permeability clays that underlie the site will make the viability of any migratory pathway from the soil leachate to the surface watercourses highly unlikely. Therefore, it is considered unlikely that the exceedances identified in soil leachate and groundwater would represent a significant risk to the identified surface water receptors.

The ground gas regime at the site has been initially classified as CS2 (low risk), which may require special gas protection measures to be incorporated within buildings / structures in accordance with BS8485:2015. In addition, given the elevated concentrations of methane and carbon dioxide recorded in natural soils across the site care should be taken when entering excavations during construction.

The results of the soil and groundwater screening indicate that there are unlikely to be significant risks to property receptors from contaminants detected in soils and groundwater underlying the route. However, aggressive ground conditions and the potential implications to buried structures will need to be assessed further as part of the geotechnical investigation report and incorporated into the Project design.

Appropriate and representative geotechnical and environmental sampling and laboratory analysis of the material excavated and proposed to be re-used will be required with detected concentrations compared to appropriate re-use criteria to confirm suitability for re-use of material on-site or otherwise, with material managed under the CL:AIRE DoWCoP and following a MMP. In addition, although no asbestos fibres or Asbestos Containing Material were identified within the soil samples tested, the potential for asbestos to be present is still a significant risk and additional testing and assessment by a suitably qualified asbestos specialist is required prior to the re-use of materials to confirm the suitability of material for re-use on-site.

Material that is surplus to requirements and where there is no clear strategy for reuse on-site is classified as waste and should be disposed of in accordance with Duty of Care as specified in the current waste management legislation and guidance. If materials are to be removed off-site for disposal, they must be appropriately classified using WAC testing and disposed of in agreement with the chosen landfill operator. A preliminary waste assessment indicates that the samples would be classified as non-hazardous waste.

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In order to ensure the protection of human, controlled waters, property receptors and the environment as a whole, there will be requirements to be followed during the construction works as part of the CoCP. These will include but are not limited to:

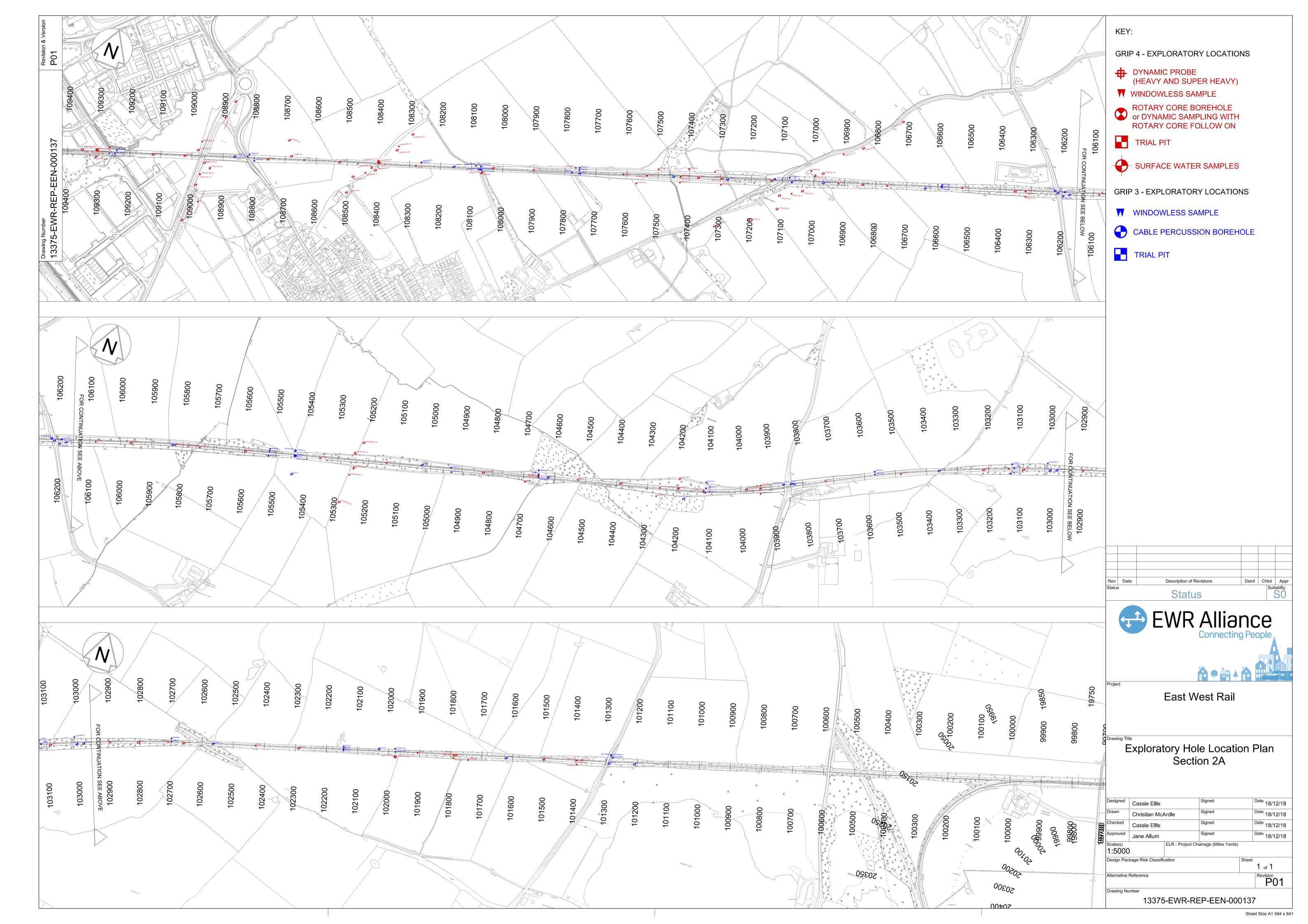
- Robust method statements and risk assessment to identify appropriate working methods and PPE to protect on-site workers, adjacent residents/workers, and the environment where applicable; and
- Measures and strategy to manage and control unforeseen and unexpected contamination if encountered during the works.

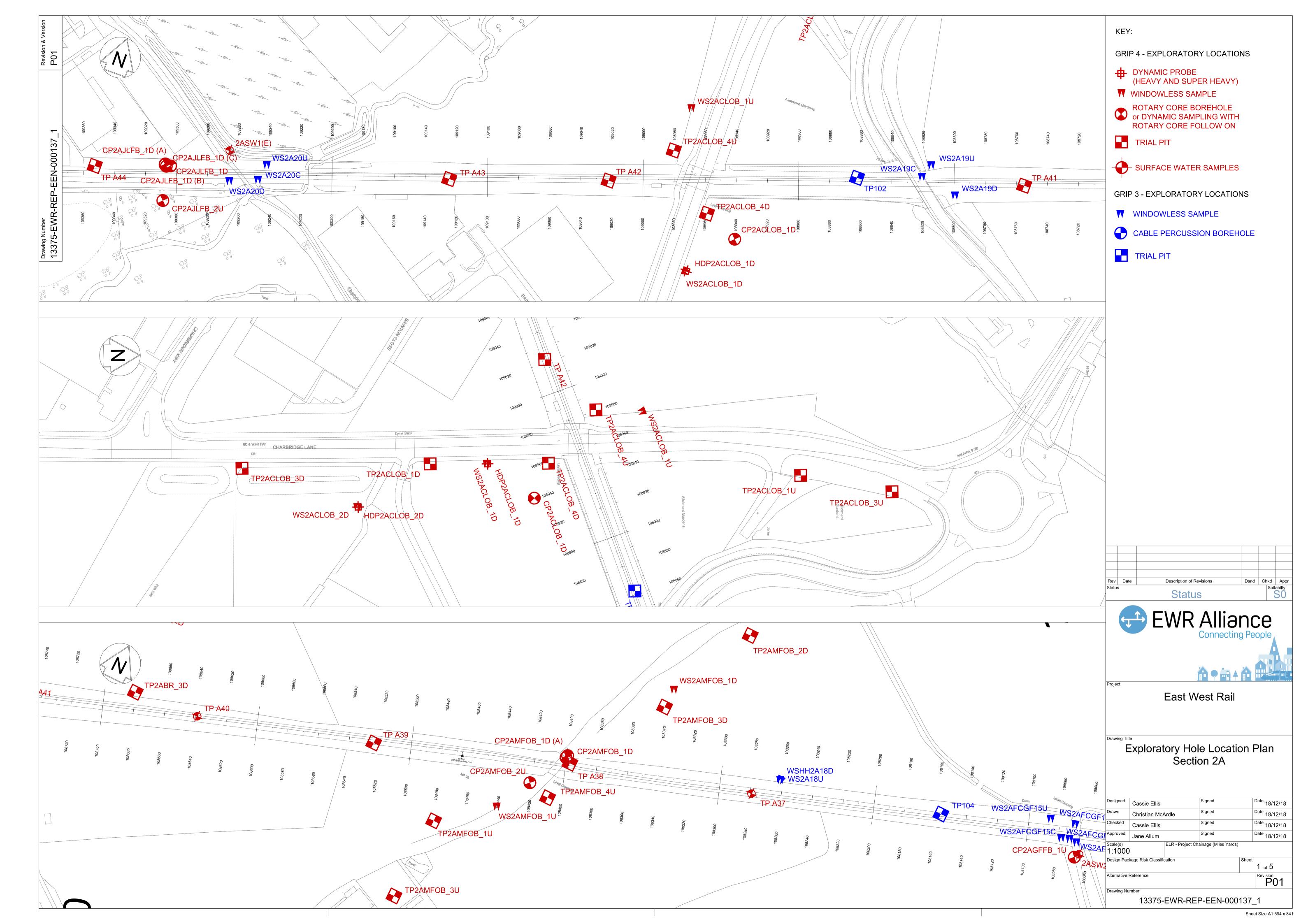
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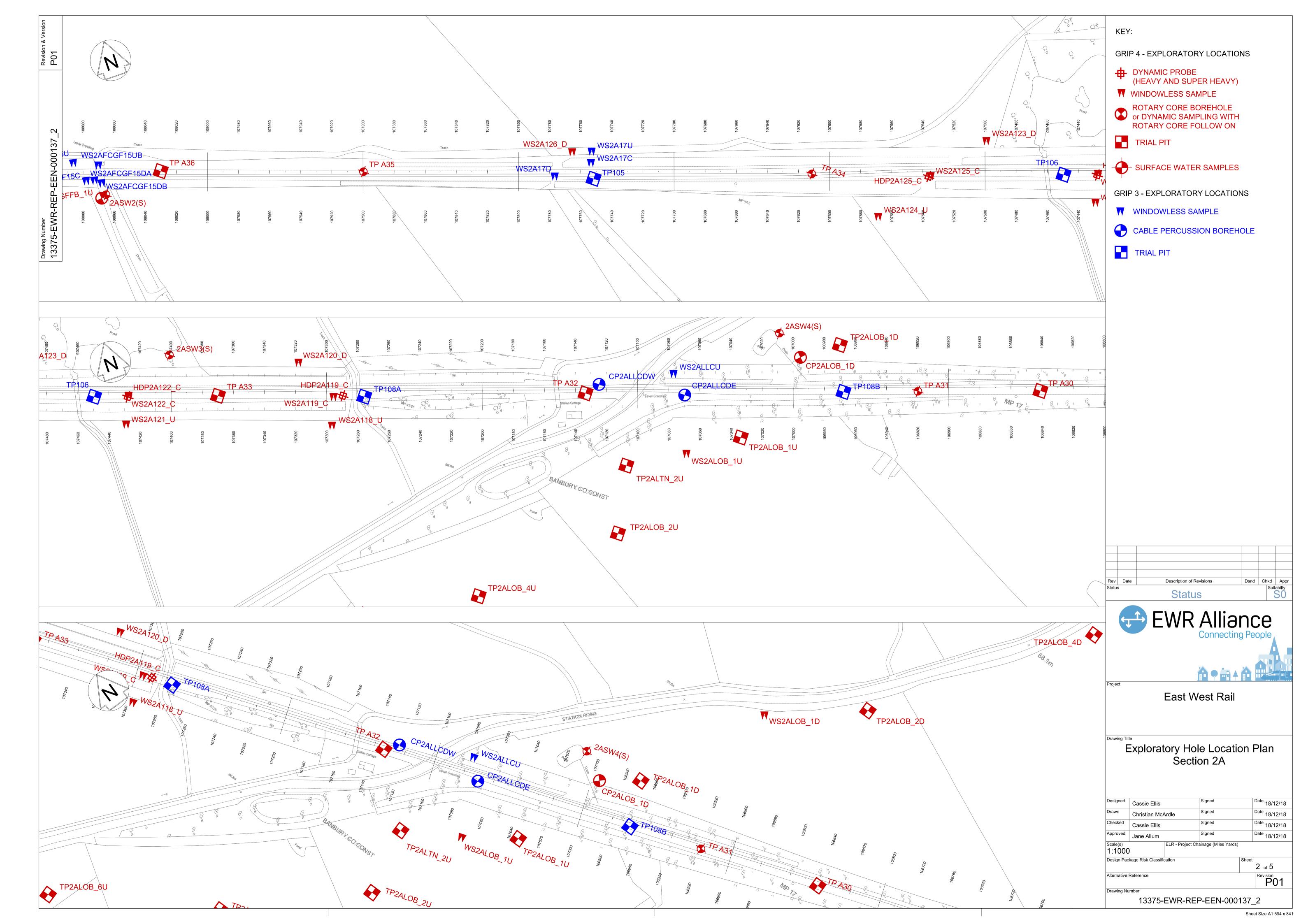


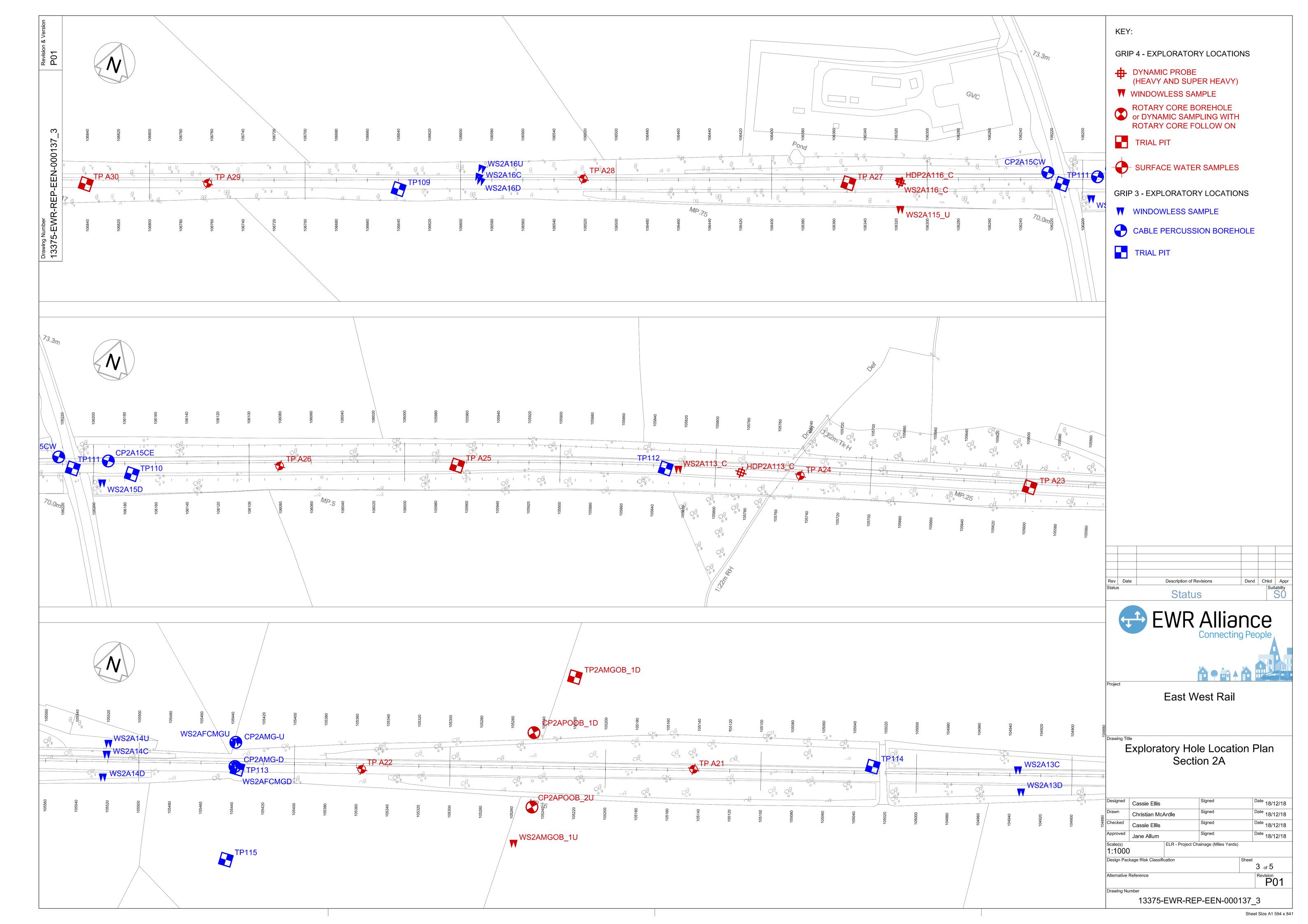
Appendix A – Drawings and Figures

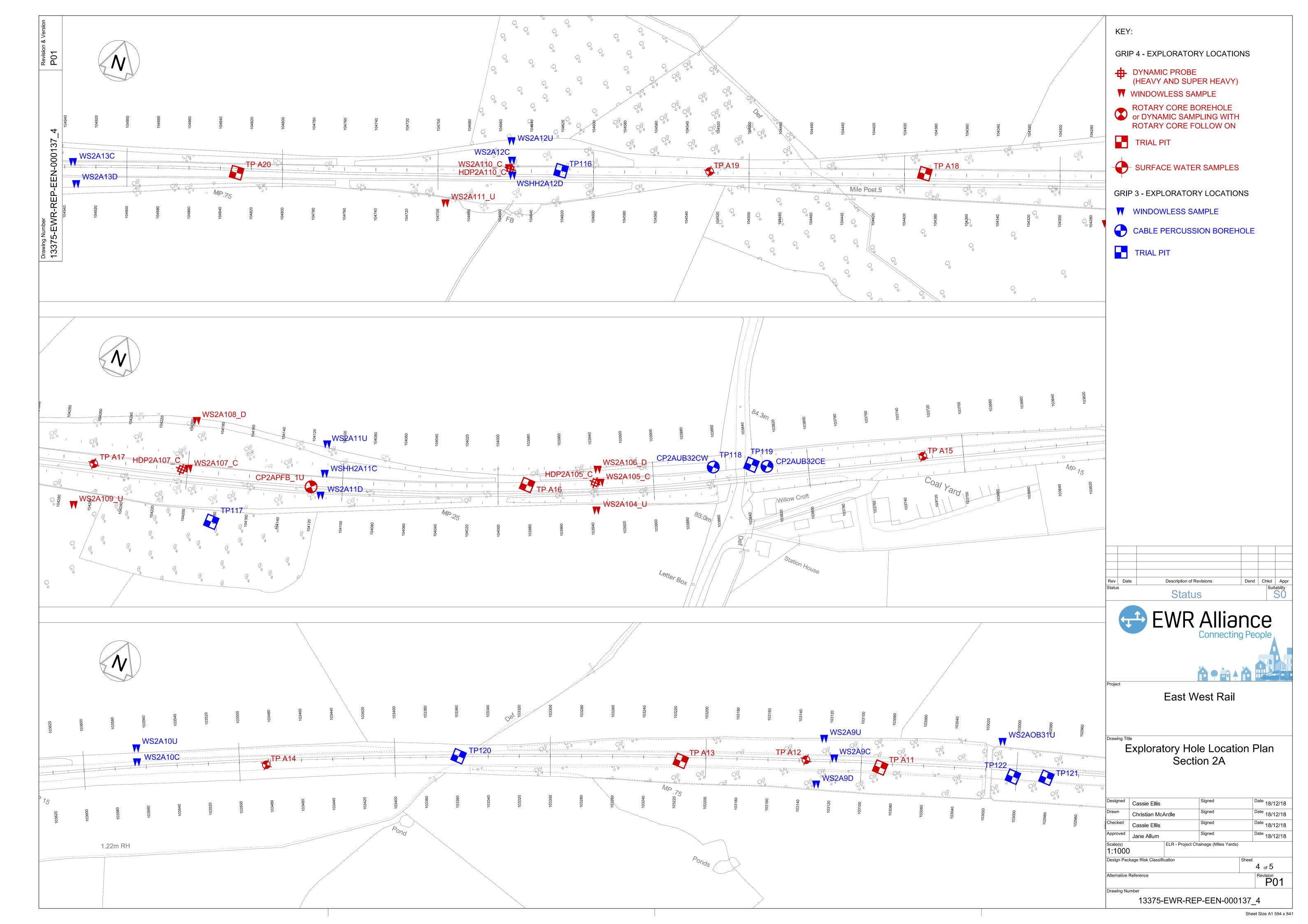
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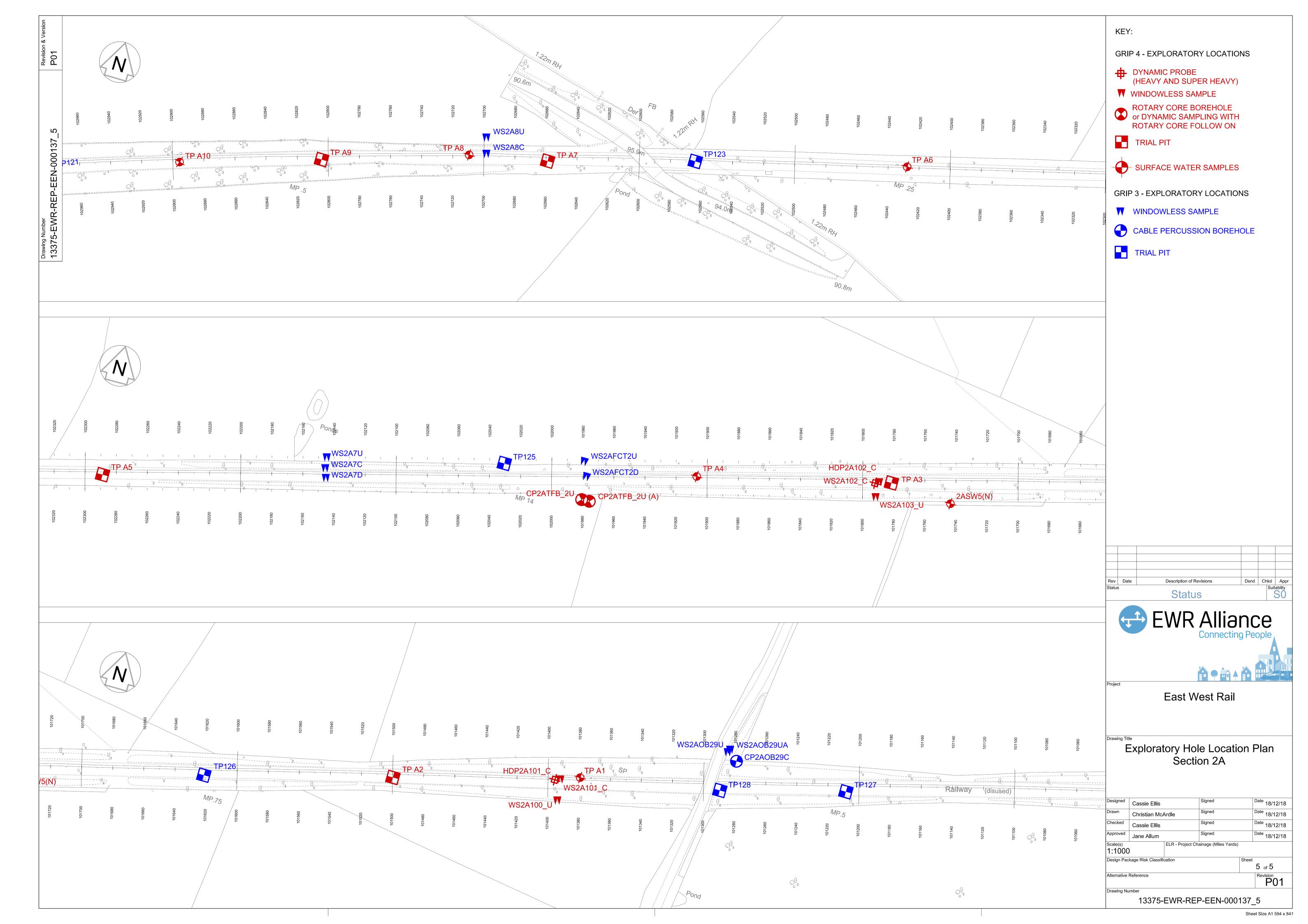














Appendix B - Definition of Probability & Consequence

The descriptions of the classified risks as given in R&D 66 are summarised in the following tables:

Table B1 - Risk estimation - classification of probability

Classification	Definition of the probability of harm / pollution occurring
High Likelihood	The pollutant linkage exists, and it is very likely to result in harm/pollution in the short term, and/or will almost inevitably result in harm/pollution in the long term, and/or there is current evidence of harm/pollution. Likelihood is defined as more likely than not and meets the definition of 'significant possibility' under Part 2A of EPA 1990.
Likely	The source, pathway and receptor exist for the pollutant linkage and it is probable that harm/pollution will occur. Circumstances are such that harm/pollution is not inevitable, but possible in the short term and likely over the long term. Likelihood is defined as reasonably possible and meets the definition of 'significant possibility' under Part 2A of EPA 1990.
Low Likelihood	The source, pathway and receptor exist, and it is possible that harm/pollution could occur. Circumstances are such that harm/pollution is by no means certain in the long term and less likely in the short term.
Unlikely	The source, pathway and receptor exist for the pollutant linkage, but it is improbable that harm/pollution will occur even in the long term.

Table B-2 - Risk estimation - definition of consequence

Classification	Definition of consequence				
Human Health Red	ceptors - Site end use or other more sensitive receptor				
Severe	Acute damage to human health based on the effects on the critical human health receptor. Concentrations of contaminants above appropriate site-specific assessment criteria. Harm meets definition of 'significant harm' under Part 2A of EPA 1990.				
Medium	Chronic damage to human health based on the effects on the critical human health receptor. Concentrations of contaminants above appropriate site-specific assessment criteria. Harm meets definition of 'significant harm' under Part 2A of EPA 1990.				
Mild	No appreciable impact on human health based on the potential effects on the critical human health receptor. Concentrations of contaminants above generic assessment criteria but below appropriate site-specific assessment criteria.				
Minor	No appreciable impact on human health based on the effects on the critical human health receptor. Concentrations of contaminants below appropriate generic assessment criteria.				
Human Health Red	Human Health Receptors - Site construction workers				
Severe	Exposure to hazardous substances resulting in a reportable death, major injury, 3-day injury or illness/disease under RIDDOR.				

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Classification	Definition of consequence
Medium	Exposure to hazardous substances resulting in a dangerous occurrence reportable under RIDDOR. Exposure to hazardous substances resulting in exceedance of a workplace exposure limit.
Mild	Exposure to hazardous substances resulting in limited effects such as headache, dizziness, nausea. Exposures below the workplace exposure limits. Not reportable under RIDDOR.
Minor	Minor exposure to hazardous substance resulting in no appreciable ill health effects.
Controlled Water	Receptors
Severe	Pollution of a Principal aquifer within a source protection zone or potable supply characterised by a breach of drinking water standards. Pollution of a surface water course characterised by a breach of an EQS at a statutory monitoring location or resulting in a change in GQA grade of river reach. Discharge of a List I or List II substance to groundwater. Pollution meets Part 2A definition.
Medium	Pollution of a Principal aquifer outside a source protection zone or a Secondary A aquifer characterised by a breach of drinking water standards. Pollution of an industrial groundwater abstraction or irrigation supply that impairs its function. Substantial pollution but insufficient to result in a change in the GQA grade of river reach. Pollution meets Part 2A definition.
Mild	Low levels of pollution of a Principal aquifer outside a source protection zone or an industrial abstraction, or pollution of a Secondary aquifer. Low levels of pollution insufficient to result in a change in the GQA grade of river reach, pollution of a surface water course without a quality classification.
Minor	No appreciable pollution, or pollution of a low sensitivity receptor such as a non-aquifer or a surface water course without a quality classification
Property Receptor	ors – Buildings, Foundations and Services
Severe	Catastrophic damage to buildings, such as explosion. Catastrophic failure of foundations and services. Substantial damage to a Scheduled Monument significantly impairing the by reason of which the monument is scheduled. Harm meets definition of 'significant harm' under Part 2A of EPA 1990.
Medium	Substantial damage to buildings and foundations rendering the structures unsafe. Substantial damage to services impairing their function. Significant damage to a Scheduled Monument significantly impairing the reason of which the monument is scheduled. Harm meets definition of 'significant harm' under Part 2A of EPA 1990.
Mild	Significant damage to buildings and foundations but not resulting in them being unsafe for occupation. Damage to services but not sufficient to impair their function. Damage to a Scheduled Monument but no significant impairment to the reason of which the monument is scheduled.
Minor	Easily repairable damage to buildings, foundations and services.



Table B-3 - Risk estimation - classification of consequence

Classification	Definition of risk
Very High Risk	There is a high probability that severe harm may arise to a designated receptor or there is evidence that severe harm to a designated receptor is currently happening. This risk is likely to result in a substantial liability. Urgent investigation (if not already undertaken) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not already undertaken) is required and remedial works may be necessary in the short term and are likely over the longer term.
Moderate Risk	It is possible that harm may arise to a designated receptor. It is either relatively unlikely that any such harm will be severe, or if any harm were to occur, it is more likely that the harm will be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low Risk	It is possible that harm will arise to a designated receptor, but it is likely that this harm will be mild. Further investigation is not necessarily required and should be considered to confirm that there is no unanticipated contamination present.
Very Low risk	The possibility of harm to the designated receptor is either not plausible or, if the possibility of harm is plausible, risk is considered to be very unlikely with attenuation along the exposure pathway. Further investigation is not necessarily required and may be considered to confirm that there is no unanticipated contamination present.



Appendix C – Exploratory Hole Logs

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East West Rail-Phase 2A

Status: FINAL

Project:

CP2AOB29C

Sheet 1 of 2

Ground Level: 91.768mOD

Coordinates: 467393.00E Project No: 5624.2A 225403.00N Casing (Water) Sample / Test Legend Depth O.D. Description

Description	Legend	Depin	J O.D.			<u>'</u>	—(Water)	
Boothplion	Logona	(m)	Level (m)	Туре	Depth (m)	Test Results	Depth (m)	Installations
MADE GROUND: Dark grey to black sandy angular to subangular fire to coarse GRAVEL of		0.20	91.57	B B	0.00-0.20 0.20-0.60		(111)	=
\limestone and clinker.	×××××	0.60	91.17	D	0.60			=
MADE GROUND: Light orangish brown gravelly slightly clayey fine to coarse SAND. Gravel is angular to rounded fine to coarse of chert and clinker.	×-×-×			D	1.00			
Firm to stiff greyish brown thinly laminated CLAY with much brown and grey sandy silt and	×			UT100 D	1.50-1.95 2.00	17 blows, 60% Recovery		
shell partings. Sand is fine. (OXFORD CLAY-STEWARTBY MEMBER)from 2mbgl to 2.5mbgl - stiff to hard.	<u> </u>	- - - - 2.50	89.27	SPT(S)	2.50	N=20 (2,1/2,6,6,6)		
Very stiff to hard dark brown organic CLAY	××			D	2.50-2.95	(_, ,, _,, _,		
with orangish brown and grey sandy silt and shell partings. (OXFORD CLAY-STEWARTBY MEMBER)	×——××			D	3.00			
from 3mbgl to 4mbgl - with occasional gypsum crystals.	×			UT100	3.50-3.95	60 blows, 80% Recovery		
Hard dark brown silty slightly organic	××	- 4.00	87.77	D	4.00			-
friable CLAY with shell fragments. (OXFORD CLAY-STEWARTBY MEMBER)from 4.5mbgl to 5mbgl - with much shell	×X			SPT(S)	4.50 4.50-4.95	N=35 (3,7/6,8,8,13)		
fragments.	×	5.00	86.77	D	5.00			_
Hard dark greyish brown thinly laminated slightly organic CLAY with silt dusting and shell fragments. (OXFORD CLAY-PETERBOROUGH MEMBER)				UT100	5.50-5.95	80 blows, 50% Recovery		
02	====	_		D	6.00			<u>-</u>
		-						- - - -
		-		SPT(S) D D	7.00 7.00 7.00-7.45	N=37 (3,5/6,8,9,14)		 - - - -
	=====							-
from 8mbgl to 9mbgl - iron pyrites mineralisation on shell fragments and				D	8.00			=
hydrocarbon odour.				UT100	8.50-8.95	80 blows, 70% Recovery		-
				D	9.00			=
	====							=
Parabala continued on payt sheet			-		M-4	Observations		

Borehole	continue	ed on next sh	eet				Water Level Observations								
Hole	Diamete	er Detail	Chisellin	ng / Slow	/ Progress	Date		Water Strike (m)		Standing Time	Standing	Casing		Depth	
Diameter (mm)	Depth (m)	Casing Depth (m)	From (m)	To (m)	Time (hours)					(mins)	Level (m)	Depth (m)	Sealed (m)	
200 150 150	5.00 12.00 17.00	5.00 6.00	2.10	2.30	4203	11/06/15	5	2.10		20	1.80	0.00		3.00	
Client	Client: Network Rail			Progress											

Network Rail Consultant: WSP | Parsons Brinckerhoff Dates Drilled: 11/06/2015-16/06/2015 Plant: Dando 100 (T820-637) SPT Hammer: 002

Date Printed: 12/02/2016 Drilled By: SW Logged By: NJD JHS Checked By:

Casing Depth Date Hole Depth Water Depth 11/06/2015 11/06/2015 15/06/2015 Start of Hole End of shift Start of shift 1.80

Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network



East West Rail-Phase 2A

Status: FINAL

Project:

Sheet 2 of 2

CP2AOB29C

Ground Level: 91.768mOD Coordinates: 467393.00E

ritchies	Project No: 5624.2A Coordinates: 4								467393 225403	
Description	1 1	Depth	O.D.		San	nple / Te	est		Casing	
Description	Legend	(m)	Level (m)	Туре			est Re	sults	Depth	Installations
Hard dark greyish brown thinly laminated slightly organic CLAY with silt dusting and shell fragments. (OXFORD CLAY-PETERBOROUGH MEMBER)			()	SPT(S) D D	10.00 10.00 10.00-10.45	N=43 (4,7/	7,9,13,14)		(111)	
		-		D	11.00					
				UT100	11.50-11.95	80 blows,	70% Recov	very		
		- - - - -		D	12.00					
from 13mbgl to 16mbgl - with occasional shell fragments.				SPT(S) D D	13.00 13.00 13.00-13.45	29 (7,14/18	3,11,0 for 0	mm)		
				D UT100	14.00 14.00-14.45	80 blows, 7	70% Recov	rery		
				D	15.00					
from 16mbgl to 17mbgl - with shell fragments.				SPT(S) D D	16.00 16.00 16.00-16.45	33 (6,11/1	5,18,0 for 0	mm)		
Borehole Complete at 17.00 m		17.00	74.77	D	17.00					
Hala Diameter Detail Chicalling / Clay Progress					Water Level	Observati	ons			
Hole Diameter Detail Chiselling / Slow Progress	Date		Water Strik	ke (m) S	tanding Time (mins)	Stan- Leve	_	Casing Depth (r	' I	Depth Sealed (m)
200 5.00 5.00 150 12.00 6.00 150 17.00										
Client: Network Rail					Progress					
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 11/06/2015-16/06/2015 Plant: Dando 100 (T820-637)	15/06/201 16/06/201 16/06/201		Hole De 13.00 13.00 17.00	oth C	6.00 6.00 6.00 6.00	Wate	r Depth	Remarks End of shift Start of shift Completion	t	oy WSP/PB
SPT Hammer: 002 Date Printed: 12/02/2016 Drilled By: SW Logged By: NJD Checked By: JHS	Remarks:			l		•				



Borehole Log Status: FINAL

CP2AOB31C

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 93.168mOD Coordinates: 465719.00E

224925.00N

ritchies Project No: 5624.2A

	Project	110.5	024.ZA					224925.00N	
Description	Logond	Dept	h O.D.		Sam	ple / Test		Casing	
Description	Legend	(m)	Level (m)	Type	(m)	Test Re	sults	(Water) Depth (m)	Installations
MADE GROUND: Hard brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of chert, limestone and brick.		0.10	93.07	B B ES	0.00-0.10 0.10-0.60 0.30				-
from 0mbgl to 2.2mbgl - live roots and probable desiccation.			02.01	D ES	1.00				
MADE GROUND: Dark orange slightly gravelly fine to coarse SAND.				UT100	1.50-1.95	30 blows, 100% Rec	overy		-
Hard brown mottled orange and grey very sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to rounded fine to medium of chert. (HEAD)	××	2.20	90.97	D ES	2.00 2.00				
from 1.5mbgl to 2.2mbgl - with occasional black carbonaceous fragmentsfrom 1.8mbgl to 2.2mbgl - becoming slightly	<u>×_×_×</u>	- - - - - -		SPT(S) D D ES	2.50 2.50-2.95 3.00 3.00	N=19 (3,2/3,5,5,6)			- - -
sandy. Hard brown mottled orange and grey very sandy				UT100	3.50-3.95	80 blows, 50% Reco	very		- - -
slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to rounded fine to medium of chert. (HEAD)				D	4.00				- - -
from 1.5mbgl to 2.2mbgl - with occasional black carbonaceous fragments.		- - - 4.50	88.67	B SPT(S)	4.30-4.50 4.50	31 (5,14/31,0 for 0mr	m)		
from 1.8mbgl to 2.2mbgl - becoming slightly sandy.		- - - -	00.07	D D	4.50-4.95	31 (3,14/31,010101111	11)		=
Stiff dark brownish grey CLAY with much orangish brown and yellow silt partings. (OXFORD CLAY-STEWARTBY MEMBER)		- - - - -							-
from 3mbgl to 3.8mbgl - with silt partings.		-							=
gypsum crystals. from 3.8mbgl to 4mbgl - with much grey									
silty fine sand partings. No silt partings. Borehole Complete at 4.50 m									=
30.01.010 CO.1.p.010 at 1.00 1.1.		- - -							-
		- - -							= = = = = = = = = = = = = = = = = = = =
		-							=
		- - -							<u> </u>
		_							=
									=
		- - -							=
		_							
		- - -]
		-			Water I evel	Observations			-
Hole Diameter Detail Chiselling / Slow Progress	Date		Water Strik	ke (m) S	Standing Time		Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date				(mins)	Level (m)	Depth (m	n)	Sealed (m)
200 4.50 2.00 4.30 4.50 1.00			No G	ioundwat	er Encountered				
					Progress				
Client: Network Rail	Date	, [Hole De	oth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 18/06/2015-22/06/2015 Plant: Dando 100 (T820-637)	22/06/201 22/06/201	5 5	0.00 4.50			-	Start of Hole Completion	e instructed b	y WSP/PB
SPT Hammer: 002 Date Printed: 12/02/2016 Drilled By: SW Logged By: NJD Checked By: JHS	1	Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.						inates	



Checked By:

JHS

Borehole Log

Status: FINAL

Sheet 1 of 2

CP2AUB32CE

Ground Level: 85.229mOD Coordinates: 464990.00E

224592.00N

Project: East West Rail-Phase 2A

Description		Deptl	h O.D.	Sample / Test		Casi	ng	
Description	Legend	(m)	Level (m)	71 -	Depth (m)	Test Re	esults (Wali	er) th Installatio
MADE GROUND: Soft black slightly sandy		\$		В	0.00-0.40			_
gravelly CLAY. Sand is medium to coarse. Gravel is angular medium to coarse of crushed		0.50	84.73	ES B	0.30 0.40-1.00			3
rock possibly limestone.		\$ 0.50	64.73					
MADE GROUND: Dark brown gravelly SAND with a	- XXXXX	0.90	84.33	D	1.00			
high cobble content. Sand is fine to coarse.		‡		В	1.00-1.20			=
Gravel is angular fine to coarse concrete and		Æ		ES SPT(S)	1.00 1.50	(1,1/0 for 0mm)		3
crushed rock possibly limestone. Cobbles are angular concrete.		\$		D D	1.50-1.95	(1,1/0 101 011111)		
	- >>>>>>	*		D	2.00			=
MADE GROUND: Soft to firm dark grey CLAY with	$\times\!\!\times\!\!\times\!\!\times$	Æ			2.00			=
occasional pockets of black organic clay. Organic clay is black amorphous peat.		⋡		UT100	2.50-2.95	30 blows, 1% Recov	-n-	=
		⊱ .		01100	2.30-2.93	30 blows, 1 % Recov	ery	=
		Œ.		D	2.95-3.10			<u> </u>
		*						=
	\times	æ		D SPT(S)	3.30 3.50	N=6 (1,0 for 0mm/1,2	2.1.2) 2.50	, =
		‡		D D	3.50-3.95	14-0 (1,0 101 011111/1,2	2.50	
		3		D	4.00			
		\$		D	4.00			
		¥		UT100	4.50-4.95	34 blows, 100% Rec	overv	
	****	\$		31100	7.50-4.85	J- DIOWS, 100% Rec	Over y	
	- XXXXX	Ł						<u>=</u>
	- XXXXX	Æ						Ξ
		Œ.		D SPT(S)	5.30 5.50	N=22 (3,3/4,5,6,7)	2.50	, =
		≵		D D	5.50-5.95	14-22 (3,3/4,3,0,7)	2.50	
	XXXXX	€ 6.00	79.23					
Stiff dark grey silty CLAY with occasional	××	- 0.00	75.20					=
shell fragments. Shell fragments are up to 5mm wide. Occasional thin laminations occur.	××	¥		D	6.40			=
(OXFORD CLAY-PETERBOROUGH MEMBER)	<u>x</u>	*						_
	<u>x</u>	<u></u>		D	7.00			_
		;		UT100	7.00-7.45	74 blows, 100% Rec	overy	=
	XX	Ŧ		D	7.45-7.55			
	××	*						=
		×						_
	<u>×</u>							=
	<u>x</u>	Į.		SPT(S)	8.50	N=30 (2,5/7,7,7,9)	2.50) =
	XX	ŧ		D	8.50 8.50-8.95	(=,0,1,1,1,0)		=
	××	¥.			0.50-0.55			
	×_×	×						
	<u>x</u>	+		D	9.50			
	<u>x</u>	-						=
	×x	±						-
Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progres			14/			Observations		
Diameter Depth Casing From To Time	Date	e	Water Stri	ке (m) S	tanding Time (mins)	e Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
(mm) (m) Depth (m) (m) (m) (hours) 200 0.00 2.50	+				/	Level (III)	Deptii (III)	Sealeu (III)
Client: Network Rail					Progress			•
Consultant: WSP Parsons Brinckerhoff	Date		Hole De	pth (Casing Depth	Water Depth	Remarks	
Dates Drilled: 06/05/2015-07/05/2015	06/05/20)15	0.00		-	-	Start of Hole	
Plant: Dando 2000 (T820-634)								
SPT Hammer: 002	Remarke:	Coording	ates were r	rovided b	v WSP/PR	ising a hand held G	PS (Gamin etrex 10)) with an
Date Printed: 12/02/2016		accuracy	y of +/-4me	tres. Grou	und levels ar	e approximate and	are based on the co	ordinates
Drilled By: SW		taken by Rail.	/ WSP/PB a	and cross	-correlated w	vith LiDAR survey in	formation provided b	y Network
Logged By: ZR	1	ndii.						



East West Rail-Phase 2A

Status: FINAL

Project:

Sheet 2 of 2

CP2AUB32CE

Ground Level: 85.229mOD Coordinates: 464990.00E

ritchies	Project	No:5	624.2A	Coordinates: 464990.00E 224592.00N						
2	İ	Dept	h O.D.		San	nple / Te	est		Casing	
Description	Legend	(m)	Level (m)	Туре			est Re	sults	(Water) Depth	Installations
Stiff dark grey silty CLAY with occasional	×_^_×	E	()	Ut100	10.00-10.45	110 blows,	50% Rec	covery	(111)	-
shell fragments. Shell fragments are up to		=		D	10.45-10.55					
5mm wide. Occasional thin laminations occur. (OXFORD CLAY-PETERBOROUGH MEMBER)		E			10.45-10.55					=
(OXI OND OBXI I ETENBOROOGITMEMBER)	×	-								= =
	××	E								=
	××	-								=
	××_	E								=
	××	E		D	12.00					
	××	E		D D	12.00-12.45					=
		F								=
	×	Ē								=
	<u>×</u>	-		D	13.00					
	×××	E								=
	×_×_×	E		UT100	13.50-13.95	120 blows,	60% Rec	covery		3
		F								
		E		D	14.00					
	×— —×	Ė								=
	XX	E								=
	××	Ė								3
at 15mbgl - friable zone with abundant	×_×_×	-		D D	15.00 15.00-15.45					-
shell fragments and sand sized crystals of		F								=
possibly pyrite and selenite. crystals are fine to coarse. friable zone is possibly less		Ė								=
than 0.5m thick and crumbles under thumb		E		D	16.00					_=
pressure.	×x	F			16.00					=
	<u>x</u> x	Ē		UT100	16.50-16.95	120 blows,	85% Rec	overv		=
	××	Ė				,		,		-
	××_	_		D	17.00					-
	×××	E] :
		E								3 1
		Ė								
		-		D	18.00-18.45					
	×	E								∃ ∴ ∃ ∴
Very soft dark grey slightly gravelly silty	××	18.50	66.73	D	18.50					∃:::\ ∃ :::
CLAY. Gravel is angular fine to medium		<u> </u>	00.00	_	40.00					
siltstone. (OXFORD CLAY-PETERBOROUGH \MEMBER)	/	19.00	66.23	D	19.00					
Borehole Complete at 19.00 m		E								
		Ē								
		<u> </u>		Water Level		Observati	ons			-
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time	Date	9	Water Stril	ke (m) S	Standing Time		•	Casin	- 1	Depth
(mm) (m) Depth (m) (m) (hours)	07/05/15		19.0	0	(mins)	Leve	I (m)	Depth (m)	Sealed (m)
200 0.00 2.50	07/05/18	,	19.0		ວ	-				
					Progress					
Client: Network Rail	Date		Hole De		Casing Depth	Wate	r Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	06/05/20 07/05/20 07/05/20	15 15	11.00 11.00 19.00		2.50 2.50 2.50	-		End of shift Start of shi	t ft instructed b	
Dates Drilled: 06/05/2015-07/05/2015 Plant: Dando 2000 (T820-634)	07/05/20	15	19.00		2.50] -		Completion	instructed b	y WSP/PB
SPT Hammer: 002						<u> </u>				
Date Printed: 12/02/2016	Remarks:									
Drilled By: SW										
Logged By: ZR										
Checked By: JHS										



Borehole Log Status: FINAL

CP2AUB32CW

Sheet 1 of 2

Project: East West Rail-Phase 2A

Ground Level: 86.035mOD Coordinates: 464957.00E

224572.00N

	1 10,000	140.0	024.2/1					224572	2.00N
Description	Legend	Dept	h O.D.			nple / Test		Casing (Water)	Installation
•		(m)	Level (m)	Type	Depth (m)	Test Re	sults	Depth (m)	installation
MADE GROUND: Dark brown sandy slightly silty	XXXXX	-	(,	В	0.00-1.00			(111)	-186886
angular to subangular fine to coarse GRAVEL		E		ES	0.30				- (2)((2)
of limestone clinker and granite.		0.70	85.34	D	0.50				-
MADE GROUND: Black gravelly sandy fine to	$\times\!\!\times\!\!\times\!\!\times$	€ 0.70	05.54						=
coarse ASH. Gravel is subangular fine to		;=		D ES	1.00 1.00				_
coarse limestone clinker and granite.		1.40	84.64	D	1.40				=
MADE GROUND: Soft dark grey silty CLAY with	*****	*	0	UT100	1.50-1.95	17 blows, 100% Rec	overy		=
occasional pockets of black organic clay. Organic clay is black amorphous peat. (MADE		Έ.							=
GROUND)		 		D	2.00				=
		Æ							3
		<u>†</u>		SPT(S)	2.50 2.50-2.95	3 (1 for 0mm/0 for 0r	nm)	2.50	=
		₹			2.00 2.00				<u> </u>
	XXXX	}		D	3.00				_
		E							Ξ
	$\times\!\!\times\!\!\times\!\!\times$	‡		UT100	3.50-3.95	40 blows, 100% Rec	overy		=
MADE GROUND: Soft to firm dark brown and grow	*****	3.80	82.24	_	205.412				
MADE GROUND: Soft to firm dark brown and grey mottled slightly gravelly CLAY. (MADE		+		D	3.95-4.10				-
GROUND)		£							3
	$\times\!\!\times\!\!\times\!\!\times$	‡		SPT(S) D	4.50 4.50-4.95	N=6 (1,1/1,1,2,2)		2.50	=
	****	× -							=
Firm to stiff dark brown and dark grey thinly		5.00	81.04	D B	5.00 5.00-5.50				_
laminated CLAY. (OXFORD		-							=
CLAY-PETERBOROUGH MEMBER)		E		UT100	5.50-5.95	57 blows, 100% Rec	overy		=
Stiff dark grey gravelly silty CLAY. Gravel	×	5.80	80.24	D	5.95-6.10				=
is subangular to subrounded fine crystals.	<u> </u>	E			0.00 0.10				
(OXFORD CLAY-PETERBOROUGH MEMBER)	^= <u>`</u> =X=	-		_	0.50				=
	×	Ξ		D	6.50				\equiv
	× - × ×	1		SPT(S)	7.00	N=23 (1,3/5,5,6,7)		2.00	=
at 7mbgl - dark grey firm clay with	×	1		D D	7.00-7.45	14=23 (1,3/3,3,0,7)		2.00	
scattered shells		ŧ							\equiv
		}							Ξ
	×	Ė		D	8.00				_=
	×	1			0.00				=
	× - × - ×	<u> </u>		UT100	8.50-8.95	110 blows, 100% Re	covory		=
	×	‡		01100	0.30-0.33	110 blows, 100 /6 10	covery		=
	<u> </u>	£		D	8.95-9.10				=
	×	-							=
	×	1		D	9.50				-
	× - × ×	£							=
	****	1			<u> </u>				-
Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress		I				Observations			-
Diameter Depth Casing From To Time	Date	e	Water Stri	ke (m) S	Standing Time (mins)	Standing Level (m)	Casing Depth (n		Depth Sealed (m)
(mm) (m) Depth (m) (m) (m) (hours) 200 2.50 2.50	10/05/15	5	7.20		20	7.20	- Deput (II	,	Coalca (III)
	1								
Client: Network Rail	Date		Holo D-	nth /	Progress	Motor Dorth	Remarks		
Consultant: WSP Parsons Brinckerhoff	07/05/20		Hole De 0.00	pai (Casing Depth	Water Depth	Start of Hole		
Dates Drilled: 07/05/2015-11/05/2015	3.700/20	.	0.00				0.00111010	-	
Plant: Dando 2000 (T820-067)									
SPT Hammer: 002									
Date Printed: 12/02/2016	Remarks:					sing a hand held G			
Drilled By: DS						e approximate and ith LiDAR survey ir			
Logged By: ZR		Rail.	, ,,,,,,,,						
Checked By: JHS									
	1								



Borehole Log Status: FINAL

CP2AUB32CW

Sheet 2 of 2

Ground Level: 86.035mOD

Coordinates: 464957.00E

224572.00N

Project: East West Rail-Phase 2A ritchies

Description Stiff dark grey gravelly silty CLAY. Gravel is subangular to subrounded fine crystals. (OXFORD CLAY-PETERBOROUGH MEMBER)	Legend	Dept (m)		Туре	Depth	nple / Test Test Re		Casing (Water)	Installations
Stiff dark grey gravelly silty CLAY. Gravel is subangular to subrounded fine crystals.	x x		Level	Туре	Depth	Toot Ro	•-	1 Denth	Installations
is subangular to subrounded fine crystals.	× × × ×		+ ,,		(m)	16311/6	sults	(m)	
is subangular to subrounded fine crystals.	×-×-×	1		SPT(S)	10.00	50 (4,8/10,13,13,14 f	or 0mm)	\''''	-
	×			ט	10.00-1045.00				-
	× × × ×	1150	74.54	D ept/e)	11.00	N 22 (4 E/O 0 0 4 O)		3.00	-
Stiff dark grey silty CLAY with occasional shell fragments. Shell fragments are up to		11.50	74.54	SPT(S) D	11.50 11.50-11.95	N=33 (4,5/6,8,9,10)		3.00	
5mm wide. Occasional thin laminations occur. (OXFORD CLAY-PETERBOROUGH MEMBER)				D	12.00				
				D	13.00				- - -
				UT100 D	13.00-13.45	80 blows, 90% Reco	very		= = = = = = = = = = = = = = = = = = = =
3		-		D	14.00				-
		Ė				E0 (4 6/44 00 0 44 5	r 70mm\	2.00	=
		[SPT(S) D	14.50 14.50	50 (4,6/11,20,8,11 fo	r /UMM)	3.00	-
at 15mbgl - friable zone with abundant shell fragments and sand sized crystals of possibly pyrite and selenite. Crystals are				D	15.00				- - -
fine to coarse. Friable zone is possibly less than 0.5m thick and crumbles under thumb pressure.		-		D UT100	16.00 16.00-16.45	100 blows, 80% Reco	overy		-
		=		D	16.50				- - -
		-		D	17.00				 -
				SPT(S) D	17.50 17.50-17.95	N=40 (6,7/8,8,10,14)		3.00	
Very soft dark grey slightly gravelly silty CLAY. Gravel is angular fine to medium siltstone. (OXFORD CLAY-PETERBOROUGH	××	18.00	68.04	D	18.00				
MEMBER) Borehole Complete at 18.80 m	<u> </u>	18.80	67.24	D	18.80				
		- - - -							
	$oldsymbol{ol}}}}}}}}}}}}}}}}}}$				Water Level	Observations			
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	е	Water Stri	ke (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m		Depth Sealed (m)
200 2.50 2.50									
Client: Network Rail					Progress				
Consultant: WSP Parsons Brinckerhoff	07/05/20:		Hole De	-	Casing Depth	Water Depth	Remarks End of shift		
Dates Drilled: 07/05/2015-11/05/2015 Plant: Dando 2000 (T820-067)	07/05/20 11/05/20 11/05/20	15 15 15	10.45 10.45 18.80		2.50 2.50 2.50	10.30	End of shift Start of shift Completion instructed		y WSP/PB
SPT Hammer: 002 Date Printed: 12/02/2016	Remarks:								
Drilled By: DS Logged By: ZR									
Checked By: JHS									



East West Rail-Phase 2A

SPT(S)

UT100

D

SPT(S)

1.00

1.50 1.50-1.95

2.00

2.50-2.95

3.00

3.50

3.50-3.95 3.50-4.00

N=10 (1,1/2,3,2,3)

20 blows, 70% Recovery

N=13 (1,2/2,4,3,4)

Status: FINAL

Project:

CP2A4C Sheet 1 of 3

Ground Level: 87.200mOD Coordinates: 468096.00E

225585.00N

2.50

Project No: 5624.2A Casing Sample / Test O.D. Depth (Water) Depth (m) Legend Description Level (m) Type Depth **Test Results** (m) (m) 0.00-0.10 0.10-0.50 TOPSOIL: Brownish grey to black slightly clayey SAND & GRAVEL. Sand is fine to coarse. 0.20 87.00 B ES 0.30 Gravel is angular fine to coarse crushed rock possibly limestone

Soft to firm light greyish brown CLAY with occasional sand size crystals. Crystals are fine to medium. Crystals are possibly selenite. (OXFORD CLAY-PETERBOROUGH MEMBER)

Stiff becoming very stiff at 16.00mbgl thinly laminated greyish brown silty CLAY. Low to moderate proportion of fossil fragments. Low organic odour. (OXFORD

CLAY-PETERBOROUGH MEMBER)

				Nater Level	Observations		
× - × - × - × - × - × - × - × - × - × -			D	9.50			
			SPT(S) D	8.50 8.50-8.95	N=31 (3,4/6,8,8,9)	3.00	
××			D	8.00			
×× ××			D	7.45-7.55			
			UT100	7.00-7.45	110 blows, 100% Recovery		
×x x x			D	6.50			1
×			SPT(S)	5.50 5.50-5.95	N=30 (3,4/5,6,10,9)	2.50	11111
	5.20	82.00	D B	5.00 5.00-5.50			1111
			UT100	4.50-4.95	110 blows, 100% Recovery		
			D	4.00			_

Borehole continued on next sheet Chiselling / Slow Progress Hole Diameter Detail Standing Time Water Strike (m) Standing Casing Depth Date Diameter Depth (m) Casing Depth (m) To (m) Time (hours) (mins) Level (m) Depth (m) Sealed (m) (mm) No Groundwater Encountered 200 0.00 3.00 Progress Client: Network Rail Date Hole Depth Casing Depth Water Depth Remarks

Consultant: WSP | Parsons Brinckerhoff Dates Drilled: 12/05/2015-13/05/2015 Plant: Dando 2000 (T820-068) SPT Hammer: 002

Date Printed: 12/02/2016 Drilled By: SR ZR Logged By: Checked By: JHS

12/05/2015 0.00 0.00 Start of Hole

Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.



Status: FINAL

CP2A4C Sheet 2 of 3

Project: East West Rail-Phase 2A

Ground Level: 87.200mOD Coordinates: 468096.00E

225585.00N

			, ,						
Description	Logorat	Depth	th O.D.			mple / Test		Casing	
Description	Legend	(m)	Level (m)	Туре		Test Re	sults	Opth Depth	Installation
Stiff becoming your stiff at 16 00mbs/ thinks	× ~ -×		(111)	UT100	(m)	110 blows, 70% Rec	overy	(m)	
Stiff becoming very stiff at 16.00mbgl thinly laminated greyish brown silty CLAY. Low to		-				-,	•		
moderate proportion of fossil fragments. Low	×x^								
organic odour. (OXFORD CLAY-PETERBOROUGH MEMBER)	××	-							
CLAT-PETERDORUUGH WEWBER)	××	_							
	<u>×</u> ×	E							
	<u>x</u>	-							
	<u>××</u>	-							
	×××	_							
	<u>x</u> x	E							
**	^	E							
_ 0.4	<u>x</u> - <u>-</u> x	Ė							
1	××	_							
	<u>x</u>	Ė							
	<u>×</u>	E							
	×x-	-							
## B	××	Ė							
	×××								
✓ 's	<u>x</u> x	Ė		00=:-:	,,=-	== (== (=			
	<u>x</u>			SPT(S) D	14.50 14.50-14.95	50 (20 for 0mm/22,2	5,3 for 5mm)	3.00	
1-3	××								
	<u> </u>	-		D	15.00				
• 7	<u>x</u> x	E							
	^x_	-							
	<u>x</u> - <u>-</u> -x								
	××	-		SPT(S) D	16.00 16.00-16.45	50 (5,9/12,12,15,11	for 55mm)	3.00	-
V		Ė		U	10.00-10.45				
		-							
	××	-							
	××			D	17.00				
	×xx	Ė							
	<u>x</u> x	E		SPT(S)	17.50	50 (5,9/11,15,20,4 fo	or 10mm)	3.00	
		-		D	17.50-17.95				
	××	E		D	18.00				
	××								=
		-							=
	<u>×</u>								
	×x			SPT(S)	19.00	50 (6,9/12,20,18 for	65mm)	3.00	
	<u>×</u> ×			D ´	19.00-19.45		•		
2/	×××	Ė							
	<u>X</u> X	E							=
	x_	-							
Hole Diameter Detail Chiselling / Slow Progress						Observations	_	1	
Diameter Depth Casing From To Time	Date	, '	Water Strik	(e (m) S	Standing Time (mins)		Casing		Depth
(mm) (m) Depth (m) (m) (m) (hours) 200 0.00 3.00	1		No C	roundwet	er Encountered	Level (m)	Depth (n	11)	Sealed (m)
200 0.00 3.00			INO G	, our luwat	or Encountered	`[
Client: Notwork Beil					Progress	1	1		
Client: Network Rail	Date	•	Hole Dep	oth (Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff		[
Dates Drilled: 12/05/2015-13/05/2015									
Plant: Dando 2000 (T820-068)									
SPT Hammer: 002	Domasic:					1	l .		
Date Printed: 12/02/2016	Remarks:								
Drilled By: SR									
Logged By: ZR									
Checked By: JHS									
	1								



JHS

Checked By:

Borehole Log

East West Rail-Phase 2A

Status: FINAL

Project:

CP2A4C Sheet 3 of 3

Ground Level: 87.200mOD Coordinates: 468096.00E

ritchies	Project	No: 56	624.2A			Cool	rdinates:	468096 225585	
Description	Legend	Depth	O.D.		Sam	nple / Test		Casing	
Description	Legend	(m)	Level (m)	Туре	Depth	Test Re	esults	Depth	Installations
Stiff becoming very stiff at 16.00mbgl thinly laminated greyish brown silty CLAY. Low to moderate proportion of fossil fragments. Low organic odour. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 20.00 m		20.00	67.20	D	(m) 20.00			(m)	
					Water Level	Observations			
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time	Date	,	Water Strik	ke (m)	Standing Time (mins)		Casing		Depth
Diameter Depth Casing From To Time (mm) 200 0.00 3.00			No G	Groundwat	ter Encountered	Level (m)	Depth (r	m)	Sealed (m)
	-				Progress				
Client: Network Rail	Date)	Hole De	pth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 12/05/2015-13/05/2015 Plant: Dando 2000 (T820-068) SPT Hammer: 002	13/05/201	15	20.00		3.00	-	Completion	instructed b	y WSP/PB
SPT Hammer: 002 Date Printed: 12/02/2016 Drilled By: SR Logged By: ZR Checked By: IHS	Remarks:	ı				•	•		



SPT Hammer:

Date Printed:

Drilled By:

Logged By: Checked By: 002

SW

NC

JHS

12/02/2016

ritchies

Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

CP2A15CE

Sheet 1 of 1

Ground Level: 75.200mOD Coordinates: 462741.00E

223867.00N

Description	Legend	Depth	h O.D.		San	mple / Test		Casing (Water)	. i
·	Legona	(m)	Level (m)	. , , , ,	(m)	Test Res	sults	Depth (m)	Installations
MADE GROUND: Dark brown sandy slightly silty angular to subangular fine to coarse GRAVEL		0.30	74.90	B D	0.00-0.50 0.30	1	_		
of basalt clinker and granite. Sand is fine to coarse.		0.70	74.50	B D	0.50-0.80 0.60	1			
MADE GROUND: Light orangish brown slightly gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse of chert.				D UT100	1.00 1.20-1.65	20 blows, 70% Recov	very		1
MADE GROUND: Stiff to very stiff dark brown CLAY clasts in in a firm brown mottled grey clay matrix.		il printerior		D	2.00				-
		100	72.20	SPT(S)	2.50-2.95	N=5 (1,1/1,1,2,1)			-
MADE GROUND: Firm brownish grey sandy CLAY with black organic partings. Sand is fine to medium.		3.00	72.20	D UT100	3.00	18 blows, 80% Recov	overy		-
MADE GROUND: Firm grey slightly sandy CLAY with orangish brown silt partings.		3.70	71.50	D	4.00				-
MADE GROUND: Firm light brown mottled orange and grey CLAY with orangish brown silt		4.50	70.70	SPT(S)	4.50 4.50-4.95	N=8 (1,2/2,2,2,2)			
partingsfrom 4.5mbgl to 7mbgl - firm dark greyish brown thinly laminated slightly organic clay	<u>x - x - x</u>	5.00	70.20	D	5.00				
with extremely closely spaced orangish brown and yellow silt and shell laminae with gypsum crystals.	×——×——× ——————————————————————————————			UT100 D	5.50-5.95 6.00	49 blows, 100% Reco	overy		-
Firm dark greyish brown thinly laminated slightly organic CLAY with extremely closely spaced orangish brown and yellow silt and shell laminae. (OXFORD CLAY-PETERBOROUGH	xx_								- - - - - - -
MEMBER) \(\text{from 5.5mbgl to 7mbgl - becoming stiff.}\)	Æ	7.00	68.20	SPT(S) D D	7.00 7.00-7.45	N=34 (3,4/7,8,9,10)			
Very stiff dark grey thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)from 7.3mbgl to 7.5mbgl - slightly sandy	× × ×	7.50	67.70 67.20	D D	7.50 8.00	1			- - - -
\silty with grey fine to medium sand partings. \Dark grey clayey silty fine to medium SAND. \((OXFORD CLAY-PETERBOROUGH MEMBER)\)	X - X - X - X - X - X - X - X - X - X -	8.50	66.70	SPT(S)		29 (9,11/21,8,0 for 0m	mm)		
Very stiff dark grey very sandy silty CLAY with frequent grey fine to medium Sand partings. (OXFORD CLAY-PETERBOROUGH MEMBER)	- XX	8.95	66.25						
		<u> </u>		L		1			
Chicalling / Clay Dragge	\perp					Observations			
Hole Diameter Detail Chiselling / Slow Progress	S Date	э '	Water Strik	. ,	Standing Time (mins)	Level (m)	Casing Depth (m	- 1	Depth Sealed (m)
150 9.00 3.00			NO O	Touriuwate	# Encountered				
Client: Network Rail	1				Progress				
Consultant: WSP Parsons Brinckerhoff	03/06/201 03/06/201		0.00 9.00		Casing Depth	h Water Depth	Remarks Start of Hole	ie	-
Dates Drilled: 03/06/2015 Plant: Dando 100 (T820-637)	03/06/201	15	9.00		3.00	-	Refusal		

Rail.

Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an

accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network



Status: FINAL

CP2A15CE
Sheet 1+ of 1

Project: East West Rail-Phase 2A

Ground Level: 75.200mOD Coordinates: 462741.00E

223867.00N

								223007	
Description		Denth	O.D.		San		Casing	!	
Description	Legend	Depth (m)	Level	Туре			Tr.	(Water)	Installations
		. ,	(m)	. , p o	Depth (m)	Test Re	sults	(m)	
Dark grey clayey silty fine to medium SAND with shell fragments. (KELLAWAYS CLAY)	1	Ė							
		E							=
Borehole Complete at 9.00 m		F							
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						Observations			
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time	Date	,	Water Stril	ke (m) S	Standing Time (mins)	Standing	Casing		Depth
(mm) (m) Depth (m) (m) (hours)						=======================================	Depth (m	1)	Sealed (m)
150 9.00 3.00			No G	roundwat	er Encountered	7			
					Progress				
Client: Network Rail	Date	e	Hole De	pth (Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff					<u> </u>				
Dates Drilled: 03/06/2015									
Plant: Dando 100 (T820-637)									
SPT Hammer: 002	<u> </u>					1	<u> </u>		
Date Printed: 12/02/2016	Remarks:								
Drilled By: SW									
Logged By: NC									
Checked By: JHS									
									EC7 BH LOG



CP2A15CW

Sheet 1 of 1

Status: FINAL

Project: East West Rail-Phase 2A

Ground Level: 75.000mOD

Coordinates: 462710.00E 223859.00N

Project No: 5624.2A

									.00.1
Description	Legend	Depth	O.D.		Sar	nple / Test		Casing (Water)	(I
Безоприон	Legena	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth (m)	Installations
MADE GROUND: Dark brown to black sandy angular to subangular fine to coarse GRAVEL of basalt clinker and granite. Sand is fine to coarse.		0.20	74.80	B B	0.00-0.20 0.20-0.80			(111)	
MADE GROUND: Light orangish brown gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse of sandstone and chert.				D UT100	1.00 1.50-1.95	22 blows, 70% Reco	very		
MADE GROUND: Stiff to very stiff dark brown CLAY clasts in in a firm brown mottled grey clay matrix.		2.00	73.00	D	2.00				-
MADE GROUND: Stiff brown to light brown mottled orange and grey slightly sandy CLAY with silt partings. Sand is fine.		2.50	72.50 72.00	SPT(S) D	2.50 2.50-2.95 3.00	N=9 (1,2/2,2,2,3)			
MADE GROUND: Stiff light brown mottled orange and grey CLAY with much silt partings.				UT100	3.50-3.95	27 blows, 30% Reco	very		=
Stiff light brown mottled orange and grey slightly sandy slightly gravelly CLAY with orangish brown silt partings and calcareous nodules. Sand is fine. Gravel is rounded fine	×	4.00	71.00	D	4.00				-
to medium of chert. (OXFORD CLAY-PETERBOROUGH MEMBER)	××	4.50	70.50	SPT(S) D	4.50 4.50-4.95	N=12 (2,2/2,2,4,4)			=
Firm grey CLAY with orangish brown silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)	XX			D	5.00				
Firm dark greyish brown thinly laminated slightly organic CLAY with extremely closely spaced orangish brown and yellow silt and shell laminae. (OXFORD CLAY-PETERBOROUGH				UT100 D	5.50-5.95 6.00	58 blows, 90% Reco	very		- - - - - - -
MEMBER)from 5.5mbgl to 7mbgl - stiff with gypsum crystalsfrom 6mbgl to 7mbgl - becoming very stiff.	××	7.00	68.00	SPT(S)	7.00	N=46 (4,5/5,11,15,15	5)		-
Very stiff to hard dark grey sandy silty CLAY with much grey fine to medium Sand partings. (OXFORD CLAY-PETERBOROUGH MEMBER)from 7.3mbgl to 8mbgl - with occasional				D	7.00 7.00-7.45				
shell fragmentsfrom 7.8mbgl to 8mbgl - becoming very sandy.	X X X X X X X X X X X X X X X X X X X	8.00	67.00	D B	8.00 8.00-9.00				-
Dark grey clayey silty fine to medium SAND with black carbonaceous fragments. (KELLAWAYS SAND)from 9mbql to 9.85mbql - becoming very	* * * * * *	-		D	9.00				
clayey.	* * * * * * * *			SPT(S) D	9.40 9.40-9.85	(13,12 for 60mm)			=======================================
Borehole Complete at 9.85 m		9.85	65.15		Motor Lever	Obconvotions			
Hole Diameter Detail Chiselling / Slow Progress		Ι.	\\/-t C: "	()	vvater Level	Observations	0		Dareth

Borehole Comp	oto at 0 85	5 m											
Borenoie Gompi	Cic ai 5.60	7 111							Water Level C	Observations			
Hole Diamete	er Detail	Chiselli	ng / Slov	w Progress	_		Water Strike	e (m)	Standing Time	Standing	Casing	Depth	
Diameter Depth (mm) (m)	Casing Depth (m)	From (m)	To (m)	Time (hours)	Date		Traio: Came	, ()	(mins)	Level (m)	Depth (m)	Sealed	
							No Gro	oundwa	ter Encountered				
Oli	N								Progress				
Client:		ork Rail			Date		Hole Dept	th	Casing Depth	Water Depth	Remarks		
Consultant:	WSP	Parsons	Brincke	erhoff	08/06/2015	5	0.00		-	-	Start of Hole		
Dates Drilled:	08/06	/2015-10/	06/2015	5	08/06/2015 09/06/2015		5.50 5.50		3.00 3.00	- -	End of shift Start of shift		
Plant:	Dand	o 100 (T8	20-637)		09/06/2015		9.85		3.00	-	Refusal		
SPT Hammer:	002												

SPT Hammer: 002
Date Printed: 12/02/2016
Drilled By: SW
Logged By: NC
Checked By: JHS

Remarks: Hole refused at 9.6mbgl due to ground conditions. Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.



Status: FINAL

Project:

Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

CP2AMG-D

Sheet 1 of 2

Ground Level: 79.860mOD Coordinates: 463459.00E

224090.00N

	i roject	140.0	02-T.Z/ (224090	.UUIN
Description	Logond	Dept	h O.D.		Sam	nple / Test		Casing	
Description	Legend	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth	Installations
TOPSOIL - Soft black slightly gravelly CLAY.		ŧ		В	0.00-1.20				=
Gravel is angular to subangular fine to /medium flint.		0.30	79.56	PID ES	0.30 0.30	0.10ppm			=
		-							=
Soft to firm light greyish brown occasionally		‡							=
thinly laminated mottled CLAY with rare rootlets. Orangish brown discolouration		E		PID D	1.00 1.00	0.10ppm			-
between partings. Rootlets are up to 5mm		1		ES B	1.00 1.30-1.50				_
thick. (OXFORĎ CLAY-PETERBOROUGH		-		SPT(S)	1.50	N=6 (1,1/1,1,2,2)			=
MEMBER)		E		D	1.50-1.95				=
Firm light grey to dark grey CLAY with		2.00	77.86	D	2.00				_
occasional fine to medium sand size crystals		E							3
and low content of weathered shell fragments.		‡		UT100	2.50-2.95	70 blows, 100% Reco	overy		=
Crystals are possibly selenite. Shell fragments are up to 5mm wide. (OXFORD		Ē							3
CLAY-PETERBOROUGH MEMBER)		-		D	3.00				- 2/11/11
		Ė							
1.4		-		SPT(S) D	3.50 3.50-3.95	N=18 (1,3/3,3,5,7)			
Pa		F		U	3.30-3.93				
Firm to stiff dark grey silty CLAY with low	= = =	4.00	75.86	D	4.00				
content of weathered shell fragments. Shell		‡							
fragments are up to 5mm wide. (OXFORD		£		UT100	4.50-4.95	120 blows, 70% Reco	overy		
CLAY-PETERBOROUGH MEMBER)		-							- (2)(2)
		Ė		D	5.00				
1,3		-							
6.5		Ē							3000
		-							
		Ė		SPT(S)		N=21 (1,3/4,5,5,7)			
		F		D B	6.00 6.00				
		Ė		D	6.00-6.45				
		Ē							
0.000		7.00	72.86	D	7.00				- 7000
Stiff dark grey CLAY with a low content of weathered shell fragments. Shell fragments			-						
are up to 10mm wide. (OXFORD		Ė		UT100	7.50-7.95	5 120 blows, 70% Recovery	overy		
CLAY-PETERBOROUGH MEMBER)		E							
		-		D	8.00				
-33		E							
		ţ.							
0.3		E							
		-		SPT(S)		50 (3,5/8,12,17,13 for	r 55mm)		
		E		D D	9.00 9.00-9.45				
		Ē							
		‡							
Borehole continued on next sheet		Г			Water I evel	Observations			
Hole Diameter Detail Chiselling / Slow Progress			Water Strik	(e (m)	Standing Time		Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	Э		(111)	(mins)	Level (m)	Depth (m		Sealed (m)
200 13.70 13.70 150 19.00 19.00			No G	roundwa	ter Encountered	1	- ,		
150 13.00 13.00									
					Progress				
Client: Network Rail	Date	е	Hole De	pth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	05/10/20		0.00		- 3	-	Start of Hole	e	
Dates Drilled: 02/10/2015-07/10/2015									
Plant: Dando 3000 (T820-632)									
SPT Hammer: 006									
Date Printed: 12/02/2016						sing a hand held G approximate and a			
Drilled By: PM		taken by				ith LiDAR survey in			
Logged By: ZR	1	Rail.							
Checked By: JHS									
	I .								



Sheet 2 of 2

Project: East West Rail-Phase 2A

Ground Level: 79.860mOD

Coordinates: 463459.00E

CP2AMG-D

Description							Project	No: 5	624.2A					224090	.00N
Self dark grey silly CLAY with a low content of weathered shell fragments. Shell fragments are up to flown with content of weathered shell fragments. Shell fragments are up to flown with (OXPO) 12,000 12,			Daganinti				1	Dept	h OD		Sam	ple / Test		Casing	
Stiff day grey CLAY with a low content of weathered shell fragments. Shell fragments. Shell fragments. Shell fragments are up to 10mm wide. (OXFORD CLAY with a low content of weathered shell fragments. Shell fragments are up to 10mm wide. (OXFORD CLAY with frequent angular medium to coarse still gravel.			Description	on			Legena		Level	Туре	Depth		Regulte	-(water) Depth	Installations
Value Valu								_	(m)	D.	(m)	1631	resuits	(ṁ)	16//89//89
are up to 15mm wide. (CXCROR CLAY-PETERBOROUGH MEMBER) Firm dark grey sity CLAY with a low content of weatherest shell fragments. Shell fragments of weathered shell fragments. Shell fragments of weather weather weather weather weather weather weather	Stiff dark	k grey C	LAY with a	a low conte	ent of			Ē		D	10.00				
CLAY-PETERBOROUGH MEMBER	are up to	o 10mm	wide (OX	. Shell flag	Jillelits			_		UT100	10 50-10 95	120 blows 80%	Recovery		
Firm dark grey silty CLAY with a low content of weathered shell fragments. Shell fragments are up to 10mm wide. (CXFCP) CLAY PETERBOROUCH MEMBER? 12,00 67.86 SPTIS 12,00)			-		01100	10.00 10.00	120 510413, 0070	recovery		- 30000
Firm dark grey salty CLAY with a low content of weathered shell fragments. Shell fragments are up to 10mm wide. (XFCRD CLAY with factuart of weathered shell fragments are up to 10mm wide. (XFCRD CLAY FETERROR ROUGH MEMBER) 1300 66.96 D 1300 1200-12.45 1300 13					,			-		_	44.00				
Firm dark grey ellip CLAY with a low content of weathered shell fragments. Sell if ragments are up to 10mm wide. (DXFORD CLAY-PETERBROUGH in MEMBER) Soft dark grey sardy CLAY with frequent angular medium to coarse sill gravel. (KELLAWAYS SANDS) Dark grey slightly clavey fine SAND. Clay is extremely rare. (KELLAWAYS SANDS) Stiff to very stiff dark grey CLAY. (KELLAWAYS SANDS) Stiff to very stiff dark grey CLAY. (KELLAWAYS CLAY) Storing to extremely strong light grey SLITSTONE recovered as angular medium to coarse sill gravel. Hole Diameter Detail Chiefling / Slovy Progress Demote Complete at 19.10 m Dark grey lightly clavey fine SAND. Clay is extremely strong light grey SLITSTONE recovered as angular medium to coarse sill gravel. Hole Diameter Detail Chiefling / Slovy Progress Demote Depth Death Coarse sill gravel. Elevance Depth Death Coarse sill gravel. Client: Network Rail Consultant: WSP Parsons Brinckerhoff Dates Dates Dates Dates Dates Dates Dates Dates Dates Dates Dates Dates Dates Dates Dates Dates Dates Dates Date Da										D	11.00				1 3 × × ×
Firm dark grey silly CLAY with a low content of weathered shell fragments. Sell fragments are up to 10mm wide. (DXFORD CLAY-PETERBROUGH INEMER) Soft dark grey sardy CLAY with frequent angular medium to coarse sill gravel. (KELLAWAYS SANDS) Dark grey slightly clavey fine SAND. Clay is extremely rare. (KELLAWAYS SANDS) Stiff to very stiff dark grey CLAY. (KELLAWAYS CLAY) Stiff to very stiff dark grey CLAY. (KELLAWAYS CLAY) Storing to extremely strong light grey sliLTSTONE recovered as angular medium to coarse sill gravel. Hole Diameter Detail Chies as angular medium to coarse sill gravel. The coarse sill gravel. Water Sill Sill Sill Sill Sill Sill Sill Sil															
Firm dark grey silly CLAY with a low content of weathered shell fragments. Sell fragments are up to 10mm wide. (DXFORD CLAY-PETERBROUGH INEMER) Soft dark grey sardy CLAY with frequent angular medium to coarse sill gravel. (KELLAWAYS SANDS) Dark grey slightly clavey fine SAND. Clay is extremely rare. (KELLAWAYS SANDS) Stiff to very stiff dark grey CLAY. (KELLAWAYS CLAY) Stiff to very stiff dark grey CLAY. (KELLAWAYS CLAY) Storing to extremely strong light grey sliLTSTONE recovered as angular medium to coarse sill gravel. Hole Diameter Detail Chies as angular medium to coarse sill gravel. The coarse sill gravel. Water Sill Sill Sill Sill Sill Sill Sill Sil															
Firm dark grey silly CLAY with a low content of weathered shell fragments. Sell fragments are up to 10mm wide. (DXFORD CLAY-PETERBROUGH INEMER) Soft dark grey sardy CLAY with frequent angular medium to coarse sill gravel. (KELLAWAYS SANDS) Dark grey slightly clavey fine SAND. Clay is extremely rare. (KELLAWAYS SANDS) Stiff to very stiff dark grey CLAY. (KELLAWAYS CLAY) Stiff to very stiff dark grey CLAY. (KELLAWAYS CLAY) Storing to extremely strong light grey sliLTSTONE recovered as angular medium to coarse sill gravel. Hole Diameter Detail Chies as angular medium to coarse sill gravel. The coarse sill gravel. Water Sill Sill Sill Sill Sill Sill Sill Sil															
Of weathered shell fragments. Shell fragments wide. (DXPCAM) MEMBER) The shell fragments wide. (DXPCAM) MEMBER wide. (DXPCAM) MEMBE	Firm dor	rk arov s	silta CLAV	with a law	contont		- ×	12.00	67.86			N=43 (2,5/7,9,13	3,14)		
According to 1/mm wilds. (OXFORD CUGH MEMBER)	of weath	nered sh	ell fragmer	wiiii a iow nts Shell fi	ragment	ts									- 0000
Soft dark grey sandy CLAY with frequent angular medium to coarse sill gravel. (KELLAWAYS SANDS) 13.00 68.86 D 13.00	are up to	o 10mm	wide. (OX	FORD	agiiioiii		××	-							
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Date Diameter Detail Chiselling / Slow Progress Date								E]]
Date Diameter Detail Chiselling / Slow Progress Date								<u> </u>	-1	١ ,	Water Level	Observations		1	1 1
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Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

CP2AMG-U

Sheet 1 of 3

Ground Level: 80.280mOD Coordinates: 463455.00E

224105.00N

Depth Depth Depth Depth Depth Depth Depth Test Results Casing Management of the part of the search Depth Depth Test Results Depth Depth Depth Depth Test Results Depth		i ioject							224105	0.00IN
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Firm Ign greyish brown coassionally thinly large internated motiles (CAY, Clarges) troub to committee in the continuation of t			100	70.29	חום	1.00	0.20npm			
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Crystals are possibly selente. Shell fragments are up to 5mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER)			<u> </u>							
Trigments are up to 5mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER)			E		SPT(S)	2.50 2.50-2.95	N=14 (1,2/2,4,4,4)			
CLAY-PETERBOROUGH MEMBER) Jensel Description on next sheet Local Similar (CLAY-PETERBOROUGH MEMBER) Jensel Description on next sheet Local Description on next sheet Solid dark grey CLAY with low content of weathered shell fragments. Shell fragments are up to 5mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) Jensel Description on next sheet Jen	fragments are up to 5mm wide. (OXFORD		-							
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Spring A 500 N=22 (2.34.5.8.8) Firm to stiff dark grey silty CLAY with low content of weathered shell fragments. Shell fragments are up to 5mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) John fare bands. Spring A 50 D S 500	1 2		E							
### A smbgl to 6.0mbgl - becoming stiff ### A sound of the content of weathered shell fragments are up to 5mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 16mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 16mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 10mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 10mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 10mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 10mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 10mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 10mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 10mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of weathered shell fragments are up to 10mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content of the content of weathered shell fragments are up to 10mm wide (OXFORD CLAY-PETERBOROUGH MEMBER) ### A sound of the content	4,5		F							
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Firm to stiff dark grey silty CLAY with low content of weathered shell fragments. Shell fragments are up to 5mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) from 6mbgl to 6.5mbgl - silty clay occurs in rare bands. Stiff dark grey CLAY with a low content of weathered shell fragments are up to 5mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) from 6mbgl to 6.5mbgl - silty clay occurs in rare bands. Stiff dark grey CLAY with a low content of weathered shell fragments are up to 10mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) p. 7.00	om 4.ombgi to o.ombgi - becoming still		Ė		U	4.50-4.95				
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fragments are up to 5mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) .from 6mbgl to 6.5mbgl - sifty clay occurs in rare bands. Stiff dark grey CLAY with a low content of weathered shell fragments. Shell fragments are up to 10mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress Date Da	content of weathered shell fragments. Shell		‡		U1100	6.00-6.45	120 blows, 80% Reco	overy		
from 6mbgl to 6.5mbgl - sitty clay occurs in rare bands. Stiff dark grey CLAY with a low content of weathered shell fragments. Shell fragments are up to 10mm wide. (CXFQRD CLAY-PETERBOROUGH MEMBER) Borehole continued on next sheet Hole Diameter Detail Chiselling / Siow Progress Diameter Depth Casing Pepth (min)	fragments are up to 5mm wide. (OXFORD	<u> </u>	*							
Suff dark grey CLAY with a low content of weathered shell fragments. Shell fragments are up to 10mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress Diameter Detail Chiselling / Slow Progress Diameter Detail Chiselling / Slow (Incomplete Clay) Date Water Strike (m) Standing Time Standing Casing Depth (mins) No Groundwater Encountered No Groundwater Encountered Water Strike (m) Standing Time Chine (mins) No Groundwater Encountered No Groundwater Encountered No Groundwater Encountered Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4/metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.		××		-						
Stiff dark grey CLAY with a low content of weathered shell fragments. Shell fragments are up to 10mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole continued on next sheet D		x	7.00	73.28	D	7.00				
weathered shell fragments. Shell fragments are up to 10mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole continued on next sheet D			‡							
are up to 10mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress Diameter Depth (mm) Prom To Time (mm) Prom Depth (m) Prom Depth (m) Prom Depth (m) Prom Depth (m) Progress Date Hole Depth Casing Depth Water Depth Remarks	weathered shell fragments. Shell fragments		Ė				N=30 (2,3/5,7,8,10)			
Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing Prom To Time (mm) (mm) Depth (m) Progress (mm) Depth (m) Sealed (m) No Groundwater Encountered No Groundwater Encountered Progress Client: Network Rail Consultant: WSP Parsons Brinckerhoff Dates Drilled: 28/09/2015-01/10/2015 Plant: Dando 3000 (T820-632) SPT Hammer: 006 SPT Hammer: 006 Date Printed: 12/02/2016 Date Printed: 12/02/2016 Date Printed: 12/02/2016 Femarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network	are up to 10mm wide. (OXFORD		<u> </u>		D	7.50-7.95				
Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress Date Date Strike (m) Standing Time (mins) Level (m) Depth (m) Depth (m) Depth (m) Depth (mins) Depth (mins	CLAY-PETERBOROUGH MEMBER)				D	8.00				
Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress Date Date Strike (m) Standing Time (mins) Level (m) Depth (m) Depth (m) Depth (m) Depth (mins) Depth (mins			-							
Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress Date Date Strike (m) Standing Time (mins) Level (m) Depth (m) Depth (m) Depth (m) Depth (mins) Depth (mins	* 3		F							
Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress Date Date Strike (m) Standing Time (mins) Level (m) Depth (m) Depth (m) Depth (m) Depth (mins) Depth (mins	0.3		E							
Borehole continued on next sheet Hole Diameter Detail Chiselling / Slow Progress Diameter (mm) Cepth (m) Depth (m) Depth (m) Depth (m) Cepth (m) Depth (m) Cepth (m) Depth (m) Cepth (m) Depth (m) Cepth (m) Cepth (m) Depth (m) Cepth (m) Cepth (m) Depth (m) Cepth (m) Cepth (m) Cepth (m) Depth (m) Cepth (m) Depth (m) Cepth (m) Depth (m) Depth (m) Cepth (m) Depth (m)			-							
Date			E		UT100	9.00-9.45	120 blows, 60% Reco	overy		
Date			ļ.							
Date			E							
Date	Develop continued on post of a					Weter I	Observat!			
Diameter (mm) Depth (m) Casing From (m) To (m) Time (hours) 200 18.00 18.00 19.50			П	\\/-: \C: ''				~ ·	 	D"
Client: Network Rail Consultant: WSP Parsons Brinckerhoff Dates Drilled: 28/09/2015-01/10/2015 Dando 3000 (T820-632) SPT Hammer: Date Printed: 12/02/2016 Date Printed: 12/02/2016 Date Printed: 2R PM Logged By: ZR Network Rail No Groundwater Encountered Date Casing Depth Water Depth Remarks Start of Hole Date Depth Remarks Start of Hole Date Depth Remarks Start of Hole Date Depth Start of Hole Date Depth Remarks Date Depth Start of Hole Date Depth Date Depth Start of Hole Date Depth	Diameter Depth Casing From To Time	Date	Э	vvater Stril	ke (m)				l l	
Client: Network Rail Consultant: WSP Parsons Brinckerhoff Dates Drilled: 28/09/2015-01/10/2015 Plant: Dando 3000 (T820-632) SPT Hammer: 006 Date Printed: 12/02/2016 Drilled By: PM Logged By: ZR Network Rail Date Hole Depth Casing Depth Water Depth Remarks 0.00 Start of Hole 29/09/2015 0.00 Start of Hole 29/09/2015 0.00 Start of Hole Printed: 29/09/2015				No G	roundwa	. ,	` '	Dopui (II	7	Coalca (III)
Client: Network Rail Consultant: WSP Parsons Brinckerhoff Dates Drilled: 28/09/2015-01/10/2015 Plant: Dando 3000 (T820-632) SPT Hammer: 006 Date Printed: 12/02/2016 Drilled By: PM Logged By: ZR Date Hole Depth Casing Depth Water Depth Remarks 29/09/2015 0.00 - Start of Hole	150 21.00 19.50									
Client: Network Rail Consultant: WSP Parsons Brinckerhoff Dates Drilled: 28/09/2015-01/10/2015 Plant: Dando 3000 (T820-632) SPT Hammer: 006 Date Printed: 12/02/2016 Drilled By: PM Logged By: ZR Date Hole Depth Casing Depth Water Depth Remarks 29/09/2015 0.00 - Start of Hole										
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 28/09/2015-01/10/2015 Plant: Dando 3000 (T820-632) SPT Hammer: 006 Date Printed: 12/02/2016 Drilled By: PM Logged By: ZR Date Hole Depth Casing Depth Water Depth Remarks 1.000 Start of Hole Nater Depth Remarks 1.000 Start of Hole 1.000 - Start of H	Client: Network Rail									
Dates Drilled: 28/09/2015-01/10/2015 Plant: Dando 3000 (T820-632) SPT Hammer: 006 Date Printed: 12/02/2016 Drilled By: PM Logged By: ZR Date Sprilled: 28/09/2015-01/10/2015 Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.					pth	Casing Depth	Water Depth			
Plant: Dando 3000 (T820-632) SPT Hammer: 006 Date Printed: 12/02/2016 Drilled By: PM Logged By: ZR Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.		29/09/201	15	0.00		-	-	Start of Hole	e	
SPT Hammer: 006 Date Printed: 12/02/2016 Drilled By: PM Logged By: ZR Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.										
Date Printed: 12/02/2016 Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.	` '									
Drilled By: PM accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.		Remarks:	Coordin	ates were p	rovided	by WSP/PB us	sing a hand held G	PS (Gamin e	etrex 10) w	ith an
Logged By: ZR Rail.			accurac	y of +/-4met	res. Gro	und levels are	approximate and	are based on	the coord	linates
	,			/ WSP/PB a	ind cross	s-correlated wi	ith LiDAR survey in	tormation pro	ovided by	Network
Oncorou by. Unio	33 7		. vall.							
	Checked by.									



Status: FINAL

CP2AMG-U Sheet 2 of 3

Ground Level: 80.280mOD Coordinates: 463455.00E

224105.00N

Project: East West Rail-Phase 2A

	Project	C .UVI	024.ZA					224105	
Description	Legend	Dept (m)	Level	Туре	Depth	nple / Test Test Re	esults	Casing (Water) Depth	Installations
Stiff dark grey CLAY with a low content of		_	(m)	D	(m) 10.00	1001110		(m)	
weathered shell fragments. Shell fragments		-							
are up to 10mm wide. (OXFORD		F		SPT(S)	10.50	N=43 (3,6/7,10,11,15	5)		
CLAY-PETERBOROUGH MEMBER)		E		D	10.50-10.95				
		_		D	11.00				
		-		В	11.00				
4.5		E							1 300
		þ							=
		E		D	12.00				1 3 8 8
1,0		F		UT100	12.00-12.45	120 blows, 60% Rec	covery		
		-							
₹3		-							
		F		6	40.00				
		E		D	13.00				
		-					_,		
- 3		E		SPT(S) D	13.50 13.50-13.95	N=46 (4,7/9,10,12,15	0)		
		 		_					
Soft to firm dark grey silty CLAY with low	×_~_×	14.00	66.28	D	14.00				
content of weathered shell fragments. Shell	<u>x</u> x	E							
fragments are up to 5mm wide. (OXFORD		ļ.		D	14.50				
CLAY-PETERBOROUGH MEMBER)	××	E							
3	××	-		UT100 D	15.00 15.00	75 blows, 75% Reco	very		
	<u>×</u> x			UT100	15.00-15.45	120 blows, 100% Re	covery		
4	××	-							=
Soft dark grey sandy CLAY. Sand is fine.	<u> </u>	16.00	64.28	SPT(S)	16.00	50 (6,13/20,26,4 for 2	2mm)		-
(KELLAWAYS SANDS)		-		D	16.00				=
Dark grey fine SAND. (KELLAWAYS SANDS)		16.50	63.78	D	16.50-16.95				3.1 - 3.1
Dark grey line SAND. (RELEAVIATS SANDS)		-							# <u>#</u>
4 3		-		D	17.00				∃:: <u> </u>
		F							
		Ē							B&≣&
		-							= :: <u> </u>
		18.10	62.18	SPT(S)	18.00	N=49 (4,6/10,10,13,1	16)		
Stiff dark grey silty CLAY. (KELLAWAYS CLAY)	<u> </u>	- 10.10	02.10	D D	18.00 18.00-18.45				=
from 18.3mbgl to 18.5mbgl - possible silt	×××	E		В	18.50				3
band. extremely low recovery.	<u>×</u> ×	F							=
Chiff down was CLAV (IZELLAMANO CLAVO		19.00	61.28	D	19.00				-
Stiff dark grey CLAY. (KELLAWAYS CLAY)		Ė							
		Ė		UT100	19.50-19.95	120 blows, 30% Rec	covery		
1.2		E							=
		Γ			Water Level	Observations			-
Hole Diameter Detail Chiselling / Slow Progress			Water Strik		tanding Time	1	Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (m) (hours)	Date	•	vvalet Still	ve (111) 9	(mins)	Level (m)	Depth (m		Sealed (m)
200 18.00 18.00 150 21.00 19.50			No G	Froundwat	er Encountered		-1 (* 	
150 21.00 19.50									
					Duamere				
Client: Network Rail	Date	_	Hole De	nth (Progress Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff						_	End of shift		
Dates Drilled: 28/09/2015-01/10/2015	29/09/201 30/09/201	15	16.50 15.50		6.00 6.00	7.40	Start of shift	t	
Plant: Dando 3000 (T820-632)									
SPT Hammer: 006						1			
Date Printed: 12/02/2016	Remarks:								
Drilled By: PM									
Logged By: ZR									
Checked By: JHS									
,									



East West Rail-Phase 2A

Status: FINAL

Project:

Sheet 3 of 3

CP2AMG-U

Ground Level: 80.280mOD Coordinates: 463455.00E

ritchies	Project	No: 56	624.2A				Coor	dinates:	46345 22410	
		Dont	0.0		Sam	nple / Tes	t		Casin	g
Description	Legend	(m)	Level (m)	''	Depth (m)		st Re	sults	-(Wate Depth (m)	Installations
\Stiff dark grey CLAY. (KELLAWAYS CLAY)	×××××××	20.00	60.28	D	20.00					
Strong to extremely strong light grey SILTSTONE recovered as angular medium to coarse silt gravel. (KELLAWAYS CLAY)	X X X X X X X X X X X X X X X X X X X									
Borehole Complete at 21.00 m	*****	21.00	59.28	D	21.00					_
Borenoie Complete at 21.00 m		E								=
		E								
		F								
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Hole Diameter Detail Chiselling / Slow Progress			· · · · ·		Water Level	T	I			
Diameter Depth Casing From To Time	Date	Э	Water Stril	ke (m) S	tanding Time (mins)	Standii Level (-	Casing Depth (r		Depth Sealed (m)
(mm) (m) Depth (m) (m) (m) (hours) 200 18.00 18.00 20.90 21.00 1.00 150 21.00 19.50 19.50 19.50 19.50			No C	Groundwate	er Encountered		,	Doptii (I	,	200100 (111)
150 21.00 19.50										
					Progress	1				
Client: Network Rail	Date	е	Hole De	pth C	Casing Depth	Water [Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	30/09/201		21.00		19.50	-	•		instructed	by WSP/PB
Dates Drilled: 28/09/2015-01/10/2015										
Plant: Dando 3000 (T820-632) SPT Hammer: 006										
Date Printed: 12/02/2016	Remarks:			ı		•				
Drilled By: PM										
Logged By: ZR										
Checked By: JHS										
·										



CP2ALLCDE

Sheet 1 of 2

Ground Level: 69.917mOD Project: East West Rail-Phase 2A

Coordinates: 461915.00E

223572.00N

Project No: 5624.2A Casing Sample / Test O.D. Depth Legend (Water) Depth Installations Description Level (m) Type Depth **Test Results** (m) (m) 0.00-1.00 (m) MADE GROUND: Light orangish brown slightly 0.30 0.30 gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse of chert and clinker. 1.00 68.92 1.00 MADE GROUND: Hard dark brown and dark grey CLAY clasts in a soft brown mottled orange and grey clay with silt partings matrix. UT100 1.50-1.95 20 blows, 100% Recovery D 1.95-2.10 SPT(S) N=4 (2 for 0mm/1,1,1,1) 2.50 2.50-2.95 3.00 UT100 3.50-3.95 26 blows, 60% Recovery D 4.00 SPT(S) 4 50 N=9 (1,1/2,2,2,3) 5.00 64 92 D 5.00 Soft dark grey sandy silty CLAY. Sand is fine to coarse. (ALLUVIUM) UT100 5.50-5.95 50 blows, 80% Recovery 6.00 6.00-6.50 6.00 6.10 6.00 63.92 Dark grey very clayey silty fine to medium B D SPT(S) D SAND. (ALLÚVIÚM) 33 (8,9/12,13,8,0 for 0mm) 6.10-6.55 D 7.00

Stiff dark grey very sandy silty CLAY with grey Sand partings. Sand is fine to medium (OXFORD CLAY-PETERBOROUGH MEMBER)

Stiff dark grey thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) ..from 8.5mbgl to 9.5mbgl - very stiff.

..from 9.5mbgl to 10mbgl - hard with

Borehole continued on next sheet

water	Level	Observations	

N=21 (2,4/4,5,6,6)

90 blows, 100% Recovery

7.50

Dolellole	Soleliole continued on hext sileet							Water Level C	Doci valions		
Hole	Diamete	er Detail	Chisellir	ng / Slov	v Progress		Water Strike (m)	Standing Time	Standing	Casing	Depth
Diameter (mm)	Depth (m)	Casing Depth (m)	From (m)	To (m)	Time (hours)	Date	vater office (III)	(mins)	Level (m)	Depth (m)	Sealed (m)
200 200 200	0.00 6.00 7.50	0.00 7.50					No Groundw	ater Encountered			
0" 1 5 "								Progress			

7.60

7.80

Client: Network Rail Consultant: WSP | Parsons Brinckerhoff

Dates Drilled: 17/05/2015-19/05/2015 Plant: Dando 2000 (T820-067) 002

JHS

Date Printed: 12/02/2016 Drilled By: DS ZR Logged By:

SPT Hammer:

Checked By:

Date Hole Depth Casing Depth Water Depth Remarks 17/05/2015 17/05/2015 18/05/2015 Start of Hole End of shift Start of shift End of shift 0.00 2.10 2.00 6.00 5.40 4.50 4.50 19/05/2015 Start of shift

SPT(S)

D

D

UT100

D

62.32

62.12

7.50 7.50-7.95

7 60

8.50

9.00-9.45

9 45-9 55

Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network

Rail.



Status: FINAL

Project No: 5624.2A

Sheet 2 of 2

CP2ALLCDE

Project: East West Rail-Phase 2A

Ground Level: 69.917mOD Coordinates: 461915.00E

223572.00N

Casing Legend Depth O.D. Sam Level Type Depth Sample / Test Description (Water) Depth Installations

	(111)	(m) 59.92	туре	(m) 10.00	Test Results	Depth (m)	IIIStaliations
Remaining Detail : 9.50m - 10.00m : \\occasional iron pyrites crystals.	_ 10.00 _ _	59.92	D	10.00			
Borehole Complete at 10.50 m	- - - -						
	-						1111
	- - - -						
	<u>-</u>						
	- - - -						
							-
	-						1
	- - - -						
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	-						1
	- - - -						
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	-						-

						-							-
									Water Level 0	Observations			
Hole	Diamete	er Detail	Chisellin	ng / Slow	Progress		Water Stri	Vater Strike (m) Standing Time		Standing	Casing		Depth
Diameter (mm)	Depth (m)	Casing Depth (m)	From (m)	To (m)	Time (hours)	Date	Water etri	ito (iii)	(mins)	Level (m)	Depth (m)		Sealed (m)
200 200 200	0.00 6.00 7.50	0.00 7.50	10.30	10.50	30in		No (Groundwa	ater Encountered				
Olivert		NI							Progress				
Client:			ork Rail			Date Hole Depth			Casing Depth	Water Depth	Remarks		
Consult Dates F			Parsons /2015-19/0			19/05/2015	5 10.50		7.50	-	Completion ins	structed l	by WSP/PB

Plant: Dando 2000 (T820-067) SPT Hammer: 002 Date Printed: 12/02/2016 DS Drilled By:

ZR Logged By: JHS Checked By:

Remarks:



Status: FINAL

Borehole Log

Project: East West Rail-Phase 2A

Project No: 5624.2A

CP2ALLCDW

Sheet 1 of 2

Ground Level: 69.880mOD Coordinates: 461860.00E

223557.00N

		1 10,000	140.0	024.2/1					223557	.00N
Descripti	on	Legend	Dept	h O.D.		Sam	ple / Test		Casing	
Возопра	011	Logona	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth (m)	Installations
MADE GROUND: Dark bro slightly silty angular to sub coarse GRAVEL of basalt	angular fine to limestone and		0.20	69.68	B B	0.00-0.20 0.20-0.70			(111)	
\clinker. Sand is fine to coa	rse.		0.70	69.18	В	0.70-1.20				-
MADE GROUND: Light ora gravelly fine to coarse SAN angular to rounded fine to and clinker. (MADE GROU	ND. Gravel is coarse of chert				D UT100	1.00	12 blows, 90% Reco	very		
MADE GROUND: Hard da CLAY clasts in a soft brow and grey clay with silt parti	irk brown and dark grey n mottled orange				D	2.00				-
and grey day with siit parti	ngs mank.				SPT(S)	2.50 2.50-2.95	N=4 (1,0 for 0mm/1,1	,1,1)		-
					D	3.00				-
					UT100	3.50-3.95	22 blows, 70% Reco	very		=
Firm light orangish brown in CLAY. Sand is fine to med			4.00	65.88	D	4.00				-
SEATT. Saile is line to med	(/ LEO V 101VI)		- 105	04.55	SPT(S) D	4.50 4.50-4.95	N=5 (1,1/1,1,1,2)			-
Light orangish brown mottl			4.95 5.00	64.93 64.88	D D	5.00 5.00				
gravelly very clayey fine to Gravel is angular to round of chert. (KELLAWAYS SA	ed fine to medium	× × × × ×	5.50	64.38	B UT100	5.00-5.50 5.50-5.95	90 blows, 100% Reco	overy		-
Extremely weak to very we calcareous fine to medium light orangish brown sandy	SANDSTONE with firm	* * * * * * * * * * * *	-		D	5.95-6.10				-
infill/interbedded. Recoverd subrounded fine to coarse in a firm light orangish brow	ed as angular to GRAVEL of sandstone wn sandy CLAY	X, X	6.50	63.38	D SPT(S)	6.50 7.00	N-25 /2 4/9 6 5 6\		7.00	-
matrix. Sand is fine to med SAND)	`	<u> </u>			D D	7.00	N=25 (3,4/8,6,5,6)		7.00	=
Dark grey slightly gravelly medium SAND and shell fr angular fine of extremely w (KELLAWAYS SAND)	ragments. Gravels is		8.00	61.88	D	8.00				
Soft dark grey very sandy fine. (KELLAWAYS CLAY)					UT100	8.50-8.95	110 blows, 100% Re	covery		
Very stiff to hard dark grey CLAY with silt dustings and shell fragments. (KELLAW	d very occasional				D	8.95-9.10				- - -
	,				D	9.50				- - - -
Borehole continued on next sh						Water Level	Observations			
Hole Diameter Detail Diameter Depth Casing (mm) (m) Depth (m)	Chiselling / Slow Progress From To Time (m) (m) (hours)	Date)	Water Stril	` /	tanding Time (mins)	Level (m)	Casing Depth (r	· I	Depth Sealed (m)
200 5.00 0.00 200 7.00 7.00 7.50				No 0	Groundwate	er Encountered				
Cliente	aul Dail					Progress	1		L	
	ork Rail Parsons Brinckerhoff	Date		Hole De	pth (Casing Depth	Water Depth	Remarks		
Dates Drilled: 19/05 Plant: Dand	7 Parsons Billickerholi 5/2015-20/05/2015 o 2000 (T820-067)	19/05/201 19/05/201 20/05/201	5 5 5	0.00 5.00 5.00		5.00 5.00	= :	Start of Hol End of shift Start of shif	e t	
SPT Hammer: 002 Date Printed: 12/02 Drilled By: DS Logged By: NC Checked By: JHS	2/2016		accurac	y of +/-4me	tres. Grou	und levels are	sing a hand held G approximate and a th LiDAR survey in	are based o	n the coord	linates



Status: FINAL

Sheet 2 of 2

CP2ALLCDW

Ground Level: 69.880mOD Project: East West Rail-Phase 2A

Coordinates: 461860.00E

223557.00N

Project No: 5624.2A Casing Sample / Test O.D. Depth (Water) Depth (m) Legend Description (m) Level Туре Depth **Test Results** (m) (m) 10.00 10.00-10.45 50 (1,2/3,4,43 for 50mm) Very stiff to hard dark grey thinly laminated D D CLAY with silt dustings and very occasional 10.00 10.45 59.43 shell fragments. (KELLAWAYS CLAY) Borehole Complete at 10.45 m Water Level Observations Hole Diameter Detail Chiselling / Slow Progress Standing Time (mins) Water Strike (m) Standing Casing Depth Date Diameter (mm) Casing Depth (m) To (m) Time (hours) Level (m) Depth (m) Sealed (m) No Groundwater Encountered Progress Client: Network Rail Date Hole Depth Casing Depth Water Depth Consultant: WSP | Parsons Brinckerhoff 20/05/2015 Completion instructed by WSP/PB 10.45 7.50 Dates Drilled: 19/05/2015-20/05/2015 Plant: Dando 2000 (T820-067) SPT Hammer: 002 Remarks: Date Printed: 12/02/2016 Drilled By: DS NC Logged By: Checked By: JHS



RC2ACBLLCD

Sheet 1 of 2

| Projec

East West Rail-Phase 2A

Project No: 5624.2A

Ground Level: 69.232mOD Coordinates: 460108.00E

222921.00N

	1.10,000		OZ 11.Z/ (222921	.00N
Description	Logond	Depti	h O.D.		5	Sample /	Test		Casing	
Description	Legend	(m)	Level	Туре				est Results	(vvater) Depth	Installations
0010575	59 5 25 5 5		(m)		(m)	,			(m)	3.75253
CONCERETE	XXXXX	0.20	69.03	В	0.20-0.50					
MADE GROUND: Grey SAND & GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular	<u> </u>	0.45	68.78	ES B	0.30 0.45-1.00					
to subangular limestone.		-								=
Firm dark greyish brown CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)	<u> </u>	1.00	68.23	B ES SPT(S	1.00-1.20 1.00 1.20	N=11 (1,1/	1334)			=
,	<u>×_^_×</u>	-		D PL	1.20-1.70 1.20-2.70		.,0,0,.,			=
Firm dark greyish brown silty CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)	××	=		D	1.70					=
,	×××	-			1.20-2.70	100.00				
	××	=		UT100	2.20-2.65					
	×_×_×	₹		SPT(S	2.70	N=16 (1,1/	2,4,5,5)		(0.63)	3
		E		D` PL	2.70-3.20 2.70-3.30	100.00	,		2.70	
Soft to firm dark grey sandy CLAY with		3.15	66.08	D C	2.70-3.30 3.20					3
occasional shell fragments. Sand is fine.		Ė			3.30-4.80					=
Shell fragments are up to 10mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER)		Ė								=
· ·		E			3.30-4.80	100.00				=
		E								=
		4.80	64.43	С	4.80-6.30					=
Dark grey stiff CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)		4.00	04.43		7.50-0.50					_
CLAT-I ETERBOROUGHTMEMBER)		Ė								=
(*)		Ė			4.80-6.30	100.00				3
		Ł								
		6.30	62.93	С	6.30-7.80					=
Stiff thinly laminated dark silty CLAY.	<u>x-</u> x	E 0.30	02.93		0.30-7.80					=
(KELLAWAYS CLAY)	×x	E						0		=
	××	<u></u>			6.30-7.80	100.00 7	3.00 7	3.00		=
	××_×	7.45	61.78							=
Strong greenish grey LIMESTONE. No evidence of weathering. Discontinuities. Closely		Ē		С	7.80-9.30			5		=
spaced, sub horizontal (13 degrees) to sub		-			7.00 0.00			ŭ		-
vertical (75 degrees), undulating, rough, open to locally clay filled. (CORNBRASH		Ė								=
LIMESTONE)		Ė			7.80-9.30	100.00 10	0.00 4	6.00		=
		Ė						10		=
		Ė		С	9.30-10.30					=
		Ė			3.50 10.50					-
	××	9.73	59.50		9.30-10.30	100.00 10 TCR S	0.00 4 CR F	6.00 5 RQD FI		=
Borehole continued on next sheet					Water Leve					
Hole Diameter Detail Flush and Circulation Diameter Depth Casing Type From To Return	n Date	9	Water Stril	ke (m)	Standing Tim	ie Stan	ding	Casing		Depth
(mm) (m) Depth (m) Type (m) (m) %		-	NI- C	rous-t-	(mins) ater Encountere	Leve	I (m)	Depth (m	1)	Sealed (m)
116 11.60 11.60 Water 3.30 4.80 60.00			NO C	oroundwa	aler Encountere	au				
Client: Network Rail										
Consultant: WSP Parsons Brinckerhoff	Date		Hole De	nth	Progress	h \\/o+=	r Depth	Remarks		
Dates Drilled: 29/10/2015-30/10/2015	29/10/20	15	0.00 2.70	μιι	Casing Dept	-		Start of Hole		
Plant: COMACCHIO GEO205	29/10/20 ⁻ 30/10/20 ⁻	15	2.70 2.70		2.70 2.70	0.0 0.6		End of shift Start of shift		
SPT Hammer: ADP02 Core Bit: PCD Shoe										
Core Barrel: T6-116	Remarks:	Hole ter	minated ea	rly due t	to time constr	aints. Coord	linates w	vere provided	by WSP/F	PB using
Date Printed: 12/02/2016		a hand h	neld GPS (0	Samin e	trex 10) with	an accuracy	of +/-4r	netres. Grour	nd levels a	re
Drilled By: SR		LİDAR s	urvey inforr	mation p	provided by N					
Logged By: ZR+NC Checked By: JHS		unaer st	ubcontract t	o BAM	KITCNIES.					
Oneorea by. Jilo	1									



RC2ACBLLCD

Sheet 2 of 2

Project:

East West Rail-Phase 2A

Project No: 5624.2A

Coordinates: 460108.00E 222921.00N

Ground Level: 69.232mOD

Description	Legend	Depth	O.D.			Sample / Te			Casing (Water)	
2 coonpact	2090	(m)	Level (m)	Туре		Rotary Corin			Depth D	Installations
Stiff thinly laminated dark silty CLAY. Low	× ^×	_	(111)		(m)	TCR SCR		RQD FI	(ṁ)	-
proportion of fossil fragments. (FOREST		Ė		С	10.30-11.60				4	3
MARBLE)		-								=
Strong light grey LIMESTONE. No evidence of	Ž T	10.75	58.48		40 20 44 60	400.00 07.00	7	4		=
weathering. Discontinuities. Closely spaced,	××	11.00	58.23		10.30-11.60	100.00 97.00	/	1.00		-
sub horizontal (7 degrees) to sub vertical (80 degrees) planar, open, smooth. (FOREST								1		=
MARBLE)	FFÂ	11.55 11.60	57.68 57.63						4	
Stiff thinly laminated grey silty CLAY with										=
rare fossil fragments. (FOREST MARBLE)		=								
Strong grey LIMESTONE. No evidence of										=
weathering. (FOREST MARBLE)		Ē								3
Borehole Complete at 11.60 m		_								=
		_]
		_								=
										<u> </u>
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										=
		=								=
		E]
		_								3
		E								
		_								
		F								
		Γ			Water Levis	TCR SCR I Observations		RQD FI	1	
Hole Diameter Detail Flush and Circulation		1	Nator Ctril	(m)				Cooine	, 1	Denth
Diameter Depth Casing Type From To Return	Date	• '	Nater Strik	re (111)	Standing Tim (mins)	e Standing Level (m		Casing Depth (r		Depth Sealed (m)
(mm) (m) Depth (m) Type (m) (m) % 116 11.60 11.60 Water 3.30 4.80 60.00			No G	roundw	ater Encountere		,	Dopui (i	,	Coaloa (III)
Clients Naturals Dail	4									
Client: Network Rail Consultant: WSP Parsons Brinckerhoff		<u>'</u>			Progress	·		ı		
Dates Drilled: 29/10/2015-30/10/2015	Date		Hole De	oth	Casing Dept		pth	Remarks		
Plant: COMACCHIO GEO205	30/10/201	15	11.60		-	1.85		Completion	instructed b	y WSP/PB
SPT Hammer: ADP02										
Core Bit: PCD Shoe							_			
Core Barrel: T6-116	Remarks:									
Date Printed: 12/02/2016										
Drilled By: SR										
Logged By: ZR+NC										
Checked By: JHS										
										EC7 CP & RC LOG



WS2AFCGF15C

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 68.960mOD Coordinates: 460965.00E

223230.00N

					San	nple / Test	IC	Casing	
Description	Legend	Depti (m)	h O.D. Level (m)	Туре	Depth (m)	Test Re	()	141 . 7	Installations
MADE GROUND: Dark brown slightly clayey gravelly SAND with a low cobble content. Cobbles are angular brick and concrete. Sand is fine to coarse. Gravel is angular fine to coarse brick, concrete and crushed rock possibly limestone.		0.30	68.66	D PID B ES D B D ES	0.00-0.30 0.30 0.30-0.80 0.30 0.80 0.80-1.20 1.00	See DCP R 0.70ppm 0.60ppm	Results	(111)	
MADE GROUND: Brown gravelly SAND. Sand is fine to coarse. Gravel is subrounded fine to coarse flint.		1.70	67.26	ES UT100 D	1.00 1.20-1.65 1.70				=
MADE GROUND: Soft black organic CLAY. Clay is spongy with organic odourat 1.6mbgl - becoming less organic with depth				D	2.70				-
Soft to firm light greyish brown mottled CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)				UT87	3.00-3.45				=
Firm brownish grey CLAY interbedded with occasional lenses of orangish brown discolouration. Discolouration occurs as		3.45	65.51	D	3.50				-
staining. (OXFORD CLAY-PETERBOROUGH MEMBER)at 3.8mbgl - discolouration becoming vextremely rare with depth.	 XX XX	4.40	64.56	D	4.40				
Firm dark grey silty CLAY with rare fine angular silt gravel. (OXFORD CLAY-PETERBOROUGH MEMBER)at 4.8mbgl - silty gravel band.	× × × × × × × × × × × × × × × × × × ×	5.00	63.96	D	5.00				- - - - -
Dark grey slightly clayey SILT. (KELLAWAYS SAND) Borehole Complete at 6.00 m		6.00	62.96	D	6.00				1
		- - - - - -							1
									111111
		_ _ _ _ _							-
					Water Level	Observations	L		
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time (m) (m) Depth (m) (m) (m) (m) (hours)	Date	e	Water Strik	` ,	tanding Time (mins)	Level (m)	Casing Depth (m)		Depth Sealed (m)
102 3.00 0.00 87 5.00 75 6.00			NO G	orounawate	er Encountered	1			
Client: Network Rail			Hel- D	n th	Progress	Motor Desil	Domesti		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 28/05/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A	28/05/20° 28/05/20°		0.00 6.00	ptn (Casing Depth - -	Water Depth	Remarks Start of Hole Completion ins	structed by	y WSP/PB
Date Printed: 11/02/2016 Drilled By: SW Logged By: ZR Checked By: JHS		accuracy	y of +/-4met	res. Grou	ind levels are	sing a hand held G approximate and ith LiDAR survey in	are based on th	ne coordi	inates



Status: FINAL

Sheet 1 of 1

WS2AFCGF15DA

Project: East West Rail-Phase 2A

Ground Level: 69.180mOD Coordinates: 460970.00E

223232.00N

						-						
Descripti	on			l egend	Deptl	h O.D.	J =				Casing (Water)	
Безопри	OII			Logona	(m)	Level	Туре	Depth (m)	Test Re	sults	Depth	Installations
MADE GROUND: Dark brigravelly SAND with a low Cobbles are angular brick is fine to coarse. Gravel is coarse brick and concrete Borehole Complete at 0.40	own slightly cobble conte and concret angular fine	ent. te. Sanc	1 ,	Legend	(m)	Level (m) 68.78	B PID ES		•	esults	-(Water) Depth (m)	Installations
								Water Level	Observations			
Hole Diameter Detail	Chiselling			Date	,	Water Stril	ke (m) S	Standing Time	Standing	Casing		Depth
Diameter Depth Casing (mm) (m) Depth (m)	From (m)	To (m)	Time (hours)	Date			\	(mins)	Level (m)	Depth (m	1)	Sealed (m)
						No G	Groundwat	er Encountered	1			
Client: Netw	ork Rail			Date	,	Hole De	pth (Casing Depth	Water Depth	Remarks		
Dates Drilled: 28/05	Parsons E 5/2015 dug pit	Brinckerl	hoff	28/05/201 28/05/201	5	0.00 0.40			:	Start of Hole Refusal		
Date Printed: 11/02 Drilled By: SR Logged By: ZR Checked By: JHS	2/2016				hand he approxin	ld GPS (Ga nate and ar	min etre	x 10) with an	Coordinates were accuracy of +/-4me nates taken by WS twork Rail.	tres. Ground	levels are	-



Date Printed:

Drilled By:

Logged By: Checked By: 11/02/2016

SR ZR

JHS

Borehole Log

East West Rail-Phase 2A

Status: FINAL

Sheet 1 of 1

WS2AFCGF15DB

Ground Level: 69.060mOD

Coordinates: 460975.00E

Project:

 Project No: 5624.2A
 223232.00N

 Legend (m)
 Depth (m)
 O.D.
 Sample / Test (Water)
 Casing (Water)
 Installation

Remarks: Hole refused to to concrete at 0.4mbgl. Coordinates were provided by WSP/PB using a hand

held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.

Description	Legend	Depth	O.D.		San	nple / Test Ca		ng er)
Description	Logona	(m)	Level (m)	Туре	Depth (m)	Test Re	sults Dep	er) h Installations
MADE GROUND: Dark brown slightly clayey gravelly SAND with a low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse brick, concrete and crushed rock possibly limestone. Cobbles are angular brick and concrete Borehole Complete at 0.40 m		0.40	68.66	B PID ES	0.00-0.40 0.30 0.30	0.90ppm		
				\	Water Level	Observations	I	
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	e	Vater Stril	ke (m) St	anding Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
			No G		r Encountered			
Client: Network Rail					Progress			
Consultant: WSP Parsons Brinckerhoff	Date		Hole De	oth C	asing Depth	<u> </u>	Remarks	
Dates Drilled: 28/05/2015 Plant: Hand dug pit SPT Hammer: N/A	28/05/20 ⁻ 28/05/20 ⁻	15 15	0.00 0.40		-	-	Start of Hole Refusal	
Data Drintadi 44/00/0046	Romarke:	Hole refus	ed to to o	oncrete a	t 0 4mbal C	oordinates were nro	ovided by WSP/PR I	ising a hand



Status: FINAL

WS2AFCGF15U

Sheet 1 of 1

Ground Level: 68.370mOD Coordinates: 460958.00E

223241.00N

uit alaine	Project	: Ea	st Wes	t Rail-Ph	ase 2A
ritchies	Project	No: 562	24.2A		

	'		024.ZA					223241	.UUN
Description	Legend	Dept (m)	Level	Туре	Depth	nple / Test Test R	esults	Casing (Water) Depth	Installations
MADE GROUND: Dark brown gravelly very clayey fine to coarse SAND. Gravel is angular rounded fine to coarse of clinker.		0.30	(m) 68.07	D PID B	0.30 0.30-0.60	See DCF 0.20ppm		(ṁ)	- 133 - 23
MADE GROUND: Stiff to hard dark brown CLAY clasts in a soft to firm brown mottled orange and grey CLAY with silt partings matrix.	×	0.60	67.77	ES B PID ES	0.30 0.60-1.20 1.00 1.00	0.20ppm			- - - - - - -
Firm light brown mottled orange and grey CLAY with silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)	×x	*-		D UT100	1.90 2.00-2.45	30 blows, 100% R	ecovery		
Stiff dark greyish brown slightly organic CLAY with orangish brown and yellow silt	×	2.40	65.97			·	·		
partings. (OXFORD CLAY-PETERBOROUGH MEMBER)from 2.6mbgl to 2.8mbgl - becoming slightly sandy. sand is fine.		3.10	65.27	D D	2.90 3.20				
Stiff dark grey thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)from 4mbgl to 4.5mbgl - becoming silty and slightly sandy. Sand is fine to medium.	/			D UT87	3.90 4.00-4.45	84 blows, 100% R	ecovery		
Dark grey clayey silty fine to medium SAND. (KELLAWAYS SAND) Stiff dark grey thinly laminated CLAY. (KELLAWAYS SAND)	* * *	4.50 4.90 5.00	63.87 63.47 63.37	В	4.45-5.00				
Dark grey clayey silty fine to medium SAND. \(\(\(\text{KELLAWAYS SAND} \)\) Borehole Complete at 5.00 m									
		Ē							=
Hole Diameter Detail Chiselling / Slow Progre	ss	1	Water Stri		Water Level Standing Time	Observations	Casir		Donth
Diameter (mm) Depth (m) Casing Depth (m) From (m) To Time (hours) 102 3.00 0.00 (m) (m)	Dat	e		` '	(mins)	Level (m)	Casing Depth (r		Depth Sealed (m)
Client: Network Pail					Progress				
Client: Network Rail Consultant: WSP Parsons Brinckerhoff Dates Drilled: 27/05/2015-28/05/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	27/05/20 28/05/20	15	0.00 5.00	pth (Casing Depth - -	Water Depti	Start of Hol Completion	e instructed b	y WSP/PB
Date Printed: 11/02/2016 Drilled By: PG Logged By: NJD Checked By: JHS	Remarks:	accurac	y of +/-4me	tres. Grou	und levels are	ising a hand held e approximate an ith LiDAR survey	d are based or	n the coord	inates



Logged By:

Checked By:

NJD

JHS

Borehole Log

East West Rail-Phase 2A

Sheet 1 of 1

Status: FINAL

Project:

Ground Level: 69.180mOD

Coordinates: 460969.00E

WS2AFCGF15UB

ritchies	Project	No: 56	624.2A			Cool	rdinates:	223242	
Description	Legend	Depth	O.D.			mple / Test		Casing (Water	Installation
		(m)	(m)	Туре	Depth (m)	Test Re	esults	Depth (m)	installation
MADE GROUND: Black slightly clayey SAND & GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse of crushed rock possibly limestone.		0.40	68.78	D PID B ES D	0.10 0.30 0.30-0.80 0.30 0.80	0.50ppm		,,	-
MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is subangular fine flint with occasional crushed rock possibly limestone.		1.20	67.98	PID ES UT100	1.00 1.00 1.20-1.65	0.60ppm 40 blows, 100% Rec	covery		
MADE GROUND: Soft dark grey organic CLAY. Organic clay is wholly amorphous. Clay is slightly spongy with organic odour.	×× ×	- 1.70 	67.48	D	1.90-2.00				
MADE GROUND: Firm dark greyish brown slightly sandy silty CLAY.	×			D	2.90-3.00				- - - -
Firm light brown mottled orange and grey CLAY with occasional silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)	× ^ -× ×× × - × -×	3.10	66.08 65.58	UT87 D	3.00-3.45 3.20-3.30				- - - -
Very stiff dark greyish brown slightly sandy	<u></u>	- 3.6U - -	85.58	D	3.80-3.90				
slightly organic CLAY with orangish brown and yellow silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)		_		D	4.10-4.20				- - - - -
Stiff dark grey thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)from 4mbgl to 4.25mbgl - becoming silty and slightly sandy. Sand is finefrom 4.35mbgl to 4.5mbgl - silty slightly sandy becoming very sandy with depth. sand is fine to medium. Dark grey clayey silty fine to medium SAND. (KELLAWAYS SAND) Borehole Complete at 4.60 m		4.50	64.68 64.58	D	4.50-4.60 4.50				
Hole Diameter Detail Chiselling / Slow Progress						l Observations			
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (m) (m) (m) (m) (m) (m)	Date		Water Stril		Standing Time (mins) ter Encountere	Level (m)	Casin Depth (~ I	Depth Sealed (m)
			140 0	J. Our luwa	LINGUINGIE				
Client: Network Rail					Progress		1		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 28/05/2015 Plant: Dart 2 (T820-759) SPT Hammer: N/A	28/05/201 28/05/201	5	0.00 4.60	pth	Casing Deptl - -	Water Depth	Remarks Start of Ho Refusal		
Date Printed: 11/02/2016 Drilled By: DS Logged By: NJD	;	accuracy	of +/-4me	tres. Gro	und levels ar	using a hand held G re approximate and vith LiDAR survey ir	are based of	on the coord	dinates



Status: FINAL

Sheet 1 of 1

WS2AFCT2D

Ground Level: 89.958mOD Coordinates: 466722.00E

225209.00N

Project: East West Rail-Phase 2A ritchies

									Casin	J
Descrip	tion	Legend	Dept				Sample / Test		Casing (Water)	.
			(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth (m)	Installations
MADE GROUND: Dark b	rown to black gravelly	XXXXX	E	()	D	0.00-0.10	See DCP F	Results	(111)	-
silty fine to coarse SAND			0.30	89.66	PID D	0.30 0.30	0.20ppm			=
to rounded fine to coarse chert.	of clinker and		£		ES	0.30				
from 0mbgl to 1.8mbgl -			E		PID	1.00	0.10ppm			<u>_</u>
from 0mbgl to 2.2mbgl -	decayed roots	XXXX	‡		D	1.00	о.торріп			=
	ght brown mottled orange	ŽXXXX	1.40	88.56	ES D	1.00 1.40				3
and grey slightly gravelly angular to rounded fine to		<u>x</u> <u>x</u>	}							-
chert.		<u></u>	E		D UT100	1.90 2.00-2.45	21 blows, 100% Rec	overv		
Firm varying to stiff greyis	sh brown mottled	- X - <u>J-x</u> -	Ē		01100	2.00 2.40	21 5.6116, 100701100	0.0.,		
grey thinly laminated CLA		<u>×</u>	-							
and gypsum crystals. (O) CLAY-STEWARTBY ME		××	-		_	0.00				
	,	×	<u>-</u>		D	2.90				
		_ <u>x</u> _ <u>x</u>	ŧ							
		- X-X	}		D	3.60				
at 3.6mbgl - light orangi ∖laminae.	sh brown silt	×× -	3.80	86.16	D	3.90				
	brown mottled are:	ale ale	4.20	85.76	UT87	4.00-4.45	25 blows, 100% Rec	overy		
Firm varying to stiff dark I thin cross laminated orga		×	+ 4.20	05.70						
fragments and gypsum c	rystals and occasional	××_	₹							1 3 8
black organic partings. (CCLAY-STEWARTBY ME			4.80	85.16	D	4.90				
at 3.8mbgl - dark brown			<u> </u>							
Firm varying to stiff greyis	sh brown mottled		E							1 3 目:
grey thinly laminated CLA	AY with silt partings		ŧ							
and gypsum crystals. (O) CLAY-STEWARTBY ME			-		D	5.90				
Stiff varying to very stiff d			F							=
brown thinly cross lamina			6.60	83.36						=
CLAY with shell fragment			+ 0.00	00.00	D	6.90				=
crystals. (OXFORD CLA)	Y-PETERBURUUGH		7.00	82.96	D	6.90				
from 5.4mbgl to 6.6mbg	I - becoming very	/ <u>i</u>	Ē]
stiff to hard.			Ė							1 3
Very stiff varying hard da laminated CLAY with she		1	-							=
occasional gypsum crysta		 	F							
CLAY-PETERBOROUGH	H MEMBER)	1	E]
Borehole Complete at 7.0	00 m		E]
			E]
			E							=
			Ė							=
			E							
		+	<u></u>			Water Level	Observations			
Hole Diameter Detail	Chiselling / Slow Progress		_ [Water Stril		tanding Time		Casing	,	Depth
Diameter Depth Casing (mm) (m) Depth (m)	From To Time (m) (hours)	Date	e			(mins)	Level (m)	Depth (r	·	Sealed (m)
102 3.00 2.00				No C	Proundwate	er Encountered				
87 5.00 75 6.00 65 7.00										
						Progress				
	work Rail	Date	е	Hole De	pth (Casing Depth	Water Depth	Remarks		
	P Parsons Brinckerhoff	11/05/20 11/05/20	15 15	0.00 7.00		2.00	-	Start of Hol	e instructed b	ov WSP/PR
	05/2015 rps 1 (T820 620)	11,55,20	.	7.00		2.00		Completion		.,
Plant: She SPT Hammer: N/A	rpa 1 (T820-630)									
	02/2016	Remarks:	Coordin	ates were n	rovided h	y WSP/PB u	sing a hand held G	PS (Gamin e	etrex 10) w	ith an
Drilled By: AB			accurac	y of +/-4me	tres. Grou	and levels are	e approximate and	are based or	n the coord	linates
Logged By: NJD)		Rail.	y WSP/PB a	IIIO Cross	-correlated w	ith LiDAR survey in	iiormation pr	ovided by	INETWORK
Checked By: JHS										



WS2AFCT2U

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 89.103mOD Coordinates: 466718.00E

225218.00N

ritchies Project No: 5624.2A

								Coolin	
Description	Legend	Deptl				mple / Test		Casing (Water)	
2000.19.1011	Logona	(m)	Level (m)	Type	Depth (m)	Test Re	sults	Depth (m)	Installations
MADE GROUND: Firm dark brown sandy gravelly	88888	-	(***)	D	0.00-0.10	See DCP R	Results	(111)	-
CLAY. Sand is fine to coarse. Gravel is		0.30	88.80	PID ES	0.30 0.30	0.70ppm			=
angular to rounded fine to coarse of chert and clinker.	XXXXX	E			1.00				
from 0mbgl to 2mbgl - live roots.	$\times\!\!\times\!\!\times\!\!\times$	+		Cic	1.00	0.40			_
from 0mbgl to 3.6mbgl - decayed roots.	$\times\!\!\times\!\!\times\!\!\times\!\!\times$	1.20	87.90	PID D	1.00 1.00-1.10	0.10ppm			
MADE GROUND: Firm light brown mottled orange		£23	550	ES UT100	1.00 1.20-1.65				-
and grey slightly gravelly CLAY. Gravel is angular to rounded fine to coarse and of		E							
chert.	-=-==	E		D	1.90-2.00				-
Firm light brown mottled orange and grey CLAY		F							3
with occasional shell fragments and gypsum		2.30	86.80						
crystals.(OXFORD CLAY-STEWARTBY MEMBER)		Ė							-
from 2mbgl to 2.3mbgl - with much gypsum crystals.	<u> </u>	E		D	2.90-3.00				<u> </u>
•		Ė							=
Firm brown mottled orangish brown and grey thinly cross laminated CLAY with very closely		F							
spaced black organic partings with gypsum		Ė							
crystals. (OXFORD CLAY-STEWARTBY MEMBER)from 2.7mbgl to 3.7mbgl - becoming stiff.		-		D	3.90-4.00				
from 2.7mbgl to 3.7mbgl - becoming stiff.		E							=
stiff.		-							=
		4.80	84.30						
Very stiff varying to hard dark greyish brown		5.00	84.10	D D	4.90-5.00 5.00				
thinly cross laminated slightly organic CLAY with shell fragments and gypsum crystals.		E							
(OXFORD CLAY-PETERBOROUGH MEMBER)		Ė							=
Stiff to very stiff dark grey CLAY with rare		Ė							
shell remains. (OXFORD CLAY-PETERBOROUGH		F		D	6.00				
MEMBER)		Ė							
		F							=
		Ē							=
Borehole Complete at 7.00 m		7.00	82.10	D	7.00				
·		F							
		Ē							1 1
		F							
		E							=
		Ė							
		E							
		Ė]
		F							
		E							
		Ė							
	-	<u> </u>			Water Laws	Observat!			
Hole Diameter Detail Chiselling / Slow Progress			Water Strik		tanding Time	Observations Standing	Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	Э	vvalei Sifil	ve (III) 2	(mins)	Level (m)	Depth (m		Sealed (m)
102 200 200			No G	Froundwate	er Encountered	` ′			(/
87 3.00 75 5.00 75 6.00 65 7.00									
65 7.00					Progress				
Client: Network Rail	Date	<u>, </u>	Hole De	nth (Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	11/05/201 11/05/201			pai (-	-	Start of Hole)	
Dates Drilled: 11/05/2015	11/05/20	15	0.00 7.00		2.00	-	Completion i	instructed b	y WSP/PB
Plant: Sherpa 2 (T820-638)									
SPT Hammer: N/A	<u> </u>					1			
Date Printed: 11/02/2016						sing a hand held G approximate and			
Drilled By: SR		taken by	WSP/PB a	ind cross	-correlated w	ith LiDAR survey in	formation pro	ovided by	Network
Logged By: JHS		Rail.							
Checked By: RS									



JHS

ritchies

Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2AOB29D

Sheet 1 of 1

Ground Level: 94.313mOD Coordinates: 467379.00E

225378.00N

Descripti		Depth	n O.D.		San	nple / Test		Casing	
Description	Legend	(m)	Level	Туре	Depth	Test Re	sults	(Water) Depth	Installation
TOPSOIL: Firm dark brown alighth: gravally	\(\/\!\\/\!\\\		(m)	D	(m) 0.00-0.10	See DCP R		(ṁ)	
TOPSOIL: Firm dark brown slightly gravelly silty CLAY. Gravel is angular to rounded fine		0.20	94.11	PID	0.30	0.20ppm			=
to coarse of chert.	*****	0.50	93.81	D ES	0.30 0.30				
\from 0mbgl to 2mbgl - live roots	\otimes	Ė		В	0.50-1.20				=
, , , , , , , , , , , , , , , , , , ,		-		PID D	1.00 1.00	0.10ppm			-
MADE GROUND: Firm light orangish brown sandy slightly gravelly CLAY. Sand is fine to		1.30	93.01	ES	1.00				=
coarse. Gravel is angular to rounded fine to		Ė							
coarse and of chert.		-		D	1.90				=
MADE GROUND: Firm light brown mottled orange				UT100	2.00-2.45	111 blows, 70% Rec	overy		=
and grey slightly gravelly CLAY. Gravel is angular to rounded fine to coarse and of	3/16 = -3/16	2.40	91.91						
chert.	sile sile	-		D	2.60				
from 0.8mbgl to 1.3mbgl - becoming stiff.		2.90	91.41	D	2.90				_
Stiff light brown mottled orange and grey CLAY with occasional calcareous nodules.	Sales	3.20	91.11						=
(OXFORD CLAY-STEWARTBY MEMBER)	316 316 SHE	Ė							=
from 1.5mbgl to 2.4mbgl - becoming very	siles siles	-		_					
stiff	- syle - syle			D UT87	3.90 4.00-4.45	87 blows, 75% Reco	very		
fragments.	714	4.20	90.11						=
Hard dark brown mottled reddish brown and									=
grey thinly cross laminated organic CLAY with				D	4.90				
much shell fragments. (OXFORD CLAY-STEWARTBY MEMBER)									
Very stiff brown mottled orange and grey CLAY									_
with shell fragments. (OXFORD		5.70	88.61	D	5.70				
CLAY-STEWARTBY MEMBER)		5.90	88.41	D	5.90				
Hard dark brown mottled reddish brown and grey thinly cross laminated organic CLAY with	_ ^ _x	6.20	88.11	D	6.20				
much shell fragments and with gypsum		6.40	87.91						_
crystals. (OXFORD CLAY-STEWARTBY MEMBER)									_
Very stiff varying to hard dark brownish grey		7.00	87.31	D	6.90				-
thinly laminated CLAY with much shell fragments and with gypsum crystals. (OXFORD		Ė							
CLAY-STEWARTBY MEMBER)		Ė							= =
Hard dark brown thinly cross laminated		E]
organic CLAY with occasional shell fragments. (OXFORD CLAY-STEWARTBY MEMBER)		- -							1 =
,		Ē							=
Very stiff varying to hard dark brownish grey thinly laminated CLAY with much shell		Ė							
fragments and with gypsum crystals. (OXFORD		E							
CLAY-STEWARTBY MEMBER)		F							=
Stiff light brown mottled orange silty CLAY with much shell fragments and occasional		E							=
sori orion raginorità una occasional		Ē							=
					Water Level	Observations		•	
Hole Diameter Detail Chiselling / Slow Progress	Date	,	Water Strik	ke (m)	Standing Time	Standing	Casing	,	Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date				(mins)	Level (m)	Depth (n	n)	Sealed (m)
102 2.00 0.00 87 4.00 75 6.00 65 7.00			No G	roundwa	ter Encountered				
75 6.00 65 7.00									
Client: Network Rail					Progress		ı		
Consultant: WSP Parsons Brinckerhoff	Date		Hole De	pth	Casing Depth	Water Depth	Remarks		
Dates Drilled: 12/05/2015	12/05/201 12/05/201	15 15	0.00 7.00		-	-	Start of Hole Completion	e instructed b	y WSP/PB
Plant: Sherpa 1 (T820-630)									
SPT Hammer: N/A									
Date Printed: 11/02/2016						sing a hand held G			
Drilled By: AB						e approximate and ith LiDAR survey in			
Logged By: NJD		Rail.		0.000	. 55 Olakou W	<u>2.2.</u> Gaivey III		aoa by	
Chacked But ILIC	1								



JHS

Borehole Log

Status: FINAL

Sheet 1+ of 1

WS2AOB29D

Project: East West Rail-Phase 2A Ground Level: 94.313mOD Coordinates: 467379.00E

Project No: 5624.2A 225378.00N Casing Sample / Test Depth O.D. Legend (Water) Depth (m) Description (m) Level Туре Depth **Test Results** (m) (m) See DCP Results 6.20m - 6.40m : calcareous nodules. (OXFORD CLAY-STEWARTBY MEMBER) 6.40m - 7.00m: Hard dark grey thinly laminated CLAY with much shell fragments. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 7.00 m Water Level Observations Hole Diameter Detail Chiselling / Slow Progress Standing Time (mins) Water Strike (m) Standing Casing Depth Date Diameter (mm) Depth (m) Casing Depth (m) To (m) Time (hours) Level (m) Depth (m) Sealed (m) 2.00 4.00 6.00 7.00 No Groundwater Encountered 0.00 Progress Client: Network Rail Date Hole Depth Casing Depth Water Depth Remarks Consultant: WSP | Parsons Brinckerhoff Dates Drilled: 12/05/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A Remarks: Date Printed: 11/02/2016 Drilled By: AΒ NJD Logged By:



JHS

Borehole Log

East West Rail-Phase 2A

Status: FINAL

Project:

WS2AOB29U

Sheet 1 of 1

Ground Level: 93.229mOD Coordinates: 467386.00E

ritchies	Project	No: 56	624.2A				Coor	dinates:	467386 225407	
2	1	Depth	O.D.		San	nple / Tes	st		Casing	
Description	Legend	(m)	Level (m)	71 -	Depth (m)	Te	est Re		Uvater) Depth (m)	Installations
MADE GROUND: Firm dark brown slightly gravelly silty CLAY. Gravel is angular to rounded fine to coarse of chert. from 0mbgl to 2mbgl - live roots.		0.20	93.03	PID ES D	0.00-0.10 0.30 0.30 0.50	Se 0.20ppm	ee DCP R	esults		-
MADE GROUND: Firm light brown mottled orange and grey slightly gravelly CLAY. Gravel is angular to rounded fine to coarse and of chert.		1.00	92.23 91.83	PID ES D D	1.00 1.00 1.10 1.40	0.00ppm				-
MADE GROUND: Light orangish brown sandy very clayey angular to rounded fine to coarse GRAVEL of chert. Sand is fine to coarse.		- 1.80 - 2.00	91.43 91.23		1.70					
MADE GROUND: Very stiff light brown mottled orange and grey slightly sandy slightly gravelly CLAY with occasional black carbonaceous fragments. Sand is fine to coarse. Gravel is angular to rounded fine to coarse and of chert. from 1.4mbgl to 2mbgl - probable		- - - - - - - - - - - - - - - - - - -								
Very stiff light brown mottled orange and grey CLAY with much calcareous nodules and with gypsum crystals. (OXFORD CLAY-STEWARTBY MEMBER)										
Borehole Complete at 2.00 m		 - - - - -								
		- - - - - - -								
		- - - - - - -								1
		- - - - - -								
		- - - - - -								
		_			Market and a second	01				=
Hole Diameter Detail Chiselling / Slow Progress			Water Stril	ke (m)	Water Level Standing Time			Casing	,	Depth
Diameter (mm) Depth (m) Casing Depth (m) From (m) To (m) Time (hours) 102 2.00 0.00	Date	•		` '	(mins)	Level	~	Depth (r	· I	Sealed (m)
			140 0	J. Odi luwa	io. Enoduniorec					
Client: Network Rail					Progress	1			1	
Consultant: WSP Parsons Brinckerhoff	Date		Hole De	pth	Casing Depth	Water	Depth	Remarks		
Dates Drilled: 12/05/2015 Plant: Sherpa 2 (T820-638)	12/05/201 12/05/201	5	0.00 2.00		-	-		Start of Hol Refusal	le	
SPT Hammer: N/A										
Date Printed: 11/02/2016					ogl, hole move by WSP/PB u					
Drilled By: EK		accuracy	of +/-4me	tres. Gro	und levels are	approxima	ite and a	are based o	n the coord	dinates
Logged By: MO		taken by Rail.	WSP/PB a	and cross	s-correlated w	itn Lidar si	urvey in	rormation pi	rovided by	network



RS

Borehole Log

Status: FINAL

WS2AOB29UA

Sheet 1 of 1

Ground Level: 93.123mOD Coordinates: 467387.00E

225409.00N

ritchies Project: East West Rail-Phase 2A Project No: 5624.2A

		Depth	O.D.		San	nple / Test		Casing	
Description	Legend	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	(Water) Depth (m)	Installatio
TOPSOIL: Soft dark brown sandy gravelly CLAY with rootlets. Gravel is subangular to rounded fine to coarse flint and chalk. Sand is fine to coarse.		0.15	92.97	D PID ES	0.15 0.30 0.30	0.20ppm			-
MADE GROUND: Firm greenish brown mottled bluish grey slightly sandy slightly gravelly CLAY with rare rootlets. Gravel is subangular to rounded fine and medium chalk. Sand is fine.		1.30	91.82	PID D ES D	1.00 1.00 1.00 1.30	0.30ppm			
.at 1.1mbgl - black ash fine sand. Firm to stiff dark brown speckled while slightly sandy sitty CLAY with frequent shell	x-x-x			D UT100	2.00 2.00-2.45	52 blows, 100% Reco	overy		
remains. Sand is fine to coarse. (OXFORD CLAY-STEWARTBY MEMBER)from 2.6mbgl to 2.65mbgl - thin band of orange fine to coarse sandfrom 2.9mbgl to 2.95mbgl - thin band of	F X X X			D	3.00				-
orange fine to coarse sand .from 3.1mbgl to 3.15mbgl - thin band of orange fine to coarse sand .from 3.7mbgl to 3.75mbgl - thin band of orange fine to coarse sand	F X X X X X X X X X X X X X X X X X X X	4.00	89.12	D UT87	4.00 4.00-4.45	41 blows, 100% Reco	overy		- - - - -
Stiff dark grey silty CLAY with rare shell remains. (OXFORD CLAY-STEWARTBY MEMBER)				D	5.00				- - - - - - - -
Borehole Complete at 6.00 m		6.00	87.12	D	6.00				-
		- - - - - -							
		_ _ _ _							
		- - - - -							- - - - - -
				-	Water Level	Observations			
Hole Diameter Detail Chiselling / Slow Progres Diameter Depth Casing From To Time (mm) Depth (m) (m) (m) (hours)	s Date	е	Water Stril	ke (m) S	tanding Time (mins)	Standing Level (m)	Casing Depth (m		Depth Sealed (m)
102 3.00 2.00 87 5.00 75 6.00	12/05/1	5	3.00		5	-	-		
Client: Network Rail					Progress			I	
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 12/05/2015 Plant: Sherpa 2 (T820-638)	12/05/20 12/05/20		0.00 6.00	pth (Casing Depth - 2.00	Water Depth	Remarks Start of Hole Completion i	e instructed b	y WSP/PB
SPT Hammer: N/A Date Printed: 11/02/2016 Drilled By: SR Logged By: JHS	Remarks:	etrex 10) on the co	with an ac	curacy of taken by	+/-4metres.	ere provided by WS Ground levels are a I cross-correlated w	approximate a	and are ba	ased



WS2AOB31D

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 93.936mOD Coordinates: 465724.00E

224916.00N

	_	ı						010	
Description	Legend	Depth	O.D.		Sam	nple / Test		Casing (Water)	
Description	Legena	(m)	Level	Type	Depth	Test Re	oulto.	Depth	Installations
	X/////////////////////////////////////		(m)		(m)			(m)	
TOPSOIL: Very stiff dark brown silty CLAY.	XXXXX	0.10	93.84	B D	0.00-1.20 0.00-0.10	See DCP R	esults		3
\from 0mbgl to 1.2mbgl - live and decayed \	$\times\!\!\times\!\!\times\!\!\times$	E		PID ES	0.30 0.30	1.00ppm			
		ļ.		D	0.50				=
MADE GROUND: Very stiff light brown slightly gravelly CLAY. Gravel is angular to rounded		0.90	93.04	PID	1.00	0.20ppm			
fine to coarse of chert and brick.		E		D	1.00	0.20ррш			=
	××	-		ES UT100	1.00 1.20-1.65	36 blows, 100% Rec	overy		=
Stiff greyish brown thinly laminated silty CLAY. Moderate proportion of fossil	××_	E					•		
fragments. (OXFORD CLAY-STEWARTBY	<u>x</u> x	F		D ES	1.80 1.80				
MEMBER)		E			1.00				<u> </u>
	Xx^	-							_
(C)	××	-							=
_ 3	xx	E		D	2.80				
		F		ES UT100	2.80 3.00-3.45	32 blows, 100% Rec	overy		_
	XX^	-							_
	××								
	XX	Ė		D	3.80				-
Fine to stiff deal, because this by best at a	_ <u> </u>	4.00	89.94	ES	3.80				
Firm to stiff dark brown thinly laminated silty CLAY with thin beds of fine sand and		-							-
gypsum 5.40mbgl and 6.20mbgl. Moderate	<u> </u>								
proportion of fossil fragments. Moderate to	<u>××</u>	E		D	4.80				
strong organic/ hydrocarbon odour. (OXFORD CLAY-PETERBOROUGH MEMBER)	<u>x</u> x	E		D	4.00				_
CLAY-PETERBOROUGH MEMBER)		F							=
	××	E							
7.2	××	-							=
		E							<u> </u>
		F							=
	×	6.50	87.44	D	6.30				
Borehole Complete at 6.50 m		6.50	07.44						
		-							=
		E							
		-							
		E]
		E]
		F							-
		Ē]
		F							
		F							
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		F							
		F							
		E]
		<u> </u>	1						
Hole Diameter Detail Chie-Illin J Claus B		1		-		Observations		ı	
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time	Date	,	Water Stril	ke (m) S	Standing Time (mins)	_	Casing		Depth
(mm) (m) Depth (m) (m) (hours)			** -	\		Level (m)	Depth (m	1)	Sealed (m)
102 3.00 1.00 87 5.00 75 6.50			No G	roundwat	ter Encountered	'			
75 6.50									
					Progress	1			
Client: Network Rail	Date	9	Hole De	oth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	07/05/201	15	0.00 6.50		-	-	Start of Hole Completion		WOE /22
Dates Drilled: 07/05/2015	07/05/201	15	6.50		1.00	-	Completion	instructed b	y WSP/PB
Plant: Sherpa 1 (T820-630)									
SPT Hammer: N/A									
Date Printed: 11/02/2016	Remarks:	Hole refu	sed at 6.5	mbgl due	e to ground co	nditions. Coordinat	es were prov	ided by W	SP/PB
Drilled By: PG						with an accuracy of nates taken by WS			
Logged By: NJD					rovided by Net			. 50 501101a	
Checked By: JHS									
,									



Plant:

SPT Hammer:

Date Printed:

Drilled By:

Logged By:

Checked By:

Sherpa 2 (T820-638)

N/A

SR

NC

JHS

11/02/2016

Status: FINAL

Project No: 5624.2A

WS2AOB31U

Sheet 1 of 1

Project: East West Rail-Phase 2A

Borehole Log

Ground Level: 93.016mOD Coordinates: 465724.00E

224942.00N

Casing Sample / Test Depth O.D. Legend (Water) Depth (m) Description Level (m) Type Depth **Test Results** (m) (<u>m)</u> See DCP Results TOPSOIL: Very stiff dark brown silty CLAY. 0.10 92 92 PID D 0.30 0.30 ..from 0mbgl to 1.2mbgl - live and decayed 0.50ppm 0.40 92.62 roots and probable desiccation. MADE GROUND: Very stiff light brown slightly gravelly CLAY. Gravel is angular to rounded fine to coarse of brick and chert. 0.10ppm 1.00 1.20 91.82 Very stiff light brown CLAY with occasional gypsum crystals.(OXFORD CLAY-STEWARTBY D 1.70 MĖMBER) UT100 2.00-2.45 57 blows, 80% Recovery Stiff greyish brown thinly laminated silty CLAY with gypsum crystals. Low proportion of fossil fragments. Rare rootlets. (OXFORD CLAY-STEWARTBY MEMBER) D 2 70 D 3.70 UT87 4.00-4.45 27 blows, 60% Recovery 4.50 88 52 Firm becoming stiff at 6.50mbgl dark brown D 4.70 mottled bluish grey silty CLAY. Moderate to high proportion of fossil fragments. Strong organic/hydrocarbon odour. (OXFORD CLAY-PETERBOROUGH MEMBER) D 6.70 D 7.70 7.80 Borehole Complete at 7.80 m Water Level Observations Chiselling / Slow Progress Hole Diameter Detail Water Strike (m) Depth Standing Time Standing Casing Date Diameter Casing Depth (m) To (m) Time (hours) (mins) Level (m) Depth (m) Sealed (m) (mm) (m) 3.00 5.00 7.00 7.80 No Groundwater Encountered 2.00 Progress Client: Network Rail Date Hole Depth Casing Depth Water Depth Consultant: WSP | Parsons Brinckerhoff Start of Hole Completion instructed by WSP/PB 07/05/2015 07/05/2015 2 00 Dates Drilled: 07/05/2015

Remarks: Hole refused at 7.8mbgl due to ground conditions. Coordinates were provided by WSP/PB

LiDAR survey information provided by Network Rail.

using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with



Status: FINAL

WS2A1C Sheet 1 of 1

Ground Level: 86.490mOD

Coordinates: 468438.00E 225427.00N

Project: East West Rail-Phase 2A

			D 11-	0.0		San		Casing		
Descripti	on	Legend	Depth (m)	O.D. Level (m)	Туре		Test Re		(Water) Depth (m)	Installations
TOPSOIL: Dark brown gra SAND with frequent rootle subangular to angular fine and slag gravel.	ts.		- 0.80	85.69	PID D	0.30 0.30	See DCP F 0.00ppm	Results		
MADE GROUND: Dark group fine to coarse SAND. Graves angular fine to coarse brick	el is subangular to		1.30	85.19	PID B	1.00 1.00-1.20	0.00ppm			-
MADE GROUND: Soft to f sandy silty CLAY with rare slight hydrocarbon odour.			2.00	84.49	D UT100	2.00 2.00-2.45	45 blows, 100% Rec	overv		1
Firm bluish grey mottled by with frequent fossil fragme rootlets. (OXFORD CLAY-MEMBER)	nts and rare	×_×_×			D	2.60		,		-
Firm dark brown thinly lam	inated cilty CLAV	x×	3.00	83.49						- ::: :
with frequent fossil fragme organic odour. (OXFORD	nts and slight	××			D	3.60				
CLAY-PETERBOROUGH	мемвек)				UT87	4.00-4.45	32 blows, 50% Reco	very		
		<u> </u>			D	4.60				-
Very stiff dark brown thinly CLAY with rare fossil fragr CLAY-PETERBOROUGH	nents. (OXFORD	x x x	5.00	81.49	D	5.60				1
Borehole Complete at 6.00) m	_x_ =	6.00	80.49						
						Water Level	Observations			1
Hole Diameter Detail	Chiselling / Slow Progress			Water Stril	ke (m) S	Standing Time		Casing		Depth
Diameter Depth Casing (mm) (m) Depth (m)	From To Time (m) (hours)	Date	=		,	(mins)	Level (m)	Depth (m))	Sealed (m)
102 4.00 2.00 87 6.00				No G	Groundwa	ter Encountered				
Client: Netwo	ork Rail				. —	Progress				
Consultant: WSP Dates Drilled: 12/07	Parsons Brinckerhoff //2015-13/07/2015 2 (T820-759)	12/07/201 13/07/201	15	0.00 6.00	pth	Casing Depth - 2.00	Water Depth	Remarks Start of Hole Refusal		
	/2016		using a h approxim	nand held C nate and ar	GPŠ (Ga e based	min etrex 10)	onditions. Coordina with an accuracy o nates taken by WS twork Rail.	f +/-4metres. (Ground le	vels are



Status: FINAL Project: East West Rail-Phase 2A

Borehole Log

WS2A1D

Sheet 1 of 1

Ground Level: 84.280mOD Coordinates: 468442.00E

225430.00N

ritchies Project No: 5624.2A

	Project	10.5	024.ZA					225430	0.00N
Description	Legend	Depti (m)	h O.D. Level	Турє		nple / Test		Casing (Water)	Installations
		()	(m)	Турс	(m)	Test Re	sults	(m)	motanationa
MADE GROUND: Brown slightly gravelly SAND with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse coal, flint, brick and concrete. Cobbles are angular brick and concrete.		0.80	83.48	B PID ES B PID	0.00-0.80 0.30 0.30 0.80-1.20	See DCP R 0.60ppm 0.80ppm	Results	()	
MADE GROUND: Soft black slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse brick, coal, slag and concrete.		1.20	83.08	ES D	1.00 1.20	о.оорри			
Soft light greyish brown mottled CLAY with occasional fossil fragments. Fossil fragments are up 5mm wide. (OXFORD \CLAY-PETERBOROUGH MEMBER)	 	2.50	81.78	D ES	2.00-2.45 2.50 2.70	20 blows, 100% Rec	overy		
Soft dark grey slightly organic silty CLAY with occasional fossil fragments. Fossil fragments are up to 5mm wide. Organic material is black pseudo fibrous peat with a mild organic odour. (OXFORD CLAY-PETERBOROUGH MEMBER)	×x ×x ×x			D	3.00				-
Stiff to very stiff dark brown silty CLAY with rare pockets of crystals. (OXFORD CLAY-PETERBOROUGH MEMBER)	× × × × × × × × × × × × × × × × × × ×	4.00	80.28	D UT87	4.00 4.00-4.45	48 blows, 15% Reco	very		
,	×	6.00	78.28	D D	5.70				- - - - - - - - - - - - - - - - - - -
Borehole Complete at 6.00 m			78.26		Water Level	Observations			
Hole Diameter Detail Chiselling / Slow Progress			Water Stril	(e (m)	Standing Time		Casing		Depth
Diameter (mm) Depth (m) Casing Depth (m) From (m) To (m) Time (hours) 102 2.00 <td>Date</td> <td></td> <td></td> <td>` ′</td> <td>(mins)</td> <td>Level (m)</td> <td>Depth (n</td> <td>· I</td> <td>Sealed (m)</td>	Date			` ′	(mins)	Level (m)	Depth (n	· I	Sealed (m)
Olicate Natural D. 3					Progress				
Client: Network Rail	Date	,	Hole De	pth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 12/07/2015-13/07/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A	12/07/201 12/07/201 13/07/201 13/07/201	5 5 5	0.00 4.00 4.00 6.00		2.00 2.00 2.00 2.00	2.00 2.50	Start of Hole End of shift Start of shift Completion	t instructed b	
Date Printed: 11/02/2016 Drilled By: AB Logged By: NC Checked By: JHS		GPS (Ga are base	amin etrex	10) with cordinate	an accuracy of es taken by W	nates were provide f +/-4metres. Grou SP/PB and cross-c	nd levels are	approxima	ate and



JHS

Logged By: Checked By:

Borehole Log

WS2A1U

Sheet 1 of 1

Status: FINAL

Project: East West Rail-Phase 2A

Ground Level: 83.790mOD Coordinates: 468421.00E

225434.00N

	,							_0 10 1	.0011
Description	Legend	Depth	h O.D.		Sar	nple / Test		asing Nater)	
υσοσημιστί	Legend	(m)		Туре		Test Re	I \-	Depth	Installation
MADE GROUND: Dark brown to black gravelly fine to coarse SAND with frequent cobbles.			(m)	PID	0.30 0.30	See DCP F		<u>(ṁ)</u>	-
Cobbles are subangular brick and slag. Gravel is subangular to angular fine to coarse slag and brick.				D ES PID	0.30	0.00ppm			= = = = = = = = = = = = = = = = = = = =
MADE GROUND: Firm grey mottled light brown		1.25	82.54	D ES	1.00 1.00 1.00	о.ооррии			= =
slightly sandy gravelly CLAY. Gravel is subangular to rounded fine to coarse flint. Sand is fine.		2.00	81.79	D	1.60				<u>-</u>
Firm bluish grey mottled orange and brown CLAY with moderate fossil fragments. (OXFORD				_					- - - -
CLAY-PETERBOROUGH MEMBER)				D UT100	2.60 3.00-3.45	38 blows, 90% Reco	very		= = = = = = = = = = = = = = = = = = = =
Firm brownish grey thinly laminated CLAY with		3.45	80.34	D	3.60				
pockets of coarse sand. (OXFORD CLAY-PETERBOROUGH MEMBER)from 3.6mgbl to 3.7mgbl - frequent fossil		-		5	5.00				<u>-</u> -
fragments with strong organic odour.				D	4.60				-
Borehole Complete at 5.00 m		5.00	78.79						
									= = = = = = = = = = = = = = = = = = = =
									=
		_							=
		F			<u> </u>				=
Hole Diameter Detail Chiselling / Slow Progress		1	\\/-: \\\\-: \\\\-: \\\\			Observations	2 .		D#
Diameter Depth Casing (mm) (m) Depth (m) (m) (m) (m) (hours)	Date		Water Stril	ke (m) S	Standing Time (mins)	e Standing Level (m)	Casing Depth (m)		Depth Sealed (m)
102 3.00 0.00 87 5.00	14/07/15	5	3.60)	20	-	-		
					Progress				
Client: Network Rail	Date	9	Hole De	pth (Casing Depth	n Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 14/07/2015 Plant: (Tage 600)	14/07/201 14/07/201	15 15	0.00 5.00		- - -	3.60	Start of Hole Completion inst	tructed by	y WSP/PB
Plant: Sherpa 1 (T820-630)									
SPT Hammer: N/A Date Printed: 11/02/2016	Remarks	Water et	rike at 3.60	metres	Coordinates	were provided by V	VSP/PB using a	hand h	eld GPS
Drilled By: AB		(Gamin	etrex 10) w	ith an acc	curacy of +/-4	Imetres. Ground lev	els are approxii	mate an	d are
Logged By: NC			n the coord ion provide			PB and cross-corre	ated with LiDA	≺ survey	/
Checked By: JHS			,	,					



Date Printed:

Drilled By:

Logged By:

Checked By:

11/02/2016

ΑB

NJD

JHS

Borehole Log

Status: FINAL

Project No: 5624.2A

Project:

WS2A2C Sheet 1 of 1

East West Rail-Phase 2A Ground Level: 86.490mOD

Coordinates: 468464.00E

225556.00N

Description	Lanand	Depth	O.D.		San	nple / Test		Casing	
Description	Legend	(m)	Level	Туре	Depth	Test Re	eulte	(water) Depth	Installations
	VVV.		(m)		(m)			(m)	1977897789
MADE GROUND: Dark grey to black ashy gravelly fine to coarse SAND with occasional cobbles. Cobbles are subrounded stag. Gravel is angular to subrounded fine coarse chalk, brick and slag. MADE GROUND: Soft dark grey mottled black gravelly silty CLAY with strong hydrocarbon odour. Gravel is subrounded fine and medium flint. (Reworked Clay) Firm grey mottled brown gravelly silty CLAY with occasional shell remains and rare rootlets. Gravel is subrounded fine to coarse flint. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 4.45 m		3.40	83.09 82.79 82.04	PID D D ES PID D ES D UT87	0.30 0.30 0.30 0.30 1.00 1.00-2.00 1.00 1.00 1.00 3.60 3.80 4.00-4.45	See DCP R 0.30ppm 0.00ppm			
					Water Level	Observations			
Hole Diameter Detail Chiselling / Slow Progress			Nater Stril		tanding Time		Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	,	N- C		(mins)	Level (m)	Depth (m	1)	Sealed (m)
102 2.00 2.00 87 4.00 3.00			NO C	oroundwate	er Encountered	ı			
Client: Network Rail	Dete		Hole D-	nth C	Progress	Motor Donth	Domorto		
Consultant: WSP Parsons Brinckerhoff	Date 12/07/201		Hole De	pin (Casing Depth	Water Depth	Remarks Start of Hole	<u> </u>	
Dates Drilled: 12/07/2015-15/07/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A	12/07/201 12/07/201 15/07/201 15/07/201	15 15	0.00 2.00 2.00 4.45		2.00 2.00 3.00	-	End of shift Start of shift Completion		y WSP/PB
D. (D.) () () () () () () () () ()	Domorlis:	Holo rofu	and at 2 0	mbal dua	to up lovel =	round Coordinates	wore provid	ad by MCI	1/DD

Remarks: Hole refused at 2.0mbgl due to un level ground. Coordinates were provided by WSP/PB

using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.



WS2A2D

Sheet 1 of 1

Ground Level: 84.280mOD

Coordinates: 468470.00E 225554.00N

Project: East West Rail-Phase 2A

Status: FINAL

	'						220	00 1	.0014
Description	Legeno	Depth	O.D.		Sar	nple / Test	Cas	sing	
Description	Legend	(m)	Level (m)	Туре	Depth	Test Re	esults De	pth	Installati
MADE GROUND: Brown sandy gravelly CLA	/v ××××	-	(111)	В	(m) 0.00-1.20	See DCP F	Results	n)	-10(2)
Gravel is fine to coarse angular to	`''	0.25	84.03	PID	0.30	0.00ppm			
subrounded track ballast.	/	\$		ES	0.30				=
MADE GROUND: Black and grey ashy sligh	tly 💥	₹							=
silty slightly gravelly fine to coarse SAND with frequent cobbles.		Œ		PID D	1.00 1.00	0.00ppm			=
war noquent cossice.	××××	}		ES	1.00				=
	×××	Æ		D	1.50				=
MADE ODOUND E		1.90	82.38	D	1.90				=
MADE GROUND: Firm black speckled grey slightly sand silty CLAY.	/\	2.00	82.28	D	2.00				Ξ
MADE GROUND: Firm grey mottled brown s	lightly SSSS	<u></u>							=
sandy slightly gravelly CLAY. Gravel is fine		⊱							=
and medium angular brick, chalk and Flint.		Æ		UT87	3.00-3.45	49 blows, 100% Rec	overy		$\sqrt{-}$
at 2mgbl - red ceramic pipe fragment	→ 💥	<u></u>							=
Firm light grow mothed bluich grow CLAV		3.45	80.83						=
Firm light grey mottled bluish grey CLAY. OXFORD CLAY. (OXFORD	/	3.60	80.68						=
CLAY-PETERBOROUGH MEMBER)		_		D	4.00				,* .*
Stiff dark grey CLAY with frequent broken		E						Į.	3.33
shells. OXFORD CLAY. (OXFORD		ŧ							
CLAY-PETERBOROUGH MEMBER)at 4.2mbgl - becoming slightly sandy thinly		=							
laminated clay		5.00	79.28	D	5.00				
Borehole Complete at 5.00 m	/	E]
		E]
		-							=
		E							1 -
		Ė							=
		E							
		Ė]
		-							=
		E]
		F							=
		E]
		-							=
		E]
		Ė							
		-							
		E							
		-							
		E]
		F							Ξ
				-	Water Level	Observations	I		
Hole Diameter Detail Chiselling / Slow Diameter Depth Casing From To	r Progress Time Da	te	Water Stri	ke (m) S	tanding Time		Casing		Depth
(mm) (m) Depth (m) (m) (m)	(hours)				(mins)	Level (m)	Depth (m)	+	Sealed (m)
102 2.00 2.00 87 3.00 75 5.00	09/08/1	5	3.00	U	5	-	-		
75 5.00									
0					Progress		l .		
Client: Network Rail	Da [*]	te	Hole De	pth C	Casing Depth	n Water Depth	Remarks		
Consultant: WSP Parsons Brincke	99/08/20 09/08/20	015	0.00 5.00		2.00	-	Start of Hole Completion instru	ctad h	v WSD/DR
Dates Drilled: 09/08/2015	09/08/20	,,,,	ა.00		∠.∪∪		Completion instru	vien D)	y WOF/PD
Plant: Sherpa 1 (T820-630)									
SPT Hammer: N/A	Domestic	· \\/ota= = =	nnage het	woor 2 =:	od 2 45 msts	oro Coordinates	uro provided by MC	בח/חי	Quoin~ c
Date Printed: 11/02/2016	Remarks					ers. Coordinates we accuracy of +/-4me			
Drilled By: AB		approxim	nate and ar	e based o	on the coord	inates taken by WS			
Logged By: NJD		LIDAK SU	ii vey intori	nauon pro	ovided by Ne	RWOIK KAII.			
Checked By: JHS									



WS2A2U

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 83.790mOD Coordinates: 468454.00E

225562.00N

ritchies Project No: 5624.2A

			·_ ··_· ·					223362	0014
Description	١	Depth	O.D.		San	nple / Test		Casing	
Description	Legend	(m)	Level	Туре			16	(Water)	Installations
		` ′	(m)	. 7 -	(m)	Test Re		(m)	
MADE GROUND: Dark brown to black sandy clayey	$\times\!\!\times\!\!\times\!\!\times$					See DCP R	Results		
angular to subangular fine to coarse GRAVEL of clinker and coal. Sand is fine to coarse.	$\times\!\!\times\!\!\times\!\!\times$	=		PID D	0.30 0.30	0.10ppm			=
of clinker and coal. Sand is fine to coarse.	$\times\!\!\times\!\!\times\!\!\times$			ES	0.30				3
	$\times\!\!\times\!\!\times\!\!\times$								=
from 1mbgl to 1.2mbgl - becoming slightly	$\times\!\!\times\!\!\times\!\!\times$	_		PID D	1.00 1.00	0.00ppm			_
clayey.	XXXXX	1.20	82.59	ES	1.00				
MADE GROUND: Soft light brown mottled orange		1.05	00.44	D	1.40				
and grey slightly sandy slightly gravelly	$\times\!\!\times\!\!\times\!\!\times\!\!\times$	1.65 - 1.80	82.14 81.99	D	1.70				
CLAY. Sand is fine to coarse. Gravel is	×x-	_		D UT100	1.90 2.00-2.45	21 blows, 80% Reco	very		
angular to rounded fine to coarse of chert.	××					·			_
from 1.2mbgl to 2.8mbgl - decayed roots.	×_ ×_ ×	2.40	81.39	D	2.50				=
MADE GROUND: Light orangish brown sandy	<u>x</u> x								\exists
clayey angular to rounded fine to coarse	××-	_ 2.90	80.89	D	2.90				<u>-</u>
GRAVEL of chert. Sand is fine to coarse.									Ξ.
Stiff light brown mottled orange and grey									=
sandy silty CLAY. Sand is fine. (OXFORD									-
CLAY-PETERBOROUGH MEMBER)				D	3.90				
Very stiff brown mottled orange and grey CLAY				UT87	4.00-4.45	61 blows, 100% Rec	overy		-
with much orangish brown silt partings with									
shell and fossil fragments and occasional gypsum crystals. (OXFORD		-							
CLAY-PETERBOROUGH MEMBER)				D	4.90				
at 2.85mbgl - orangish brown sandy silty		5.00	78.79	D	4.90				_
clay laminae with much shell fragments. Sand is fine.		_							=
									= 3
Stiff to very stiff dark brown mottled grey		_							=
thinly laminated organic CLAY with occasional shell and fossil fragments and gypsum		_							-
crystals. (OXFORD CLAY-PETERBOROUGH		_]
MEMBER)									
Borehole Complete at 5.00 m		_							
		_]
		_							=
									3
		_							=
		_							=
		_							3
		_							
		Ė							
]
		_							
		-							
]
		_]
		-			10/11/11			<u> </u>	<u> </u>
Hole Diameter Detail Chiselling / Slow Progress		1				Observations	_	Т	
Diameter Depth Casing From To Time	Date	,	Water Strik	ke (m)	Standing Time (mins)	_	Casing		Depth
(mm) (m) Depth (m) (m) (hours)	00/00::					Level (m)	Depth (m	1)	Sealed (m)
102 2.00 2.00 87 4.00 75 5.00	06/08/15	'	4.80	,	20	4.80	-		
75 5.00									
					Progress				
Client: Network Rail	Date	,	Hole De	oth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	06/08/201 06/08/201		0.00 5.00		0.00 2.00	-	Start of Hole		
Dates Drilled: 06/08/2015	06/08/201	15	5.00		2.00	4.80	Completion	instructed b	y WSP/PB
Plant: Sherpa 1 (T820-630)									
SPT Hammer: N/A									
Date Printed: 11/02/2016						sing a hand held G			
Drilled By: DB						e approximate and ith LiDAR survey in			
Logged By: NJD		Rail.	vvoi /FD a	114 0105	o outrelated W	iiii LiDAN Suivey III	ισιπαιιστι μι	ovided by	I VOLVVOIR
Checked By: JHS									



WS2A3C

Status: FINAL

Project No: 5624.2A

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 85.100mOD Coordinates: 468593.00E

225708.00N

December			Depth	n O.D.	Sam	Sample / Test		Casing		
Descripti	on	Legend	(m)	Level (m)	Туре	Depth (m)	Test Re	esults	Depth (m)	Installations
MADE GROUND: Black s surrounded fine to coarse and chertfrom 0mbgl to 2.8mbgl -	GRÁVEĽ of clinker		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		D PID B ES PID D ES	0.00-0.10 0.30 0.30-0.50 0.30 1.00 1.00 1.00	See DCP F 0.50ppm 0.50ppm	Results		
MADE GROUND: Soft da slightly sandy slightly grav is fine to coarse. Gravel is subrounded fine to coarse from 1.4mbgl to 2.9mbgl desiccation.	elly CLAY. Sand angular to of clinker.		1.40	83.70 83.50	D D D UT100	1.90 1.90 1.90 2.00-2.45	18 blows, 100% Rec	covery		
MADE GROUND: Firm int mottled orange and grey (CLAY with occasional she at 2.5mgbl - orangish bro clay lense. sand is fine to angular to surrounded fine	CLAY and stiff brown Il fragments. Il fragme	× × ×	3.00	82.10 81.70	D D ES D	2.90 3.10 3.20 3.50				-
clinkerfrom 2.9mbgl to 3mbgl - crystals.		××			UT87	4.00-4.45	16 blows, 100% Rec	covery		= = = = = = = = = = = = = = = = = = = =
MADE GROUND: Soft dar slightly gravelly CLAY. Gra rounded fine to medium of	avel is angular to		4.50	80.60	D	4.50				- - -
Firm light brown mottled o with orangish brown silt par CLAY-PETERBOROUGHfrom 3.6mbgl to 4.5mbglfrom 3.8mbgl to 4.5mbgl silt partings.	artings. (OXFORD MEMBER) - decayed roots.	2016	5.10 	30.00	D	5.90				-
Firm dark brown mottled g slightly organic CLAY with spaced silty shell laminae crystals and black organic CLAY-PETERBOROUGH	extremely closely with much gypsum partings. (OXFORD	Sales	7.10	78.00	D D D	6.90 6.90 7.20				-
Firm varying to stiff dark b laminated organic CLAY v spaced silty shell laminae crystals and black organic CLAY-PETERBOROUGHfrom 5.6mbgl to 6.4mbgl very stifffrom 6.4mbgl to 7.1mbgl stiff varying to hard.	vith very closely with much gypsum partings. (OXFORD MEMBER) - stiff varying to		8.00	77.10	D	7.90				
Very stiff varying to hard to dark grey CLAY with occa										
11.1.51	011.111.101.5					Water Level	Observations			•
Hole Diameter Detail Diameter Depth Casing (mm) (m) Depth (m) 103 2 00 2 00	From To Time (m) (hours)	Date	е	Water Strik	, ,	Standing Time (mins)	Level (m)	Casing Depth (m		Depth Sealed (m)
102 3.00 2.00 87 5.00 75 7.00 65 8.00				NO G	Foundwat	er Encountered	1			
Client: Netw	ork Rail	Date		Hole Do	nth '	Progress Casing Depth	Water Donth	Remarks		
Dates Drilled: 14/05	Parsons Brinckerhoff 5/2015 pa 1 (T820-630)	14/05/20 14/05/20		0.00 8.00	pan (Casing Depth - 2.00	Water Depth	Start of Hole Completion	e instructed b	y WSP/PB
	2/2016	Remarks:	hand hel	ld GPS (Ga	min etrez e based	x 10) with an	s. Coordinates wer accuracy of +/-4me nates taken by WS twork Rail.	etres. Ground	levels are	,



JHS

Borehole Log

Status: FINAL

WS2A3C Sheet 1+ of 1

East West Rail-Phase 2A Project:

Ground Level: 85.100mOD Coordinates: 468593.00E

225708.00N

Project No: 5624.2A Casing Sample / Test Depth O.D. Legend (Water) Depth (m) Description (m) Level Туре Depth **Test Results** (m) (m) See DCP Results fragments and gypsum crystals. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 8.00 m Water Level Observations Hole Diameter Detail Chiselling / Slow Progress Standing Time (mins) Water Strike (m) Casing Standing Depth Date Diameter (mm) Depth (m) Casing Depth (m) To (m) Time (hours) Level (m) Depth (m) Sealed (m) No Groundwater Encountered 3.00 5.00 7.00 8.00 2.00 Progress Client: Network Rail Date Hole Depth Casing Depth Water Depth Remarks Consultant: WSP | Parsons Brinckerhoff Dates Drilled: 14/05/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A Remarks: Date Printed: 11/02/2016 Drilled By: ΑB Logged By: ZR



WS2A3D Sheet 1 of 1

Status: FINAL

Ground Level: 84.300mOD

Coordinates: 468600.00E

225691.00N

	Project:	East West Rail-Phase 2A
itchies	Project No	: 5624.2A

Casing Sample / Test Depth O.D. (Water) Depth Installations Description Legend (m) Level Type Depth **Test Results** (m) (m) (m) See DCP Results MADE GROUND: Dark brown sandy silty angular to subangular fine to coarse GRAVÉL of 0.30 84.00 0.30 0.20ppm 0.30 0.30 D ES clinker. Sand is fine to coarse. MADE GROUND: Dark grey to black sandy angular to subangular fine to coarse GRAVEL of 0.00ppm PID 1.00 1.00 clinker. Sand is fine to coarse. 1.30 83.00 Firm dark grey slightly gravelly CLAY with 1.60 82.70 black silty organic partings. Gravel is angular fine to coarse of chert. (OXFORD 1.90 2.00-2.45 CLAY-PETERBOROUGH MEMBER) UT100 16 blows, 90% Recovery ..from 1.3mbgl to 2.7mbgl - decayed roots Soft light brown mottled orange and grey CLAY 2.60 81.70 with orangish brown silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER) D 2.90 ..from 2.2mbgl to 2.6mbgl - firm dark brownish grey. 3.50 80.80 Stiff dark brown mottled grey thinly D 3.60 laminated organic CLAY with orangish brown silt partings. (OXFORD CLAY-PETERBOROUGH 3.80 80.50 3.90 4.00-4.45 D UT87 46 blows, 100% Recovery MEMBER) ..from 2.9mbgl to 3.5mbgl - firm with gypsum crystals and no silt partings. Soft to firm brown slightly sandy silty CLAY 4.90 5.00 79.30 with occasional calcareous nodules. Sand is fine to medium. (OXFORD CLAY-PETERBÖROUGH MEMBER) ..from 3.6mbgl to 3.8mbgl - light orangish Firm to stiff dark brown thinly laminated organic CLAY with occasional orangish brown silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER) ..from 4.65mbgl to 4.8mbgl - becoming brown in colour. Borehole Complete at 5.00 m

								Water Level C	baci valiona		
Hole	Diamete	er Detail	Chisellin	ng / Slov	v Progress		Water Strike (m)	Standing Time	Standing	Casing	Depth
Diameter	Depth (m)	Casing Depth (m)	From (m)	To (m)	Time (hours)	Date	Water Clinto (III)	(mins)	Level (m)	Depth (m)	Sealed (m)
(mm)			(111)	(111)	(Hours)	04/00/45	0.50	_	2010. ()	2 op ()	ocalou (III)
102 87	2.00 4.00	2.00				04/08/15	3.50	5	-	-	
75	5.00										
01. (N. .						Progress			
Client:			ork Rail			Date	Hole Depth	Casing Depth	Water Depth	Remarks	
Consult	tant:	WSP	Parsons	Brincke	erhoff	04/08/2015	0.00	0.00	-	Start of Hole	
Dates D	Orilled:	04/08	/2015-05/0	08/2015		05/08/2015	5.00	2.00	3.60	Completion instructe	d by WSP/PB
Dlant											
Plant:		Snerp	oa 1 (T820	-b3U)			1				

SPT Hammer: N/A Date Printed: 11/02/2016 Drilled By: DB Logged By: NJD Checked By: JHS

Remarks: Water sepage at 3.5 meters. Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.

Water Level Observations



Borehole Log Status: FINAL

WS2A3U

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 84.100mOD Coordinates: 468590.00E

225724.00N

Description	Legend	Depth	O.D.	Sample / Test				Casing	
Description	Legena	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth	Installations
TOPSOIL: Dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subrounded to rounded fine to coarse flint. Proportion of rootlets.	×	0.20	83.90 83.40	PID D ES	0.30 0.30 0.30	See DCP F 0.00ppm	Results		
Firm thinly laminated dark grey silty slightly gravelly CLAY. Gravel is subrounded coarse flint. Low proportion of rootlets. (ALLUVIUM)				PID D ES	1.00 1.00 1.00	0.00ppm			
Firm thinly laminated grey mottled orange brown slightly sandy slightly gravelly CLAY. Gravel is subrounded fine and medium flint. Low proportion of fossil fragments. (ALLUVIUM)	×	1.80	82.30 81.40	D	1.90				
Soft to firm dark grey silty CLAY with thin lenses of orange fine and medium sand. Rare rootlets. (ALLUVIUM)				D UT100	2.90 3.00-3.45	43 blows, 100% Rec	overy		
Stiff to very stiff dark brown silty CLAY with small gypsum crystals. Moderate organic odour. (ALLUVIUM) Borehole Complete at 4.00 m	xxx	4.00	80.10	D	3.80				
Borehole complete at 4.00 m									
		_ _ _ _ _							1 1
					Water I evel	Observations			
Hole Diameter Detail Chiselling / Slow Progres			Water Strik	ke (m)	Standing Time		Casing		Depth
Diameter Depth Casing From To Time (mm) (mm) Depth (m) (mm) (mm) (hours) 102 3.00 1.00 87 4.00	17/05/1		4.00	` '	(mins)	Level (m)	Depth (n		Sealed (m)
					Progress				
Client: Network Rail	Date	e	Hole De	pth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 17/05/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	17/05/20 17/05/20	15	0.00 4.00	F.11	1.00	3.50	Start of Hole Refusal	e	
Date Printed: 11/02/2016 Drilled By: PG Logged By: NC Checked By: JHS		hand hel approxim	d GPS (Ga	min etre e based	ex 10) with an	gl. Coordinates we accuracy of +/-4me nates taken by WS twork Rail.	tres. Ground	l levels are	•



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Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2A4D

Sheet 1 of 1

Ground Level: 90.300mOD Coordinates: 468066.00E

	-,							225556	.0011
Description	Legend	Depth	n O.D.		Sam	nple / Test		Casing	
	Legena	(m)	Level (m)	Туре	(m)	Test Re		Depth (m)	Installations
TOPSOIL: Firm dark brown slightly gravelly silty CLAY. Gravel is angular to rounded fine		0.20	90.10	D PID	0.00-0.10 0.30	See DCP R 0.20ppm	tesults		
to coarse of chert and brick.		0.60	89.70	D ES	0.30 0.30				
from 0mbgl to 2.6mbgl - live roots.	$\otimes\!\!\!\otimes\!\!\!\otimes$			В	0.60-1.20	0.00			3
MADE GROUND: Firm light orangish brown slightly sandy slightly gravelly CLAY. Sand	$\times\!\!\times\!\!\times\!\!\times$			PID D ES	1.00 1.00 1.00	0.00ppm			-
is fine to coarse. Gravel is angular to rounded fine to coarse of chert.	****			UT100	1.20-1.65	27 blows, 100% Rec	overy		
MADE GROUND: Firm light brown mottled orange				D	1.90				= =
and grey CLAY with very clayey sandy angular to rounded fine to coarse Gravel lenses of		2.00	88.30	D	2.00				=
chert. Sand is fine to coarse.									=
from 1mbgl to 1.4mbgl - becoming stiff				D	2.90				=
stiff. from 1.4mbgl to 2.9mbgl - probable				UT87	3.00-3.45	29 blows, 80% Reco	very		
desiccation.		3.50	86.80	D	3.45				=
Very stiff light orangish brown sandy		3.75	86.55	В	3.50-3.75				
slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to		_		D	3.90				-
coarse of chert. (OXFORD CLAY-PETERBOROUGH MEMBER)	=====								=
from 2mbgl to 5.4mbgl - decayed roots	× ^×	4.70	85.60	D	4.80				=
sandy gravelly.	<u>×</u> ××	- 500	05.10						-
Light orangish brown sandy clayey angular to rounded fine to coarse GRAVEL of chert. Sand		5.20	85.10	D	5.20				=
is fine to coarse. (OXFORD	====								=
CLAY-PETERBOROUGH MEMBER)				D	5.90				_
Very stiff light brown mottled orange and grey CLAY with occasional calcareous nodules.									=
(OXFORD CLAY-PETERBOROUGH MEMBER)from 4.3mbgl to 4.7mbgl - no calcareous	====								=
nodules.		7.00	83.30	D	6.90				-
Very stiff greyish brown mottled grey silty CLAY. (OXFORD CLAY-PETERBOROUGH	1								=
MEMBÈR)									3
Very stiff brown mottled orangish brown and grey CLAY with occasional gypsum crystals.		_							=
(OXFORD CLAY-PETERBOROUGH MEMBER)		- -							=
Borehole Complete at 7.00 m									=
		_							=
		<u>-</u> -							
		_							1
					\Ma4==1 :	Observation:			1 1
Hole Diameter Detail Chiselling / Slow Progress	<u> </u>	1	Water Level Observations Water Strike (m) Standing Time Standing Casing						Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	;		, ,	(mins)	Level (m)	Depth (n	' I	Sealed (m)
102 2.00 0.00 87 4.00 75 5.00			No G	Groundwa	ter Encountered	i			
75 5.00 65 7.00									
Client: Network Rail	Date	<u> </u>	Hole De	oth	Progress Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	13/05/201 13/05/201	5	0.00 7.00	- 11	-	-	Start of Hole Completion instructed by WSP/PB		
Dates Drilled: 13/05/2015 Plant: Sherpa 1 (T820-630)	13/03/201		7.00		-		Completion	ii ioii uCleU D	y WOF/FD
SPT Hammer: N/A									
Date Printed: 11/02/2016						sing a hand held G approximate and			
Drilled By: AB Logged By: JHS						ith LiDAR survey in			
Checked By: RS									
·									



Borehole Log Status: FINAL

WS2A4U

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 89.700mOD Coordinates: 468059.00E

225584.00N

	, , , , , ,		_					220004	.0011
Description	Legend	Dept	h O.D.	Sample / Tes		ple / Test	Casing (Water		
Description	Legend	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth	Installations
TOPSOIL: Very stiff dark brown slightly gravelly silty CLAY. Gravel is angular to rounded fine to coarse of chert and brickfrom 0mbgl to 2mbgl - live roots.		0.20	89.50	D B PID ES	0.00-0.10 0.20-1.20 0.30 0.30	See DCP R 0.40ppm	Results	(111)	-
MADE GROUND: Very stiff light brown mottled orange and grey CLAY with very clayey sandy angular to rounded fine to coarse Gravel lenses of chert brick and clinker.				PID D ES	1.00 1.00-11.00 1.00	0.00ppm			1
at 1.9mgbl - subangular cobble of chert.	××××	2.00	87.70						
Stiff grey mottled orange brown sandy gravelly CLAY. Sand is fine to medium. Gravel is subrounded to rounded fine to coarse flint, chert, chalk and mudstone. Low proportion of rootlets. (GLACIAL DEPOSIST-COHESIVE)		3.00	86.70	D B	2.60 3.00-3.50				-
Orange brown clayey gravelly fine to coarse SAND. Gravel is subrounded to rounded fine to coarse quartzite, chert, flint and	×	3.70	86.00	D UT87	3.60 4.00-4.45	27 blows, 50% Reco	very		- - - - - -
mudstone.(GLACIAL DEPOSIST-GRANULAR)							,		=
Firm brownish grey silty CLAY. Low proportion of fossil fragments and rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER)		5.00	84.70	D	4.60				= = =
Firm thinly laminated greyish brown silty CLAY. High proportion of fossil fragments. Moderate organic odour. (OXFORD CLAY-PETERBOROUGH MEMBER)	× - × × × × × × × × × × × × × × × × × ×	5.55	0 0	D	5.60				
4	<u>xx</u> x			UT87	6.00-6.45	46 blows, 90% Reco	very		
	× × × × × × × × × × × × × × × × × × ×	7.80	81.90	D D	7.60				
Borehole Complete at 7.80 m		- 7.50	01.50						
									=
Hole Diameter Detail Chiselling / Slow Progress						Observations			
Diameter (mm) Depth (m) Casing Depth (m) From (m) To (m) Time (hours) 102 3.00 2.00 87 6.00 0	Date	•	Water Strik	- ()	Standing Time (mins) ter Encountered	Level (m)	Casing Depth (n		Depth Sealed (m)
75 7.00 65 7.80									
Client: Network Rail	Det	<u>_</u>	Hole De	nth	Progress	Motor Don't	Domorte		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 13/05/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	13/05/201 13/05/201		0.00 7.80	μτη	Casing Depth - 2.00	Water Depth	Remarks Start of Hole Refusal	e	
Date Printed: 11/02/2016 Drilled By: PG Logged By: NC Checked By: JHS		using a	hand held C	SPŠ (Ga	min etrex 10) v	nditions. Coordinat with an accuracy of nates taken by WS	f +/-4metres.	Ground le	vels are



WS2A5C Sheet 1 of 1

Status: FINAL

Ground Level: 88.300mOD

Project: East West Rail-Phase 2A

Coordinates: 467696.00E 225470.00N

Project No: 5624.2A Casing Sample / Test Depth O.D. Legend (Water) Depth Installations Description Level (m) Type Depth **Test Results** (m) <u>(ṁ)</u> 0.00-0.20 (m) See DCP Results MADE GROUND: Dark brown sandy slightly silty 0.20 88.10 0.20-0.70 B D angular to subangular fine to coarse GRAVEL 0.20-0.70 PID ES 0.30 0.30 of limestone clinker and granite. 0.40ppm 0.70 87.60 MADE GROUND: Light orangish brown gravelly fine to coarse SAND. Gravel is angular to 0.70-1.20 0.70-1.20 1.00 1.00 B D PID ES UT100 0.00ppm rounded fine to coarse of chert and clinker 1.20-1.65 14 blows, 100% Recovery MADE GROUND: Firm light orangish brown mottled orange and grey slightly gravelly CLAY with silt partings and occasional shell and fossil fragments. Gravel is angular to D 1.90 rounded fine to coarse of chert and clinker...from 1.7mgbl to 2mgbl - becoming soft. 2 45 85 85 D 2.50 .from 2mbgl to 2.45mbgl - firm mottled black. UT100 3.00 MADE GROUND: Soft dark brownish grey slightly UT87 3.00-3.45 21 blows, 60% Recovery 3.20 85.10 sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of chert. ..at 2.45mgbl - black gravelly fine to coarse 3.90 D 4.00 84.30 sand laminae of ash. .from 2.45mbgl to 4mbgl - probable desiccation. ..from 2.9mbgl to 3.2mbgl - becoming brown mottled orange and grey. D 4.90 5.00 83 30 Firm light brown mottled orange and grey CLAY with silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER) Firm dark brownish grey thinly laminated CLAY with extremely closely spaced dark orangish brown silt laminae. (ÓXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 5.00 m Water Level Observations Hole Diameter Detail Chiselling / Slow Progress Water Strike (m) Standing Time Standing Casing Depth Date Diamete Depth Casing Depth (m) To (m) Time (hours) (mins) Level (m) Depth (m) Sealed (m) (mm) (m) 2.00 3.00 4.00 5.00 No Groundwater Encountered 0.00 Progress Client: Network Rail Date Hole Depth Casing Depth Water Depth Consultant: WSP | Parsons Brinckerhoff Start of Hole Completion instructed by WSP/PB 20/05/2015 20/05/2015 0.00 Dates Drilled: 20/05/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an Date Printed: 11/02/2016 accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates Drilled By: AB taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail. Logged By: NJD Checked By: JHS



Plant:

SPT Hammer:

Date Printed:

Drilled By:

Logged By: Checked By: Sherpa 2 (T820-638)

N/A

PG

JHS

RS

11/02/2016

Borehole Log

East West Rail-Phase 2A

Status: FINAL

Project No: 5624.2A

Project:

WS2A5D Sheet 1 of 1

Ground Level: 86.600mOD

Coordinates: 467694.00E

225465.00N

Description	Legend	Depth	n O.D.		San	mple / Test		Casing	
Description	Legena	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth (m)	Installations
MADE GROUND: Dark brown gravelly fine SAND with rootlets. Gravel is subangular to		0.30	86.30	PID	0.30	See DCP R 0.20ppm	esults	,	[=
rounded fine to coarse flint, ballast and chalk.		0.60	86.00	D ES D	0.30-0.60 0.30 0.60-1.20				
MADE GROUND : Dark brown gravelly fine SAND with rare rootlets. Gravel is subangular to rounded fine to coarse flint, brick, ballast	<u></u>	1.20	85.40	PID ES UT100	1.00 1.00 1.20-1.65	0.10ppm 34 blows, 100% Reco	overy		- - - -
and rare chalk. Soft to firm greenish brown mottled bluish grey slightly gravelly sandy silty CLAY. Sand is fine and medium. Gravel is subangular to rounded fine flint and chalk. (COHESIVE GLACIAL DEPOSITS)	xx xx xx xx xx			D	2.00				
Firm greenish brown and bluish grey silty CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)	×x x			D UT87	3.00 3.00-3.45	16 blows, 50% Recov	very		- - - - - -
Firm dark brownish grey slightly sandy silty	××	3.60	83.00	D	3.60			ĺ	=
CLAY with frequent crystals. Sand is fine to coarse. (OXFORD CLAY-PETERBOROUGH MEMBER)	×			D	4.00				- - - -
Borehole Complete at 5.00 m	×x ²	5.00	81.60	D	5.00				-
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Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	э	Water Strik		Standing Time (mins)	e Standing	Casing		Depth
(mm) (m) Depth (m) (m) (m) (hours) 102 3.00 0.00 87 4.00 75 5.00			No C	3roundwate	er Encountered	Level (m)	Depth (m)		Sealed (m)
75 5.50					7				
Client: Network Rail	Date	e T	Hole Dep	enth (Progress Casing Depth	n Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	12/05/201 12/05/201		0.00 5.00			-	Start of Hole Completion ins	structed h	w WSP/PR
Dates Drilled: 12/05/2015	12/03/201	٠	3.00				Completion ins	sii ucieu b	y WSF/FB

Rail.

Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an

accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network



Checked By:

JHS

Borehole Log Status: FINAL

WS2A5U

Sheet 1 of 1

Ground Level: 87.000mOD Coordinates: 467690.00E

225483.00N

ritchies Project: East West Rail-Phase 2A Project No: 5624.2A

	Project	110.50)24.ZA					225483	3.00N
Description	Legend	Depth				nple / Test		Casing (Water)	Installations
l '		(m)	Level (m)	Туре	Depth (m)	Test Re	esults	Depth (m)	installations
TOPSOIL: Dark brown gravelly fine SAND with	XXXXXXX	- 0.10	86.90	D	0.10	See DCP I	Results	(111)	
rootlets. Gravel is subangular to rounded fine to coarse flint and chalk.			00.00	PID ES	0.30 0.30	0.10ppm			-
MADE GROUND: Soft to firm greenish brown mottled bluish grey slightly sandy gravelly CLAY with rare cobbles. Cobbles are subangular brick. Gravel is angular to subrounded fine to coarse flint and brick.		0.80	86.20	D PID ES	0.80 1.00 1.00	0.10ppm			-
Soft to firm greenish brown mottled bluish grey slightly sandy CLAY. Sand is fine and medium (GLACIAL DEPOSITS COHESIVE)				D UT100	2.00 2.00-2.45	49 blows, 50% Reco	overy		
		_ 3.00	84.00	D	3.00				<u> </u>
Firm greyish brown mottled grey CLAY with gypsum crystals. (OXFORD CLAY-PETERBOROUGH MEMBER) \from 3mbgl to 3.9mbgl - decayed roots.		3.30	83.70	D	3.30				
Soft light brown mottled orange and grey CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.5mbgl to 4.0mbgl - becoming firm.		4.20	82.80	D UT87	3.90 4.00-4.45	26 blows, 100% Red	covery		
Very stiff dark greyish brown thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) from 4.6mbgl to 5mbgl - with light grey silt partings. Borehole Complete at 5.00 m		5.00	82.00	D	4.90				
					Water Level	Observations			
Hole Diameter Detail Chiselling / Slow Progress			Water Stril		Standing Time	1	Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	•		,	(mins)	Level (m)	Depth (n		Sealed (m)
102 3.00 2.00 87 5.00			No G	Groundwat	er Encountered				·
Client: Network Rail					Progress			1	
Consultant: WSP Parsons Brinckerhoff	Date		Hole De	pth (Casing Depth	Water Depth	-		
Dates Drilled: 12/05/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	12/05/201 12/05/201 12/05/201 13/05/201	5	0.00 3.00 3.00 5.00		0.00 2.00 2.00 2.00		Start of Hole End of shift Start of shift Completion	t	y WSP/PB
Date Printed: 11/02/2016 Drilled By: EK Logged By: NJD	i t	accuracy	of +/-4me	tres. Grou	und levels are	sing a hand held G e approximate and ith LiDAR survey in	are based or	n the coord	linates



Status: FINAL

WS2A6C

Sheet 1 of 1

Ground Level: 93.100mOD Coordinates: 467093.00E

225311.00N

Project: East West Rail-Phase 2A ritchies

Description	Legend	Depth	n O.D.	D. Sample / Test			Casing		
Description	Legena	(m)	Level (m)	Type	Depth (m)	Test Re	sults	Depth	Installations
MADE GROUND: Grey and black sandy slightly silty angular to subangular fine to coarse \GRAVEL of limestone, clinker and granite.		0.30	92.80	D B D PID	0.00-0.10 0.10-0.40 0.20 0.30	See DCP R		(m)	-
MADE GROUND: Light orangish brown gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse of chert and clinker.		0.70	92.40	ES D B PID ES	0.30 0.70 0.70-1.20 1.00 1.00	0.00ppm			
Soft to firm light grey mottled grey and orange silty CLAY. (GLACIAL DEPOSITS COHESIVE)	××	-		D UT100	1.20	40 Nove 4000/ Page			
	×	<u></u>		D D	2.00-2.45	43 blows, 100% Rec	overy		
Stiff to stiff light greyish brown silty CLAY with rare gravel and frequent crystals.	× × ×	3.10	90.00	D	3.10				-
Gravel is subrounded to rounded fine and medium flint. (OXFORD CLAY-PETERBOROUGH MEMBER)	×			UT87	4.00-4.45	46 blows, 100% Rec	overy		- - - -
Stiff dark grey occasionally mottled bluish grey silty CLAY. (KELLAWAYS CLAY)	× × × × × × × × × × × × × × × × × × ×	4.50	88.60	D	4.50				-
grey silly CLAT. (RELEAWATS CLAT)	×			D	5.00				
Borehole Complete at 6.00 m	<u>×x</u>	6.00	87.10	D	6.00				-
		- - - -							
		_ _ _ _ _ _							
		<u>-</u> - - - -							
		- - - - - -							
				,	Water Level	Observations			
Hole Diameter Detail Chiselling / Slow Progres Diameter Depth Casing (mm) Depth (m) Depth (m	Date	е	Water Stril	ke (m) Si	tanding Time (mins)	Standing Level (m)	Casing Depth (m		Depth Sealed (m)
102 3.00 0.00 87 4.00 75 5.00 65 6.00			No C	Groundwate	er Encountered				
Client: Network Rail					Progress				·
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 21/05/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A	erhoff Date Hole Depth Casing Depth Water Depth Remarks 21/05/2015 0.00 Start of Hole Completion instructed by				y WSP/PB				
Date Printed: 11/02/2016 Drilled By: AB Logged By: JHS Checked By: RS		accuracy	of +/-4me	res. Grou	ind levels are	sing a hand held G e approximate and ith LiDAR survey in	are based or	the coord	linates



Status: FINAL

WS2A6D

Sheet 1 of 1

Ground Level: 91.100mOD Coordinates: 467090.00E

225305.00N

40 1 4	Project:	East West Rail-Phase 2A
ritchies	Project No	:5624.2A

Borehole Log

		Project	INU. 3	024.ZA					225305	5.00N	
Description		Legend	Depti (m)	h O.D. Level (m)	Туре		nple / Test Test Ro	esults	Casing (Water) Depth (m)	Installations	
TOPSOIL: soft dark brown sandy with occasional rootlets. Gravel su to rounded fine to coarse flint and Sand is fine to coarse.	ıbangular	××××× 	- - 0.30 - 0.40	90.80	PID D ES D	0.30 0.30 0.30 0.30 0.40	See DCP 0.10ppm		(111)	-	
MADE GROUND: Dark brown gra coarse SAND with rare rootlets. G subangular to rounded fine to coar	ravel is				PID ES	1.00 1.00	0.00ppm				
Soft to firm greenish brown mottle grey and orange CLAY. (OXFORI CLAY-PETERBOROUGH MEMBI)	×_^_×	2.00	89.10	D	2.00				-	
Stiff to very stiff dark bluish grey n green sandy silty CLAY with rare of frequent crystals. Gravel is subar rounded fine and medium flint. Sato coarse. (OXFORD CLAY-PETE MEMBER)	gravel and ngular to nd is fine	X X X X X X X X X X X X X X X X X X X	3.00	88.10	D UT100	3.00 3.00-3.45	110 blows, 50% Re	covery			
Stiff to very stiff dark bluish grey n green silty CLAY with rare gravel a frequent crystals. Gravel is subar rounded fine and medium flint. Sa to coarse. (KELLAWAYS CLAY)	and Igular to	× × × × × × × × × × × × × × × × × × ×	- - - - - - - - - - - - - - - - - - -	86.60	D UT87 D	4.00 4.00-4.45 4.50	51 blows, 50% Reco	overy			
Stiff dark grey occasionally mottle grey sandy silty CLAY. Sand is fin coarse. (KELLAWAYS CLAY)	d bluish e to										
Borehole Complete at 6.00 m			6.00	85.10	D	6.00					
						<u> </u>				-	
Hole Diameter Detail Chise	elling / Slow Progress			Water Stril	(e (m) S	Water Level Standing Time	Observations Standing	Casing		Depth	
Diameter (mm) Depth (m) Casing Depth (m) From (m) 102 3.00 0.00 87 4.00 75 5.00 65 6.00 65 6.00 65 6.00<	n To Time (m) (hours)	Date			` '	(mins)	Level (m)	Depth (n		Sealed (m)	
Client: Network Rail		_				Progress			'		
	ns Brinckerhoff	Date 11/05/201 11/05/201		0.00 6.00	pth (Casing Depth - -	Water Depth	Start of Hole	Remarks Start of Hole Completion instructed by WSP/PB		
Date Printed: 11/02/2016 Drilled By: PG Logged By: JHS Checked By: RS		;	accurac	y of +/-4me	res. Gro	und levels are	sing a hand held (e approximate and ith LiDAR survey i	are based or	the coord	linates	



Sheet 1 of 1

WS2A6U

Ground Level: 91.000mOD Coordinates: 467091.00E

225321.00N

Project: East West Rail-Phase 2A

Status: FINAL

			Danath	0.0		San	nple / Test	C	Casing	
Descripti	on	Legend	Depth (m)	O.D. Level (m)	Туре		Test Re	`-	Water) Depth (m)	Installations
TOPSOIL: Soft dark brown with rootlets. Gravel is sub rounded fine to coarse flint is fine to coarse.	angular to	× × - × - × - × - × - × - × - × - ×	0.20	90.80	PID D ES	0.30 0.30 0.30	See DCP R 0.10ppm	Pesults		-
Soft to firm greenish brown slightly gravelly silty CLAY rootlets. Gravel is subangu fine chalk. (GLACIAL DEP	with rare ular to rounded	*:*:	1.00	90.00	PID D ES	1.00 1.00 1.00	0.10ppm			
Soft to firm greenish brown grey and orange CLAY. (C CLAY-PETERBOROUGH at 1.6mbgl becoming firm mottled green	OXFORD MEMBER)		2.50	88.50	D UT100 D	2.00 2.00-2.45 2.50	36 blows, 80% Reco	very		
Firm dark bluish grey mott silty CLAY with rare grave crystals . Gravel is subang fine and medium flint. San- coarse. (OXFORD CLAY-I MEMBER)	l and frequent Jular to rounded d is fine to	x - x - x - x - x - x - x - x - x - x -			D D	3.00				
Stiff dark grey sandy silty of fine to coarse. (KELLAWA		x	4.20	86.80	UT87	4.00-4.45	51 blows, 100% Rec	overy		
Very stiff dark grey SILT/C CLAY)	CLAY. (KELLAWAYS	XX XX XX XX	5.00	86.00	D	5.00				
Borehole Complete at 6.00) m	x	6.00	85.00						<u> </u>
						Water Level	Observations			
Hole Diameter Detail	Chiselling / Slow Progress	Date		Water Stril	ke (m)	Standing Time		Casing		Depth
Diameter (mm) Depth (m) Casing Depth (m) 102 3.00 2.00 87 5.00 2.00 75 6.00 3.00	From To Time (m) (m) (hours)	11/05/15		1.00)	(mins) 5	Level (m)	Depth (m)		Sealed (m)
						Progress				
	ork Rail	Date)	Hole De	pth	Casing Depth	Water Depth	Remarks		
Dates Drilled: 11/05	Parsons Brinckerhoff //2015 pa 2 (T820-638)	11/05/201 11/05/201	15 15	0.00 6.00		2.00	-	Start of Hole Completion ins	tructed by	/ WSP/PB
	2/2016		etrex 10) on the co	with an ac	curacy taken by	of +/-4metres.	ere provided by WS Ground levels are a d cross-correlated w	approximate an	d are ba	sed



East West Rail-Phase 2A

Status: FINAL

Sheet 1 of 1

Ground Level: 90.000mOD

Coordinates: 466559.00E

WS2A7C

Project No: 5624.2A

Project:

				JZ4.Z/\					225169	0.00IN
Description		Legend	Depti (m)	O.D. Level	Туре		nple / Test		Casing (Water)	Installations
			,,	(m)	i ype	(m)	Test R	esults	(m)	
MADE GROUND: Grey and blue silty angular to subangular fine GRAVEL of limestone clinker and the subangular fine stone clinker and the subangular fine subangular fine subangular fine subangular suban	e to coarse		0.30	89.70 89.50	D PID B	0.00-0.10 0.30 0.30-0.50	See DCP 1.60ppm	Results	(111)	-
MADE GROUND: Light orangi fine to coarse SAND. Gravel is rounded fine to coarse of chert	ish brown gravelly		1.20	88.80	D ES B D PID D	0.30 0.30 0.50-1.20 0.50 1.00 1.00	0.20ppm			
MADE GROUND: Soft to firm grey and orange silty CLAY.	light grey mottled				ES UT100 D	1.00	29 blows, 100% Re	ecovery		
Stiff to stiff dark greyish brown with rare gravel and frequent of Gravel is subrounded to round medium flint. (OXFORD CLAY MEMBER)	crystals. led fine and	× - × ×	2.20	87.80	D	2.20				
Soft to firm dark brown and bla white sandy CLAY with rare sh Sand is fine to coarse. (OXFO CLAY-STEWARTBY MEMBER	nell remains. RD				UT87 D	3.00-3.45 3.20	21 blows, 100% Re	ecovery		-
					D	4.20				
Borehole Complete at 5.00 m			- 5.00	85.00	D	5.00				
III. Diameter Date ii	N ' - 11' - / Ol - B					Water Level	Observations			
Diameter Depth Casing (mm) (m) Depth (m)	Chiselling / Slow Progress From To Time (hours)	Date	•	Water Strik	` '	Standing Time (mins)	Level (m)	Casing Depth (n		Depth Sealed (m)
75 4.00 65 5.00						Progress				
Client: Network F		Date	9	Hole De	pth	Casing Depth	Water Depth	n Remarks		
Dates Drilled: 26/05/201	arsons Brinckerhoff 15 (T820-630)	26/05/201 26/05/201		0.00 5.00			-	Start of Hole Completion instructed by WSP/P		oy WSP/PB
Date Printed: 11/02/201 Drilled By: AB Logged By: ZR Checked By: JHS	16		accuracy	of +/-4met	res. Gro	ound levels are	sing a hand held e approximate and ith LiDAR survey	d are based or	the coord	dinates



Logged By: Checked By:

RS

Borehole Log

East West Rail-Phase 2A

Status: FINAL

Project:

WS2A7D Sheet 1 of 1

Ground Level: 89.900mOD

Coordinates: 466561.00E

ritchies	Project	No: 56	624.2A				Coord	dinates:	466561 225163	
Description	1 1	Depth	n O.D.		San	nple / Te	st		Casing	
Description	Legend	(m)	Level (m)	Туре	Depth (m)	<u> </u>	est Res	sults	-(Water) Depth (m)	Installations
TOPSOIL: soft dark brown sandy gravelly CLAY with occasional rootlets. Gravel subangular to rounded fine to coarse flint and chalk. Sand is fine to coarse. (TOPSOIL)	× x × - x × - x	0.20	89.70	D PID ES	0.20 0.30 0.30	0.20ppm	ee DCP Re	esults		- - - - -
Soft dark greenish brown and brown mottled bluish grey silty CLAY. (OXFORD CLAY-STEWARTBY MEMBER)		0.90	89.00	D PID ES UT100	0.90 1.00 1.00 1.20-1.65	0.10ppm 26 blows, 9	0% Recov	ery		
Firm dark greenish brown mottled bluish grey CLAY. (OXFORD CLAY-STEWARTBY MEMBER)				D D	1.65 2.00					- - -
Very stiff dark grey laminated CLAY. (OXFORD CLAY-STEWARTBY MEMBER)		2.40	87.50	D D UT100	2.40 2.90 3.00-3.45	26 blows, 36	0% Recov	ery		
				D D	3.90 4.10					
Borehole Complete at 5.00 m		5.00	84.90	D	4.90					-
		- - - - - -								1
		- - - - -								
		- - - - - -								1
		- - - - -								- - - -
		- - - - -								-
		- - - - -								-
		- - - - -								- - - - -
Hala Diameter Detail Objection / Objection		-			Water Level	1	ons		1	
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing (mm) (m) Depth (m) (m) (m) (m) (hours)	Date	•	Water Stril	` /	tanding Time (mins)	Level	•	Casing Depth (r		Depth Sealed (m)
102 2.00 0.00 87 4.00 75 5.00			No G	Groundwate	er Encountered	d				
Client: Network Rail				. 1.	Progress				<u> </u>	
Consultant: WSP Parsons Brinckerhoff	10/05/201 10/05/201	5	0.00 2.00	pth (Casing Depth	Water -	Depth	Remarks Start of Hole End of shift	e	
Dates Drilled: 11/05/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A	10/05/201	υ	2.00		-	-		End of Snift		
Date Printed: 11/02/2016 Drilled By: AB Logged By: JHS	1	accuracy	of +/-4me	res. Grou	y WSP/PB u und levels are correlated w	e approxima	ate and a	re based or	n the coord	inates



N/A

SR

JHS

RS

11/02/2016

SPT Hammer:

Date Printed:

Drilled By:

Logged By: Checked By:

Borehole Log

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 90.000mOD Coordinates: 466558.00E

WS2A7U

225176.00N

Project No: 5624.2A

Status: FINAL

	1							220170	
Description	Legend	Depth	O.D.	_		nple / Test		Casing (Water)	
		(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth (m)	Installations
TOPSOIL: Soft dark brown sandy gravelly CLAY with occasional rootlets. Gravel subangular to rounded fine to coarse flint and chalk. Sand is fine to coarse.	×x	0.15	89.85 89.50	D PID ES	0.15 0.30 0.30	See DCP R 0.10ppm	esults	(111)	
Soft dark greenish brown and brown mottled bluish grey silty CLAY. (OXFORD CLAY-STEWARTBY MEMBER)		-		PID D ES D	1.00 1.00 1.00 1.40	0.30ppm			
Firm dark greenish brown mottled bluish grey CLAY. (OXFORD CLAY-STEWARTBY MEMBER)at 1.4mbgl becoming firm to stiff with white mottling		- - - - - - - - - - - - - - - - - - -	87.60	D UT100	2.00 2.00-2.45	49 blows, 75% Reco	very		
Soft to firm brown mottled multicoloured slightly sand CLAY with frequent shell remains. Sand is fine and medium. (OXFORD CLAY-STEWARTBY MEMBER)		- 2.40 - - - - - -	87.60	D	2.60				
Soft dark brown and black mottled white sandy		3.40	86.60	D	3.40				
CLAY with rare shell remains. Sand is fine to coarse. (OXFORD CLAY-STEWARTBY MEMBER)		3.90 - 4.00	86.10 86.00						
Stiff dark greyish green mottled bluish grey and white CLAY. (OXFORD CLAY-STEWARTBY MEMBER) Borehole Complete at 4.00 m									
					<u> </u>				=
Hole Diameter Detail Chiselling / Slow Progress						Observations			
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (m) (hours)	Date		Water Stril	` ′	Standing Time (mins)	Level (m)	Casing Depth (m	1	Depth Sealed (m)
102 3.00 2.00 87 4.00			No C	Groundwa	ter Encountered				
Client: Network Rail				—	Progress				
Consultant: WSP Parsons Brinckerhoff	11/05/201		Hole De	pth	Casing Depth	Water Depth	Remarks		
Dates Drilled: 10/05/2015 Plant: Sherpa 2 (T820-638)	11/05/201 11/05/201	5	0.00 4.00		-	:	Start of Hole Completion	instructed b	y WSP/PB

Rail.

Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an

accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network



Status: FINAL
Project: East V

Borehole Log

East West Rail-Phase 2A

Project No: 5624.2A

WS2A8C

Sheet 1 of 1

Ground Level: 89.800mOD Coordinates: 466026.00E

	,		, .					223023	.0014
Description	Legend	Depth	O.D.		San	nple / Test		Casing	
Becompain	Logona	(m)	Level (m)	Type	Depth	Test Re	sults	Depth (m)	Installations
MADE GROUND: Light yellowish white slightly sandy subangular to rounded fine to coarse sandstone GRAVEL with frequent cobbles. Cobbles are subangular sandstone. Sand is fine.		0.30	89.50 89.40	PID B ES	0.30 0.30-1.20 0.30	See DCP R 2.00ppm	Results	(111)	
MADE GROUND: Black sandy subangular to rounded fine to coarse flint and slightly GRAVEL with sulphur odour and ash. Sand is lifne to coarse.		1.20	88.60	PID ES UT100 D	1.00 1.00 1.20-1.65	0.10ppm 16 blows, 50% Reco	very		
at 0.3mbgl geomembrane present.		2.00	87.80	D	2.00				
MADE GROUND: Dark brown gravelly fine to coarse SAND. Gravel is subangular to rounded fine to coarse flint and rare slag.									= = = = = = = = = = = = = = = = = = = =
Firm dark greenish brown mottled bluish grey slightly gravelly CLAY with occasional bands of fine to coarse SAND. Gravel is subangular to rounded fine and medium chalk. (GLACIAL		3.00	86.80	D UT87 D	3.00 3.00-3.45 3.50	14 blows, 80% Reco	very		
DEPOSITS-COHESIVE) Soft to firm dark bluish grey mottled green CLAY with frequent shell remains. (OXFORD CLAY-PETERBOROUGH MEMBER)		4.10	85.70	D	4.10				- - - - -
Firm dark bluish grey CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)		5.00	84.80	D	5.00				-
Firm to stiff dark grey thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 5.00 m									
		<u> </u>							
		-							
	-	-			Water Level	Observations			<u> </u>
Hole Diameter Detail Chiselling / Slow Progress			Water Stril	(e (m)	Standing Time	1	Casing		Depth
Diameter (mm) Depth (m) Casing Depth (m) From (m) To (m) Time (hours) 102 2.00 2.00 4.00 2.00 <td>Date</td> <td></td> <td>No G</td> <td></td> <td>(mins)</td> <td>Level (m)</td> <td>Depth (m</td> <td>n)</td> <td>Sealed (m)</td>	Date		No G		(mins)	Level (m)	Depth (m	n)	Sealed (m)
75 5.00									
Client: Network Rail	Date	,	Hole De	oth	Progress Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 10/05/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	10/05/20′ 10/05/20′		0.00 5.00	om	- 2.00		Start of Hole Completion	; instructed t	y WSP/PB
Date Printed: 11/02/2016 Drilled By: PG Logged By: JHS Checked By: RS		accuracy	of +/-4met	res. Gro	und levels are	sing a hand held G e approximate and ith LiDAR survey in	are based on	the coord	linates



Status: FINAL

East West Rail-Phase 2A

WS2A8U Sheet 1 of 1

Ground Level: 89.900mOD Coordinates: 466023.00E

225033.00N

ritchies Project: East West Project No: 5624.2A

		i Oject i	NO. 50)24.2A					225033	.00N
Description	Le	egend	Depth (m)	Level	Туре	Depth	nple / Test Test Re	esults	Casing (Water) Depth	Installations
TOPSOIL: soft dark brown sandy gravelly with occasional rootlets. Gravel subangula to rounded fine to coarse flint and chalk. Sand is fine to coarse.	CLAY r		0.15	(m) 89.75 89.30	D PID ES D	0.15 0.30 0.30 0.60	See DCP F 0.10ppm		(m)	
Soft dark brown sandy gravelly CLAY with rootlets and occasional cobbles. Cobbles a subangular chalk. Gravel is subangular to rounded fine to coarse flint and chalk. San is fine to coarse. (GLACIAL DEPOSITS-COHESIVE)	are				PID ES D	1.00 1.00	0.10ppm			
Soft to firm grey and brown mottled orange and bluish grey slightly gravelly sandy CLA Sand is fine and medium. Gravel is subangular to rounded fine and medium fli and chalk. (GLACIAL DEPOSITS-COHESat 1.2mbgl becoming firm to stiff	AY.		2.50	87.40	D D	2.00-2.45	46 blows, 75% Reco	very		-
Firm to stiff dark grey mottled bluish grey silt CLAY with rare bands of medium and coarse sand. (OXFORD CLAY-PETERBO MEMBER)	ROUGH	× × × × × × × × × × × × × × × × × × ×	_		D UT87	3.50 4.00-4.45	37 blows, 100% Rec	overy		-
	×	x x x	4.90	85.00	D	4.50				
Stiff dark grey CLAY with frequent shell remains. (OXFORD CLAY-PETERBOROUMEMBER) Borehole Complete at 5.00 m	JGH /		4.90 5.00	85.00	D	5.00	Observations			
Hole Diameter Detail Chiselling / SI Diameter Depth Casing From To (mm) (m) Depth (m) (m) (m)	Time	Date	,	Water Strik	e (m) S	tanding Time (mins)	Standing Level (m)	Casing Depth (m		Depth Sealed (m)
(mm) (m) Depth (m) (m) (m) 102 2.00 0.00 87 4.00 75 5.00	(hours)			No G	roundwate	er Encountered Progress		Deptii (II	,	Coulou (III)
Client: Network Rail Consultant: WSP Parsons Brinc Dates Drilled: 10/05/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	kerhoff 1	Date 10/05/2015 10/05/2015	5	Hole Dep 0.00 5.00	oth (Casing Depth	Water Depth	Remarks Start of Hole Completion	e instructed b	y WSP/PB
Date Printed: 11/02/2016 Drilled By: SR Logged By: JHS Checked By: RS	Rei	a ta	ccuracy	of +/-4met	res. Grou	ind levels are	sing a hand held G approximate and ith LiDAR survey ir	are based on	the coord	inates



SPT Hammer:

Date Printed:

Drilled By:

Logged By:

Checked By:

N/A

PG

NJD

JHS

11/02/2016

Borehole Log

East West Rail-Phase 2A

Status: FINAL

Project No: 5624.2A

Project:

WS2A9C Sheet 1 of 1

Ground Level: 89.100mOD Coordinates: 465629.00E

224889.00N

	.,							224003	.OOIN	
Description	Legend	Depth				ple / Test		Casing (Water)		ione
		(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth (m)	Installat	lions
MADE GROUND: Dark brown sandy slightly silty	XXXXX	- 0.20	88.90	D	0.00-0.10	See DCP R	esults	(111)	-(3)	
angular to subangular fine to coarse GRAVEL				PID B	0.30 0.30-0.50	1.00ppm			=	
of basalt limestone and clinker.	××	- 0.50	88.60	ES B	0.30 0.50-1.20				=	
MADE GROUND: Light brown gravelly fine to	<u>x</u> x			D	0.50-0.60				11 =	
coarse SAND. Gravel is angular to rounded fine to coarse of chert and clinker.		— 1.00 -	88.10	PID D	1.00 1.00-1.10	0.00ppm				
Firm greyish brown CLAY with occasional silt		_		ES UT100	1.00 1.20-1.65	23 blows, 100% Reco	overy		-	
partings shell fragments and gypsum crystals.									=	
(OXFORD CLAY-PETERBOROUGH MEMBER)		2.00	87.10	D	1.90					
Firm to very stiff greyish brown thinly	×x								**. :	= 7.1
laminated CLAY with much shell fragments. (OXFORD CLAY-PETERBOROUGH MEMBER)	×	3							= ::	$\exists : :$
Stiff to hard thinly interlaminated dark	<u>×_^_×</u>	-		D	2.90					∃ :::
greyish brown mottled orangish brown and grey	××	-		UT87	3.00-3.45	98 blows, 50% Recov	very		333	\equiv
slightly organic CLAY and dark brown organic CLAY with much orangish brown silt and shell		3.20	85.90						3.5	$\exists :$
partings and gypsum crystals. (OXFORD		- - - 3.70	85.40	D	3.60				3:3:	\exists ::
CLAY-PETERBOROUGH MEMBER)from 2.8mbgl to 3.2mbgl - becoming very			55.40							
stiff to hard.		-								
Hard dark grey thinly laminated CLAY with]	
much silt partings and shell fragments.		- -								
(KELLAWAYS ČLAY) from 3.6mbgl to 3.7mbgl - occasional shell		_							-	
fragments.		_]	
Borehole Complete at 3.70 m		-]	
		- - -								
		_							1 =	
									=	
]	
		- -							1 3	
		-							1 =	
		_							=	
		-]	
		_								
		-							=	
]	
		-							1 3	
		- -							=	
		-							=	
		_							=	
Hole Diameter Detail Chiselling / Slow Progress		<u> </u>				Observations	_			
Diameter Depth Casing From To Time	Date	, '	Water Stril	ke (m) S	Standing Time (mins)	Standing Level (m)	Casing Depth (n		Depth Sealed (m	<i>a</i>)
(mm) (m) Depth (m) (m) (hours) 102 3.00 0.00 87 3.70		+	No G	Groundwat	er Encountered	` '	ъери (п	11)	Sealeu (III	'/
87 3.70										
					Drogress					
Client: Network Rail	Date	.	Hole De	nth (Progress Casing Depth	Water Depth	Remarks			
Consultant: WSP Parsons Brinckerhoff	26/05/201 26/05/201		0.00 3.70	ν '	-	-	Start of Hole Refusal	9		
Dates Drilled: 26/05/2015	26/05/201	5	3.70		-	-	Refusal			
Plant: Sherpa 2 (T820-638)										
SDT Hammer: N/A	1	- 1				1				

Remarks: Hole refused at 3.7mbgl due to ground conditions. Coordinates were provided by WSP/PB

using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.



Status: FINAL Project:

WS2A9D

Sheet 1 of 1

East West Rail-Phase 2A

Borehole Log

Ground Level: 91.200mOD Coordinates: 465625.00E

224869.00N

	i roject	140.0	024.2/					224869	0.00N
Description	Logond	Dept	h O.D.		San	nple / Test		Casing	
Description	Legend	(m)	Level	Туре	Depth	Test R	esults	Depth	Installations
	V//KV//KV		(m)		(m)	See DCP		(m)	
TOPSOIL: Dark brown gravelly clayey fine to coarse SAND. Gravel id subrounded fine to		E		PID	0.30	0.00ppm	Results		3
coarse flint.	**************************************	0.40	90.80	D	0.30	о.ооррпі			
		ļ.		ES	0.30				
Soft to firm bluish grey mottled brown		-		5.5					
slightly gravelly CLAY. Gravel is subrounded flint. (OXFORD CLAY-PETERBOROUGH		E		PID D	1.00 1.00	0.00ppm			3
MEMBER)				ES UT100	1.00 1.20-1.65	51 blows, 100% Re	covery		3
	<u> </u>	1.65	89.55	01100	1.20-1.03	31 blows, 100 /6 fte	covery		
Stiff grey mottled brown thinly laminated	××	- 1.03	09.55	D	1.80				
silty CLAY. Low to moderate proportion of	x	2.00	89.20	UT100	2.00-2.45	42 blows, 80% Rec	overy		
fossil fragments. (OXFORD CLAY-PETERBOROUGH MEMBER)		‡							Ξ
,		F							=
Very stiff to hard dark brown thinly		E							3
laminated organic CLAY with gypsum crystals and occasional orangish brown silt partings.		E		D	2.90				_
(OXFORD CLAY-PETERBOROUGH MEMBER)		-							Ξ
·	====	3.40	87.80						=
Firm to stiff dark brown mottled grey thinly laminated organic CLAY with much silt and		E							
shell partings and with gypsum crystals.		Ė		D	3.90				
(OXFORD CLAY-PETERBOROUGH MEMBER)		F		UT87	4.00-4.45	26 blows, 100% Re	covery		-
(*		F							=
		E							=
from 4.6mbgl to 4.65mbgl - dark brown		ļ.							
organic mudstone clast.		_		D	4.90				=
		F							=
		E							\equiv
		-							=
Very stiff to hard dark brown grey to dark		5.80	85.40	D	5.90				=
brown thinly laminated slightly organic CLAY		6.20	85.00	D	6.20				\exists
with shell fragments. (KELLAWAYS CLAY)		0.20	05.00	D	0.20				=
Hard dark greyish brown thinly laminated CLAY		F							Ξ
with much shell fragments. (KELLAWAYS CLAY)		E		D	6.90				
Borehole Complete at 7.00 m		7.00	84.20	В	0.30				_
Borenole Complete at 7:00 m		F							=
		E							- <u>3</u>
		-							=
		<u> </u>							ユ
		E							3
		E]
		Ė.							‡
		Ė]
		E]
		ļ.							
		F							
		É]]
					Water Level	Observations		1	
Hole Diameter Detail Chiselling / Slow Progress	_		Water Stril		tanding Time		Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	9		, 0	(mins)	Level (m)	Depth (n		Sealed (m)
65 0.00 2.00 102 2.00			No G	Froundwate	er Encountered	` '	1. (-	` '
102 2.00									
Client: Network Rail					Progress				
Consultant: WSP Parsons Brinckerhoff	Date	-	Hole De	pth C	Casing Depth	Water Depth			
Dates Drilled: 07/05/2015	06/05/20 06/05/20 07/05/20	15 15	0.00 2.00		2.00	-	Start of Hole End of shift		
	07/05/20 07/05/20	15 15	2.00 7.00		2.00 2.00	-	Start of shift Completion	t	y WSP/PB
. , ,									,
SPT Hammer: N/A	Domonico	Coordin	otoc were -	rovided L	v W6D/DD	sing a band hald (CDS (Comin	strov 10\	ith an
Date Printed: 11/02/2016	Remarks:					sing a hand held (approximate and			
Drilled By: AB		taken by				ith LiDAR survey i			
Logged By: NC+NJD		Rail.							
Checked By: JHS									
	1								



Status: FINAL

Sheet 1 of 1

WS2A9U

Ground Level: 91.300mOD Coordinates: 465618.00E

224898.00N

Project: East West Rail-Phase 2A

	Project	110.50	024.ZA					224898	.00N
B		Depth	n O.D.		San	nple / Test		Casing	
Description	Legend	(m)	Level (m)	Туре	Depth (m)	Test Re		(Water) Depth (m)	Installations
MADE GROUND: Brown gravelly clayey fine to coarse SAND. Gravel iS angular to subrounded fine to coarse brick and flint. Moderate proportion of rootlets.		0.40	90.90	PID D ES	0.30 0.30 0.30	See DCP i 0.10ppm	Results		-
Firm becoming stiff at 1.20mbgl bluish grey mottled brown silty slightly gravelly CLAY. Gravel is subrounded flint. (OXFORD CLAY-PETERBOROUGH MEMBER)				PID D ES	1.00 1.00 1.00	0.00ppm			-
				UT100	2.00-2.45	51 blows, 100% Red	covery		<u>-</u>
Stiff brown silty CLAY. Moderate to high proportion of fossil fragments. (OXFORD CLAY-PETERBOROUGH MEMBER)	×× ×× ××	2.40	88.90	D	2.60				-
	××			D	3.60				- - - -
	<u> </u>			UT87	4.00-4.45	22 blows, 80% Reco	overy		=
Stiff greyish brown silty CLAY. Low proportion of fossil fragments. Strong hydrocarbon/ organic odour. (KELLAWAYS CLAY)	××	4.50	86.80	D	4.60				- - -
.,,	× × × × × × × × × × × × × × × × × × ×			D	5.60				-
Borehole Complete at 6.30 m	×x	6.30	85.00						
		-							-
					Water I evel	Observations			
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date)	Water Strik	ke (m) S	tanding Time (mins)	Standing Level (m)	Casing Depth (m	I .	Depth Sealed (m)
102 3.00 2.00 87 5.00 75 6.30			No G	Groundwate	er Encountered	Ė			
Client: Network Rail					Progress				
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 06/05/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	06/05/201 06/05/201		0.00 6.30	oth C	Casing Depth - 2.00	Water Depth	Remarks Start of Hole Refusal	9	
Date Printed: 11/02/2016 Drilled By: SR Logged By: NC Checked By: JHS		using a h approxim	nand held G nate and ar	SPS (Gan e based o	nin etrex 10)	conditions.Coordina with an accuracy on ates taken by WS twork Rail.	of +/-4metres.	Ground le	vels are



Sheet 1 of 1

WS2A10C

Status: FINAL

East West Rail-Phase 2A

Ground Level: 87.800mOD Coordinates: 465219.00E

224708.00N

Project No: 5624.2A

Project:

								10 :	
Description	Legend	Depth	O.D.			ple / Test		Casing (Water)	
Возоприон	Logeria	(m)	Level	Туре		Test Re	sults	Depth	Installations
MADE COOLIND, Dork grouish brown sond:	XXXXX		(m)	В	(m) 0.00-0.50	See DCP R		(ṁ)	_
MADE GROUND: Dark greyish brown sandy GRAVEL with regular angular slag cobbles. Sand is		-		PID	0.30	1.60ppm			-
fine to coarse. Gravel is angular to		0.50	87.30	ES B	0.30 0.50-1.20				
\subrounded <mark>slag</mark> and basalt.									
MADE GROUND: Soft to firm greyish blue silty gravelly CLAY. Gravel is subrounded chalk and		100	00.00	PID ES	1.00 1.00	0.20ppm			-
\siltstone. Low proportion of rootlets.		1.20	86.60	UT100		36 blows, 1% Recove	ery		=
Stiff light brown mottled orange and grey		_							
CLAY with occasional silt partings and shell		Ė		D	1.90				=
and fossil fragments (OXFORD CLAY-STEWARTBY MEMBER)	====	F							
from 1.2mbgl to 2.8mbgl - Decayed roots.		2.30	85.50	D	2.30				=
\from 1.8mbgl to 1.95mbgl - With much shell and fossil fragments.									=
	====			D UT87	2.90 3.00-3.45	18 blows, 1% Recove	ery		_
Firm greyish brown thickly laminated CLAY with extremely closely spaced dark brown to									=
black organic silt and shell laminae with									_
gypsum crystals (OXFORD CLAY-STEWARTBY MEMBER)				D	3.90				
from 3.2mbgl - becoming stiff		4.20	83.60		1.00				
Stiff to hard dark greyish brown thinly		4.20	05.00						=
laminated CLAY with gypsum crystals (OXFORD CLAY-STEWARTBY MEMBER)		-							
OLAT-OTE WARTET MEMBERY		_		D	4.90				<u> </u>
from 5.2mbgl - becoming hard				D	5.20				=
rom 5.2mbgr - becoming hard								Α.	=
	====	-		D	5.00				=
Borehole Complete at 6.00 m		6.00	81.80	J D	5.90				-
Describe Complete at circ in									3
									=
		_							
		-							-
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		_							
		-							=
		-							1
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		Ė							
		ļ.							
		F			1				1 -
Hole Diameter Detail Chiselling / Slow Progress		T	M/ / =: ::	,.1		Observations	2 ·	T	D "
Diameter Depth Casing From To Time	Date	•	Water Stril	ke (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (n		Depth Sealed (m)
(mm) (m) Depth (m) (m) (m) (hours)		+	No G	Froundwa	iter Encountered	` ′	Dopin (II	,	Journal (III)
102 2.00 2.00 87 4.00 75 5.00 65 6.00									
0.00	-				Progress				
Client: Network Rail	Date	,	Hole De	pth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	05/05/201	15	0.00 6.00	P 111		-	Start of Hole Completion	e	
Dates Drilled: 05/05/2015	05/05/201	15	6.00		2.00	-	Completion	instructed b	y WSP/PB
Plant: Sherpa 1 (T820-630)									
SPT Hammer: N/A Date Printed: 11/02/2016	Remarks:	Coordina	ites were n	rovided	by WSP/PR us	sing a hand held G	PS (Gamin e	etrex 10) w	ith an
Date Printed: 11/02/2016 Drilled By: AB		accuracy	of +/-4met	tres. Gro	ound levels are	approximate and	are based or	n the coord	inates
Logged By: NC+NJD		taken by Rail.	WSP/PB a	and cross	s-correlated wi	th LiDAR survey in	tormation pr	ovided by I	vetwork
Checked By: JHS									
,									



ritchies

Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2A10U

Sheet 1 of 1

Ground Level: 87.500mOD Coordinates: 465215.00E

				o, .					224710).UUIN
Description		Lagand	Depth	n O.D.		San	nple / Test		Casing	
Description		Legend	(m)	Level	Туре		Test Re	sults	Depth	Installations
MADE GROUND: Dark brown gravelly fir coarse SAND. Gravel is subangular fine to coarse slag, basalt and chalk. Moderate proportion of rootlets.			0.25	87.25	PID D ES	0.30 0.30-0.40 0.30	See DCP R 0.60ppm		(m)	-
MADE GROUND: Firm orange mottled bigrey silty gravelly CLAY. Gravel is subrounded fine to coarse chalk. Low proportion of rootlets.	ue and		1.20	86.30 86.20	PID D ES D	1.00 1.00-1.10 1.00 1.20-1.30 1.40-1.50	0.00ppm			-
Stiff light brown mottled orange and grey slightly gravelly CLAY with occasional silt partings, shell and fossil fragments. Grav is angular to rounded fine to coarse of ch (OXFORD CLAY-STEWARTBY MEMBEfrom 1.2mbgl to 2mbgl - live roots.	el ert	XX	2.20	85.30	D UT100	1.90-2.00 2.00-2.45	17 blows, 100% Rec	overy		-
from 1.2mbgl to 3mbgl - decayed roots. Stiff light brown mottled orange and grey		<u> </u>	_		D UT87	2.90-3.00 3.00-3.45	13 blows, 100% Rec	overy		
CLAY with occasional silt partings, shell a fossil fragments. (OXFORD CLAY-STEW		<u>xx</u>			D	3.50-3.60				
MEMBER)from 1.5mbgl to 1.95mbgl - firm.		××			D	3.80-3.90				
at 1.6mbgl - light orangish brown silty clay laminaefrom 1.6mbgl to 2.2mbgl - with much shifragments.	ell	××	4.40	83.10						-
rragmentsfrom 1.95mbgl to 2.2mbgl - becoming st	iff	====			D	4.90-5.00				-
Soft to firm greyish brown thickly laminate CLAY with extremely closely spaced dark to black organic silt and shell laminae witl gypsum crystals. (OXFORD CLAY-STEV MEMBER) from 2.8mbgl to 3.7mbgl - fissured.	k brown h		6.00	81.50	D	5.90-6.00				
Stiff to very stiff dark greyish brown thinly laminated CLAY with gypsum crystals (O CLAY-STEWARTBY MEMBER)from 4.9mbgl to 6mbgl - becoming hardfrom 5.8mbgl to 6mbgl - occasional shelfragments. Borehole Complete at 6.00 m	XFORD									
Hala Diameter Detail Chicalling / S	Naw Pragrass		1				Observations	I		
Hole Diameter Detail Chiselling / S		Date	•	Water Strik	` ′	Standing Time (mins) ter Encountered	Level (m)	Casing Depth (m		Depth Sealed (m)
						Progress				
Client: Network Rail		Date		Hole De	pth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brin Dates Drilled: 05/05/2015 Plant: Sherpa 2 (T820-638 SPT Hammer: N/A		05/05/201 05/05/201	5 5	0.00 6.00		Ξ	-	Start of Hole Completion	e instructed b	y WSP/PB
Date Printed: 11/02/2016 Drilled By: EK Logged By: NC Checked By: JHS		i	accuracy	of +/-4met	res. Gro	und levels are	sing a hand held G e approximate and ith LiDAR survey in	are based or	the coord	linates



Drilled By:

Logged By:

Checked By:

PG

NJD

JHS

Borehole Log

East West Rail-Phase 2A

Status: FINAL

Project:

Sheet 1 of 1

Ground Level: 86.500mOD

WSHH2A11C

Coordinates: 464729.00E

ritchies	Project	No: 56	24.2A				Coord	dinates:	464729 224470	
Description	Legend	Depth (m)	O.D. Level	Туре	Sam Depth	nple / Tes			Casing (Water)	Installations
		()	(m)	''	(m)	Te	st Res	sults	(m)	motanatione
MADE GROUND: Dark brown sandy slightly silty angular to subangular fine to coarse GRAVEL of basalt clinker and granite.		0.30	86.20	D B ES	0.00-0.10 0.30-0.80 0.30					-
MADE GROUND: Brown very gravelly slightly clayey fine to coarse SAND with low cobble content. Gravel is angular to rounded fine to coarse of chert. Cobble is subrounded siltstone. from 0.7mbgl to 0.8mbgl - with timber fragments.		- 0.80 	85.70 84.80	B ES D	0.80-1.20 1.00 1.60-1.70					
Very stiff to hard dark greyish brown thinly laminated slightly organic CLAY occasional shell fragments. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 1.70 m										
		-								
		_	1		Water Level	Observation	ns		1	
Hole Diameter Detail Chiselling / Slow Progress			Water Stril		tanding Time			Casing		Donth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date			` /	(mins)	Level (_	Depth (n		Depth Sealed (m)
			No G	roundwate	er Encountered					
Client: Network Rail		-		-	Progress	1				
Consultant: WSP Parsons Brinckerhoff	Date		Hole De	pth C	Casing Depth	Water [Depth	Remarks		
Dates Drilled: 08/06/2015 Plant: Hand Held WS SPT Hammer: N/A	08/06/201 08/06/201	5	0.00 1.70		Ξ	-		Start of Hole Refusal	e 	
Date Printed: 11/02/2016	Remarks:	Coordina accuracy	tes were p of +/-4me	rovided b tres. Grou	y WSP/PB us and levels are	sing a hand le approximat	held GF e and a	PS (Gamin e are based or	etrex 10) w	ith an linates

Rail.

accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network



ritchies

Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2A11D

Sheet 1 of 1

Ground Level: 89.200mOD Coordinates: 464732.00E

Description Legend Depth (m) Level (m) Type Depth (m) Test Results TopsolL: Soft dark brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is subrounded fine to coarse flint, chert and chalk. Moderate proportion of rootlets. Firm greyish brown gravelly CLAY. Gravel is subrounded to rounded chalk and flint. Low proportion of rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER) Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth Level (m) Type Depth (m) See DCP Results O.00ppm See DCP Results O.00ppm See DCP Results O.00ppm D 1.00 ES 1.00 ES 1.00 ES 1.00 UT100 2.00-2.45 D 2.60 UT100 2.00-2.45 UT100 2.00-2.45	Casing (Water) Depth (m)	Installations
TOPSOIL: Soft dark brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is subrounded fine to coarse flint, chert and chalk. Moderate proportion of rootlets. Firm greyish brown gravelly CLAY. Gravel is subrounded to rounded chalk and flint. Low proportion of rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER) Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4/mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth Legend (m) Level (m) Type Depth (m) See DCP Results 0.00ppm PID 1.00 ES 1.00 ES 1.00 ES 1.00 D 1.60 UT100 2.00-2.45 UT100 2.00-2.45 D 2.60 UT87 4.00-4.45	(Water) Depth (m)	Installations
TOPSOIL: Soft dark brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is subrounded fine to coarse flint, chert and chalk. Moderate proportion of rootlets. Firm greyish brown gravelly CLAY. Gravel is subrounded to rounded chalk and flint. Low proportion of rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER) Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth (m) (m) (m) (m) See DCP Results 0.00ppm 1.20 88.00 ES 1.00 D 1.60 UT100 2.00-2.45 UT100 2.00-2.45 UT100 D 3.60 UT87 4.00-4.45	(m)	
gravelly CLAY. Sand is fine to medium. Gravel is subrounded fine to coarse flint, chert and chalk. Moderate proportion of rootlets. Firm greyish brown gravelly CLAY. Gravel is subrounded to rounded chalk and flint. Low proportion of rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER) Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth 0.20 89.00 PID 0.30 ES 0.30 0.00ppm 1.20 88.00 D 1.00 ES 1.00 ES 1.00 D 1.00 D 2.00-2.45 D 2.00-2.45 D 3.60 UT100 2.00-2.45		
is subrounded fine to coarse flint, chert and chalk. Moderate proportion of rootlets. Firm greyish brown gravelly CLAY. Gravel is subrounded to rounded chalk and flint. Low proportion of rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER) Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 3.60 UT87 4.00-4.45		
\[\lambda \text{chalk. Moderate proportion of rootlets.} \] \[Firm greyish brown gravelly CLAY. Gravel is subrounded to rounded chalk and flint. Low proportion of rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER) \] \[\text{Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) \] \[\text{Long decidence of the content of		
Firm greyish brown gravelly CLAY. Gravel is subrounded to rounded chalk and flint. Low proportion of rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER) Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 3.60 UT100 0.00ppm 1.00 ES 1.00 D 1.60 UT100 2.00-2.45 UT100 2.00-2.45		
subrounded to rounded chalk and flint. Low proportion of rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER) Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 3.60 UT100 2.00-2.45 UT100 D 3.60 UT87 4.00-4.45		
proportion of rootlets. (OXFORD CLAY-PETERBOROUGH MEMBER) Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 3.60 UT100 2.00-2.45 UT100 2.00-2.45 UT100 D 3.60 UT87 4.00-4.45		
Very stiff becoming stiff at 3.00mbgl grey mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 3.60 UT100 2.00-2.45		
mottled brown thinly laminated silty CLAY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 3.60 UT87 4.00-4.45		
mottled brown thinly laminated silty ČLÁY. High proportion of fossil fragments. Rare rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 3.60 UT87 4.00-4.45		
rootlets (<4mm thick) (OXFORD CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 3.60 UT87 4.00-4.45		
CLAY-PETERBOROUGH MEMBER) from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 2.60 D 3.60 UT87 4.00-4.45		-
from 3.0mbgl to 4.0mbgl - gypsum crystal growth D 3.60 UT87 4.00-4.45		
growth D 3.60 UT87 4.00-4.45		- - - - -
growth D 3.60 UT87 4.00-4.45		
UT87 4.00-4.45		_
X——X——————————————————————————————————		
X——X——————————————————————————————————	1	=
4.45	ı	-
4.45 84.75		=
Stiff thinly laminated dark brown silty CLAY		=
with small pockets of fine and medium sand.	l	=
Moderate proporttion of fossil fragments.	l	-
Moderate organic odour. (OXFORD CLAY-PETERBOROUGH MEMBER)	l	=
D 5.60	l	3
	l	=
		_
D 6.30	l	=
6.50 82.70	l	-
Borehole Complete at 6.50 m		=
	l	
	l]
	l	
E l l	l]
	l	
<u>E</u>	l]
	I	
F I I	<u> </u>	
Water Level Observations		
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time Date Date Date Water Strike (m) Standing Time Standing Casing (mins) Level (m) Depth (m)	,	Depth
(mm) (m) Depth (m) (m) (m) (hours) (mm) (min) Level (m) Depth (min))	Sealed (m)
102 3.00 0.00 87 6.50 No Groundwater Encountered		
Client: Network Rail		
Date Hole Depth Casing Depth Water Depth Remarks		
Consultant: WSP Parsons Brinckernorr 14/05/2015 0.00 - - Start of Hole		
Plant: Sherpa 2 (T820-638)		
SPT Hammer: N/A		
Date Printed: 11/02/2016 Remarks: Hole refused at 6.5mbgl due to ground condtions. Coordinates were provided in the condition of the condition	ded by W	SP/PR
using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. (Ground le	vels are
Drilled By: PG approximate and are based on the coordinates taken by WSP/PB and cross Logged By: NC LiDAR survey information provided by Network Rail.	ss-correla	ted with
99		
Checked By: JHS		



SPT Hammer:

Date Printed:

Drilled By:

Logged By: Checked By: N/A

ΕK

NC

JHS

11/02/2016

Status: FINAL

Project No: 5624.2A

WS2A11U

Sheet 1 of 1

Project: East West Rail-Phase 2A

Borehole Log

Ground Level: 91.400mOD Coordinates: 464723.00E

224488.00N

Casing Sample / Test O.D. Depth Legend (Water) Depth (m) Description Level (m) Type Depth **Test Results** (m) (m) 0.00-0.10 See DCP Results TOPSOIL: Firm dark brown silty CLAY. 0.30 0.30-0.50 0.30 ..from 0mbgl to 1.2mbgl - live roots and 0.30 91.10 PID 0.00ppm B decayed roots Firm light brown mottled orange and grey CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) 1.00 1.00-1.10 1.00 1.20-1.65 PID D 0.00ppm ES UT100 ..at 0.8mbgl - becoming stiff. 1.40 90.00 33 blows, 100% Recovery Very stiff brown mottled grey thinly 1.65 89.75 D laminated CLAY with shell fragments and gypsum crystals. (OXFORD CLAY-PETERBOROUGH MEMBER) Stiff grey mottled brown silty CLAY. Moderate proportion of fossil fragments. Low 2.80 proportion of rootlets (<2mm thick). (OXFORD CLAY-PETERBOROUGH MEMBER) UT100 3.00-3.45 58 blows, 95% Recovery 3.80 D D 4.80 5.45 Stiff thinly laminated dark greyish brown silty CLAY. Low proportion of fossil fragments. Moderate organic odour. (OXFORD CLAY-PETERBOROUGH MEMBER) D 6.80 7.50 83.90 7.50 D Borehole Complete at 7.50 m Water Level Observations Chiselling / Slow Progress Hole Diameter Detail Water Strike (m) Depth Standing Time Standing Casing Date Diameter Casing Depth (m) To (m) Time (hours) (mins) Level (m) Depth (m) Sealed (m) (mm) (m) 3.00 6.00 7.00 7.50 No Groundwater Encountered 0.00 Progress Client: Network Rail Date Hole Depth Casing Depth Water Depth Remarks Consultant: WSP | Parsons Brinckerhoff 14/05/2015 14/05/2015 Start of Hole Refusal Dates Drilled: 14/05/2015 Plant: Sherpa 2 (T820-638)

Remarks: Hole refused at 7.5mbgl due to ground conditions. Coordinates were provided by WSP/PB

LiDAR survey information provided by Network Rail.

using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with



Project:

Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

WS2A12C

Sheet 1 of 1

Ground Level: 84.200mOD Coordinates: 464211.00E

	.,							224317	.0011
Description	Legend	Deptl	h O.D.		San	nple / Test		Casing (Water)	
Description	Legend	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth (m)	Installations
MADE GROUND: Dark brown sandy slightly silty angular to subangular fine to coarse clinker,		0.20	84.00	D B	0.00-0.10 0.20-0.60	See DCP R	Results		-
limestone and granite GRAVEL. Sand is fine	$\times\!\!\times\!\!\times\!\!\times$	-		PID ES	0.30 0.30	0.60ppm			= 2000
to coarse.		0.60	83.60	B D	0.60-1.20 0.60-0.70				
MADE GROUND: Light brown very gravelly		_		PID	1.00	0.40ppm			
slightly clayey fine to coarse SAND. Gravel is angular to rounded fine to coarse chert	\times			D ES	1.00 1.00				-
clinker and brick.	$\times\!\!\times\!\!\times\!\!\times$			D	1.40				1 3
MADE GROUND: Soft light brown mottled orange				D	1.90				
and grey CLAY with occasional silt partings	\times			UT100	2.00-2.45	12 blows, 50% Reco	very		
shell fragments and gypsum crystals interbedded with hard dark greyish brown									
thinly laminated CLAY.									
at 1.65mbgl - hard dark greyish brown				D	2.90				
thinly laminated clay lenseat 1.9mbgl - hard dark greyish brown thinly									
laminated clay lense.									
from 1.9mbgl to 3.2mbgl - becoming stiffat 2.9mbgl - hard dark greyish brown thinly		_							
laminated clay lense.	\times	_		D UT87	3.90 4.00-4.45	12 blows, 100% Reco	overv		
at 3.25mbgl - hard dark greyish brown thinly laminated clay lense.				0101	7.00-4.40	12 DIOWS, 100% REC	0 7 61 y		
at 3.5mbgl - hard dark greyish brown thinly									
laminated clay lense.				_					3
at 3.8mbgl - hard dark greyish brown thinly laminated clay lense.		_		D	4.90				- 3000
from 3.8mbgl to 4.2mbgl - becoming soft.					E 40 E 00				
at 4.85mbgl - light orangish brown silty shell pocket.		F 65	78.55	ES D	5.40-5.60 5.65				
√at 5mbgl - hard dark greyish brown thinly		5.65 - 5.70	78.55 78.50	D	5.65				
\laminated clay lense.									
Firm dark brown clayey SILT.	×	6.30	77.90	_	0				
Firm grey CLAY with black organic partings.	<u>×</u> _×			D	6.50				=
(RELIC TOPSOIL)from 5.7mbgl to 8mbgl - decayed roots.		_							-
,	<u>x</u> x								-
Firm grey mottled orange CLAY with silt partings. (OXFORD CLAY-PETERBOROUGH	×x^	-							
MEMBER)	××			D	7.70				
from 7.4mbgl to 7.7mbgl - slightly sandy. sand fine to medium.	××	7.90	76.30	D	8.00				
from 7.7mbgl to 7.9mbgl - sandy slightly	×_×_×								3////
gravelly. Gravel is subrounded to rounded fine to coarse of chert.		8.60	75.60						
Soft greyish brown mottled grey slightly				D	8.90				3
sandy silty CLAY. Sand is fine. (OXFORD		9.00	75.20	_					168/168/18
CLAÝ-PETERBOROUGH MEMBER)from 8.3mbgl to 8.6mbgl - light orangish		_							
		F							
		-			M-4::1	Observation of the second of t]
Hole Diameter Detail Chiselling / Slow Progress	-		Matar Ct	(0 (m)		Observations	Cosin	,	Donth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date		Water Strik	ve (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (r	· I	Depth Sealed (m)
102 3.00 2.00			No G	Froundwa	ter Encountered	` '	(-		()
87 5.00 75 7.00 65 9.00									
0.00	-				Progress	1			
Client: Network Rail	Date	,	Hole De	pth	Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	18/05/201 19/05/201		0.00 9.00		-	-	Start of Hol	e	WOD/DD
Dates Drilled: 18/05/2015-19/05/2015	19/05/201	15	9.00		2.00	-	Completion	instructed b	y WSP/PB
Plant: Sherpa 1 (T820-630)									
SPT Hammer: N/A	Remarks	Coordin	ates were =	rovided	hv W/SD/DD	sing a hand held G	PS (Comin	etrev 10\ ···	ith an
Date Printed: 11/02/2016		accuracy	y of +/-4met	res. Gro	und levels are	approximate and	are based o	n the coord	inates
Drilled By: AB Logged By: NJD		taken by Rail.	/ WSP/PB a	ind cross	s-correlated w	ith LiDAR survey in	formation p	rovided by I	Network
Checked By: JHS		. wii.							
550.00 by.									



WSHH2A12D

Sheet 1 of 1

Status: FINAL

Project:

East West Rail-Phase 2A Ground Level: 84.000mOD Coordinates: 464214.00E

ritchies	Project No: 5624.2A Coordinates: 464214.00E 224308.00N									
Description	Legend	Depth (m)	O.D. Level (m)	Туре	Depth	nple / Te	st est Re	sults	Casing (Water) Depth	Installations
MADE GROUND: Black SAND & GRAVEL with occasional rootlets. Sand is fine to coarse. Gravel is angular fine to coarse brick concrete and crushed rock possibly limestone. Rootlets are up to 5mm thick.		0.80	83.20	B PID ES B PID	(m) 0.00-0.80 0.30 0.30 0.80 1.00	0.10ppm 0.30ppm			(ṁ)	
MADE GROUND: Firm dark grey sandy CLAY. Sand- is fine to coarsefrom 0.8mbgl to 1.2mbgl - made ground - firm dark grey sandy clay. sand is fine to coarse		1.20	82.80 82.00	ES D	1.90-2.00					
MADE GROUND: Firm light brown mottled orange and grey CLAY with silt partings and occasional shell fragments gypsum crystals and hard dark brown clay pockets. Borehole Complete at 2.00 m										
		-								- - - - -
Hole Diameter Detail Chiselling / Slow Progress		1			Water Level	1		_		
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (m) (hours)	Date	•	Water Stril	ke (m) S	tanding Time (mins)	Stand Level	•	Casing Depth (r	·	Depth Sealed (m)
, , , , , , , , , , , , , , , , , , , ,			No 0	Groundwate	er Encountered	_				
Client: Network Rail					Progress	1		<u> </u>		
Client: Network Rail Consultant: WSP Parsons Brinckerhoff Dates Drilled: 08/06/2015 Plant: Hand Held WS SPT Hammer: N/A	08/06/201 08/06/201	5	Hole De 0.00 2.00	pth (Casing Depth - -	Water	Depth	Remarks Start of Hol Refusal	e	
Date Printed: 11/02/2016 Drilled By: PG Logged By: ZR+NJD Checked By: JHS		WSP/PB levels ar	using a ha e approxim	and held (ate and a	conditions an GPS (Gamin are based on survey inform	etrex 10) w the coordir	ith an ac nates tak	ccuracy of +/ ken by WSP/	/-4metres. PB and	



East West Rail-Phase 2A

Status: FINAL

Project:

WS2A12C Sheet 1+ of 1

Ground Level: 84.200mOD

Coordinates: 464211.00E

ritchies	Project No: 5624.2A Coordinates. 464211.00E 224317.00N								
Description	Legend	end Depth O.D.				ple / Test		Casing (Water)	Installations
		(m)	(m)	Type	Depth (m)	Test Re	esults	Depth (m)	installations
7.90m - 8.60m : Remaining Detail : 8.30m - 8.60m : brown mottled grey.;;; 8.50m - 8.60m :from 8.5mbgl to 8.6mbgl - sandy slightly gravelly. sand is fine to medium. Gravel is surrounded to rounded fine to coarse chert. 8.60m - 9.00m : Firm light brown mottled grey thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 9.00 m	Logona	(m)	Level (m)	Type	Depth (m)	Test Re		Depth (m)	Installations
				١	Water Level	Observations			
Hole Diameter Detail Chiselling / Slow Progress	Date	9	Water Strik	` /	anding Time (mins)	Standing Level (m)	Casing Depth (m	I	Depth Sealed (m)
65 9.00									
Client: Network Rail			11-1 5		Progress	1M-4. D ::	D '		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 18/05/2015-19/05/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A	Date	9	Hole Dep	otn C	Casing Depth	Water Depth	Remarks		
Date Printed: 11/02/2016 Drilled By: AB Logged By: NJD Checked By: JHS	Remarks:								



SPT Hammer:

Date Printed:

Drilled By:

Logged By:

Checked By:

N/A

AB

ZR

JHS

11/02/2016

Status: FINAL

Project No: 5624.2A

WS2A12U

Sheet 1 of 1

Project: East West Rail-Phase 2A

Borehole Log

Ground Level: 79.600mOD Coordinates: 464207.00E

224329.00N

Casing Sample / Test Depth O.D. (Water) Depth Installations Description Legend Level (m) Type Depth **Test Results** (m) (m) 0.00-1.20 0.00-0.10 (m) See DCP Results TOPSOIL: Soft dark brown CLAY. D ..from 0mbgl to 1.2mbgl - live roots 0.30 79.30 PID ES 0.30 0.00ppm 0.30 .from 0mbgl to 3mbgl - decayed roots MADE GROUND: Soft light brown mottled orange and grey CLAY with silt partings and 0.00ppm PID 1.00 occasional black carboniferous (ash) 1.00 ES 1.00 fragments. D 1.50 78.10 1.50 ..from 1.2mbgl to 1.5mbgl - becoming firm. Soft to firm brown mottled orange and grey 1.90 2.00-2.45 UT100 29 blows, 100% Recovery slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to rounded fine to coarse of chert. (OXFORD 2 20 77 40 CLAY-PETERBOROUGH MEMBER) ..from 1.8mbgl to 1.95mbgl - light brown D 2 90 mottled orange grey with dark brown silt 3.10 76.50 partings D ES 76.30 3.30 .from 1.95mbgl to 2.2mbgl - light orangish 3.50 brown mottled grey sandy slightly gravelly. Firm light orangish brown CLAY. (OXFORD UT87 4.00-4.45 32 blows, 100% Recovery CLAY-PETERBOROUGH MEMBER) 4.30 75.30 Firm light brown mottled orange and grey D 4 50 thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) Firm varying to stiff dark brown mottled grey slightly organic CLAY with very closely spaced orangish brown silty shell laminae D 5.50 with occasional gypsum crystals. (OXFORD CLAY-PETERBÖROUGH MEMBÈR) 6.00 73.60 Stiff dark grey thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) ..from 4.6mbgl to 5.3mbgl - very stiff with occasional shell fragments. ..from 5.1mbgl to 6mbgl - very stiff varying to hard. ..from 5.3mbgl to 5.6mbgl - with shell fragments. ..from 5.6mbgl to 6mbgl - dark brownish grey with much shell fragments. Borehole Complete at 6.00 m Water Level Observations Hole Diameter Detail Chiselling / Slow Progress Water Strike (m) Standing Time Standing Casing Depth Date Diamete Depth Casing Depth (m) To (m) Time (mins) Level (m) Depth (m) Sealed (m) (mm) (m) 2.00 4.00 5.00 6.00 19/05/15 0.30 5 0.30 2.00 Progress Client: Network Rail Date Hole Depth Casing Depth Water Depth Consultant: WSP | Parsons Brinckerhoff Start of Hole Completion instructed by WSP/PB 19/05/2015 19/05/2015 0.00 2 00 Dates Drilled: 19/05/2015 Plant: Sherpa 1 (T820-630)

Remarks: Water strike at 0.3 managed to dig inspection pit to 1.2 metres. Coordinates were

provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of

+/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.



Borehole Log Status: FINAL

WS2A13C

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 82.700mOD Coordinates: 463941.00E

224235.00N

Description	Lagand	Depth	n O.D.		Sam	Sample / Test		Casing	*
Description	Legend	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	Depth (m)	Installations
MADE GROUND: Dark brown sandy angular to subangular fine to coarse GRAVEL of basalt, Clinker and granite. Sand is fine to coarse. MADE GROUND: Light brown gravelly fine to		0.30	82.40 82.00	D PID B ES B	0.00-0.10 0.30 0.30-0.70 0.30 0.70-1.20	See DCP R 1.00ppm	tesults		
coarse SAND. Gravel is angular to rounded fine to coarse of chert and clinker.				PID ES UT100	1.00 1.00 1.20-1.65	0.40ppm 48 blows, 100% Rec	overy		-
Stiff dark brownish grey thinly laminated CLAY with very occasional shell and fossil fragments and gypsum crystals. (OXFORD CLAY-STEWARTBY MEMBER)from 1mbgl to 2.4mbgl - becoming very stifffrom 1.5mbgl to 2.6mbgl - very soft grey				D	1.90-2.00				
clayfrom 1.8mbgl to 2.4mbgl - with occasional shell and fossil fragmentsfrom 2.4mbgl to 2.6mbgl - with shell and fossil fragments.				D UT87	2.90-3.00 3.00-3.45	42 blows, 100% Reco	overy		
from 2.4mbgl to 4mbgl - very stiff varying to hardfrom 2.6mbgl to 3.2mbgl - with very occasional shell and fossil fragmentsfrom 3.2mbgl to 4mbgl - with occasional		4.00	78.70	D	3.90-4.00				
shell and fossil fragments. Borehole Complete at 4.00 m		- - - - - - - - -							
		- - - - - - -							
		- - - - - - - - -							
		- - - - - - -							
,			1		Water Level	Observations		1	<u> </u>
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	•	Water Strik		standing Time (mins)	Level (m)	Casing Depth (m		Depth Sealed (m)
			No G	oroundwat	er Encountered				
Client: Network Rail	<u> </u>				Progress				
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 02/06/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	02/06/20 ⁻ 02/06/20 ⁻	15	Hole De 0.00 4.00	pth (Casing Depth - -	Water Depth	Remarks Start of Hole Completion	e instructed b	y WSP/PB
Date Printed: 11/02/2016 Drilled By: EK Logged By: NJD Checked By: JHS		accuracy	of +/-4met	res. Grou	und levels are	sing a hand held G approximate and th LiDAR survey in	are based or	the coord	inates



ritchies

Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2A13D

Sheet 1 of 1

Ground Level: 83.300mOD Coordinates: 463947.00E

	Project	140.5	024.ZA					224222	2.00N
Description	Legend	Dept (m)	Level	Туре	Depth	nple / Tes	t st Results	Casing (Water) Depth	Installations
TORONI OWIL	\$(/)\$\(/)\$\(/)		(m)	D	(m) 0.00-0.10		DCP Results	(ṁ)	4
TOPSOIL: Stiff brown mottled dark brown clayey soil with rootlets.	DRUITAUIT	0.20	83.10	D B D	0.00-1.20 0.20-0.60	366	J		=
Stiff grey brown mottled orange brown CLAY.		0.60	82.70	PID ES	0.30 0.30	0.00ppm			=
\(OXFORD CLAY-STEWARTBY MEMBER)		-	0	D	0.60-1.00				=
Stiff grey CLAY with a little brown mottled	===	1.00	82.30	PID D	1.00 1.00-1.10	0.00ppm			<u>-</u>
white silty (chalky?) sand to fine gravel		Ė		ES	1.00	40 blanca 400	20/ Danning		=
size material. (OXFORD CLAY-STEWARTBY		-		UT100	1.20-1.65	42 blows, 100	J% Recovery		=
MEMBER)		Ė		D	1.80-2.00				
Stiff brown to orange brown CLAY with some		2.00	81.30						_
white coarse sand to fine gravel size silty material as thin very closely spaced		Ē							\exists
(10-50mm) irregular 1-2mm thick bands,		-		D	2.60-2.70				=
becoming darker brown. At 1.7m becoming									
mottled orange brown with a little selenite. ((OXFORD CLAY-STEWARTBY MEMBER).		3.00	80.30	UT87	3.00-3.45	38 blows, 709	% Recovery		-
Stiff brown thickly laminated/horizontally		E							=
fractured CLAY with traces of sand size		È							=
crystals. (OXFORD CLAY-STEWARTBY MEMBER)		-		D	3.80-4.00				_
from 2.6mbgl to 2.75mbgl - subvertical fissure with 1mm crystals	I-I-I-	=							=
,		4.40	78.90						=
Stiff brown to dark brown CLAY with scattered 1-2mm selenite. At 3.60m-3.8m subvertical		E		D	4.70-4.80				
tight fissure with selenite 2-3mm and yellow		-			000				=
brown silty material. Closely spaced subhorizontal seams of selenite. Traces of		E							
thin lamination. (OXFORD CLAY-STEWARTBY		E							=
MEMBER).									
Stiff dark brownish grey CLAY with some		6.00	77.30	D	5.80-6.00				_=
white, pink and iridescent flattened fossil	1	- 0.00	77.50						=
shell fragments to 10-15mm diameter. Thin lamination and fracturing. (OXFORD		Ē							3
CLAY-STEWARTBY MEMBER).		-							=
Borehole Complete at 6.00 m		Ē]
		F							=
		E]
		Ė							3
		_							
		Ē]
		-							=
		Ē]
		-							=
		E							
		Ė]
		F							=
		Γ			Water Level	Ohservation	16		1 1
Hole Diameter Detail Chiselling / Slow Progress		I	Water Strik		tanding Time			ng	Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	•	vvalei Sifil	ve (III) 2	(mins)	Level (3	٠	Sealed (m)
			No G	Groundwat	er Encountered		,	` /	
75 5.00									
65 6.00					Dua				
Client: Network Rail	D-:		Liais D	nth .	Progress	\A/=+= - F	Conth Danie		
Consultant: WSP Parsons Brinckerhoff	28/05/201		Hole Dep	pui (Casing Depth -	Water D	Depth Remarks Start of Ho		
Dates Drilled: 28/05/2015	28/05/201 28/05/201	iš	0.00 6.00		-	-	Completio	n instructed b	y WSP/PB
Plant: Sherpa 2 (T820-638)									
SPT Hammer: N/A									
Date Printed: 11/02/2016							held GPS (Gamin		
Drilled By: AB							e and are based or rvey information p		
Logged By: NJD		Rail.	_					,	
Checked By: JHS									



Borehole Log Status: FINAL

Project No: 5624.2A

WS2A13U

Sheet 1 of 1

Project: East West Rail-Phase 2A Ground Level: 85.800mOD

Coordinates: 463935.00E

	1 TOJCCL	140.00	JZ4.Z/\					224247	.00N
Depointing	1	Deptl	n O.D.		Sam	nple / Test		Casing	
Description	Legend	(m)	Level	Туре	Depth	Test Ro	oculto	(water) Depth	Installations
	×///× //		(m)		(m) 0.00			(m)	
TOPSOIL: Stiff dark brown silty CLAYfrom 0mbgl to 1.4mbgl - live roots.		0.20	85.60	D B	0.20-0.50	See DCP	Results		3
from 0mbgl to 1.4mbgl - live roots.		E		PID ES	0.30 0.30	0.00ppm			
, , , , , , , , , , , , , , , , , , ,	××								=
Very stiff brown mottled orangish brown and grey CLAY with occasional silt partings.	×××	E		PID	1.00	0.00ppm			=
(OXFORD CLAY-STEWARTBY MEMBER)	<u>x</u> x			D	1.00	о.ооррпі			=
from 0.6mbgl to 1.4mbgl - probable				ES UT100	1.00 1.20-1.65	28 blows, 100% Re	covery		=
desiccation.	<u>xx</u>	1.70	84.10				,		3
Firm to stiff dark greyish brown mottled grey	××	1.70	04.10	D	1.90				=
thinly laminated slightly organic CLAY with	×××								3
occasional black organic partings and gypsum crystals. (OXFORD CLAY-STEWARTBY MEMBER)	<u>x</u> x	_							=
at 1.8mbgl - firm light brown sandy silty	^x_	-							=
clay laminae. sand is fine.	Xx^	E		D	2.90				=
from 2.2mbgl to 4mbgl - stiff to very stiff	×××	-		UT87	3.00-3.45	29 blows, 100% Re	covery		_
with very closely spaced light brown silt and shell laminae and gypsum crystals.	xx								3
57.1									_
from 3.6mbgl to 4mbgl - becoming very stiff	××-	-		_	2.00				
to hard.	×	4.00	81.80	D	3.90				
Very stiff to hard dark brownish grey thinly		-							=
laminated CLAY with occasional shell fragments. (OXFORD CLAY-STEWARTBY		E							
MEMBER)		E							
from 4.5mbgl to 6mbgl - becoming very		_		D	4.90				_
stiff.									3
(-		-							=
from 5.5mbgl to 5.8mbgl - with shell		Ē		D	5.70				3
fragments.		6.00	79.80						_
Borehole Complete at 6.00 m		-							
									Ε Ε
		-							=
		E]]
		_							=
		-							
		E]
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		-							‡
		E]
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		E							
			1	,	Water Level	Observations		1	
Hole Diameter Detail Chiselling / Slow Progress			Water Strik		tanding Time		Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	•	vvalei Silli	(III) O	(mins)	Level (m)	Depth (n	I	Sealed (m)
(iii) (iii) (iii) (iii) (iiii)			No G	Groundwate	er Encountered	· · · · ·	('	()
					_				
Client: Network Rail				a I -	Progress	100			
Consultant: WSP Parsons Brinckerhoff	Date		Hole De	pth C	Casing Depth	Water Depth			
Dates Drilled: 20/05/2015	20/05/201 20/05/201	15 15	0.00 6.00		-	-	Start of Hole Completion	e instructed b	y WSP/PB
Plant: Sherpa 2 (T820-638)									
SPT Hammer: N/A						<u> </u>			
Date Printed: 11/02/2016	Remarke:	Conrding	ates were n	rovided h	v WSP/PR 116	sing a hand held (GPS (Gamin e	etrex 10) w	ith an
		accuracy	of +/-4met	tres. Grou	ind levels are	approximate and	l are based or	the coord	inates
Drilled By: EK		taken by Rail.	WSP/PB a	and cross-	correlated wi	ith LiDAR survey i	nformation pro	ovided by I	Network
Logged By: NJD		rvall.							
Checked By: JHS									



Status: FINAL

WS2A14C

Sheet 1 of 1

Project: East West Rail-Phase 2A

Ground Level: 78.700mOD Coordinates: 463378.00E

224073.00N

		Project No. 5624.2A 224073						224073	5.00N	
Description	on	Legend	Depti (m)	h O.D. Level (m)	Туре	Depth	nple / Test Test Re	sults	Casing (Water) Depth	Installations
MADE GROUND: Dark broangular to subangular basa granite GRAVEL. MADE GROUND: Yellow be fine to coarse SAND. Grave	orown slightly gravelly sel is angular to		0.30	78.40	D PID B ES B	0.30-0.70 0.30-0.70 0.30 0.70-1.20	See DCP R 1.60ppm 0.40ppm		(m)	
rounded fine to coarse che MADE GROUND: Firm gre with black organic partings partings. Gravel is angular fine to coarse brick and clinufrom 0.9mbgl to 1.1mbgl obstruction.	ey slightly gravelly CLAY /discoloured silt to subangular	X	2.00	76.70	ES UT100 D	1.00 1.20-1.65 1.80-1.90 2.10-2.20	29 blows, 100% Reco	overy		
Firm light brown mottled or with silt partings. (OXFORI CLAY-PETERBOROUGHfrom 2mbgl to 3.4mbgl defrom 2.7mbgl to 3.4mbgl crystals.	D MEMBER) cayed roots.	XX	3.20	75.50	D D	2.90-3.00 3.30-3.40				-
át 3.05mgbl - becoming v Firm brownish grey thinly li orangish brown and yellow (OXFORD CLAY-PETERE	aminated CLAY with	×	4.00	74.70	D UT87 D	3.90-4.00 4.00-4.45 4.50-4.60	44 blows, 100% Reco	overy		
from 3.6mbgl to 4mbgl - s slightly sandy with grey cla partings. sand fine.	stiff silty		4.60 - - - -	74.10	D D	4.90-5.00 5.00-6.00				-
Very stiff to hard dark grey laminated slightly organic (brown and yellow silt partir occasional gypsum crystal CLAY-PETERBOROUGH	CLAY with orangish ngs and s. (OXFORD		6.00	72.70						-
Hard dark grey thinly lamin CLAY-PETERBOROUGH from 5.1mbgl to 5.5mbgl sandy with grey sand parti from 5.9mbgl to 6mbgl - s sandy with grey sand parti Borehole Complete at 6.00	MEMBER) - silty slightly ngs. ilty slightly ngs.									
			-							
						Water Level	Observations			
Hole Diameter Detail Diameter Depth Casing (mm) (m) Depth (m)	Chiselling / Slow Progress From To Time (m) (m) (hours)	Date)	Water Strik	. ,	Standing Time (mins) ter Encountered	Level (m)	Casing Depth (m		Depth Sealed (m)
						Progress				
Consultant: WSP Dates Drilled: 03/06	ork Rail Parsons Brinckerhoff /2015 oa 2 (T820-638)	03/06/201 03/06/201	5	Hole De 0.00 6.00	pth	Casing Depth	Water Depth	Remarks Start of Hole Completion	e instructed b	y WSP/PB
Date Printed: 11/02 Drilled By: EK Logged By: NJD Checked By: JHS	/2016		accurac	y of +/-4met	res. Gro	und levels are	sing a hand held G approximate and a th LiDAR survey in	are based on	the coord	inates



Status: FINAL

Borehole Log

Diatus. I INAL

Project: East West Rail-Phase 2A

Project No: 5624.2A

WS2A14D

Sheet 1 of 1

Ground Level: 77.600mOD Coordinates: 463382.00E

	,							224000	0.00IN
Description	Legend	Deptl	n O.D.		Sam	nple / Test		Casing (Water)	
2 000p.ii.o	2090	(m)	Level (m)	Type	Depth (m)	Test Re	sults	Depth (m)	Installations
TOPSOIL: Firm dark brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to medium of clinkerfrom 0mbgl to 1.8mbgl - live rootsfrom 0mbgl to 2mbgl - decayed roots.	×	0.30	77.30	D PID B ES	0.00 0.30 0.30-1.20 0.30	See DCP F 0.80ppm	Results	(111)	
Firm light brown mottled orange and grey CLAY with silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)from 1mbgl to 1.8mbgl - becoming stiff. \(\).at 1.7mgbl - orangish brown silt laminae.	×× ×x ×x ×x	1.80	75.80	PID ES UT100 D D	1.00 1.00 1.20-1.65 1.70 1.90	0.40ppm 24 blows, 100% Rec	overy		
Stiff brownish grey thinly laminated CLAY with much orangish brown and yellow silt partings and gypsum crystals. (OXFORD CLAY-PETERBOROUGH MEMBER)	×	2.40	75.20	D	2.50				
Very stiff to hard dark greyish brown thinly laminated slightly organic CLAY orangish brown and yellow silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)at 2.4mgbl - light brown silty fine sand	× × × × × × × × × × × × × × × × × × ×	3.20	74.40	UT87	3.90	41 blows, 70% Reco	very		
laminaefrom 2.75mbql to 2.85mbql - slightly sandy		-		D	4.20				
silty with grey fine sand partings.		Ē		D	4.60				
Very stiff dark grey thinly laminated CLAY with occasional yellow silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)from 3.7mbgl to 4mbgl - slightly sandy silty with grey fine sand partingsfrom 4.1mbgl to 4.2mbgl - with very occasional gold iron pyrite crystalsfrom 4.3mbgl to 4.7mbgl - slightly sandy silty with grey fine sand partingsfrom 4.55mbgl to 4.7mbgl - sandy with shell fragments. Borehole Complete at 4.70 m		4.70	72.90						
					Water Level	Observations	I		
Diameter Detail Chiselling / Slow Progress	Date	9	Water Strik	. ,	Standing Time (mins) ter Encountered	Level (m)	Casing Depth (m		Depth Sealed (m)
Olivert N. C. J. D. T.					Progress				
Client: Network Rail Consultant: WSP Parsons Brinckerhoff Dates Drilled: 27/05/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	27/05/201 27/05/201 27/05/201		Hole De 0.00 4.70	pth	Casing Depth - 2.00	Water Depth	Remarks Start of Hole Refusal)	
SPT Hammer: N/A Date Printed: 11/02/2016 Drilled By: SR Logged By: NJD Checked By: JHS	Remarks: Hole refused at 4.7mbgl due to gound conditions. Coordinates were provided by WSP/l using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels approximate and are based on the coordinates taken by WSP/PB and cross-correlated LiDAR survey information provided by Network Rail.						f +/-4metres.	Ground le	evels are



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Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2A14U

Sheet 1 of 1

Ground Level: 78.500mOD Coordinates: 463377.00E

	1 10,000	140.0	024.2/1					224080	.00N
Description	Lagand	Dept	h O.D.		San	nple / Test		Casing	
Description	Legend	(m)	Level	Туре	Depth	Test Re	eulte	Depth	Installations
	\$//28///28		(m)	D	(m) 0.00	See DCP F		(m)	8///8///8
TOPSOIL: Firm dark brown gravelly silty CLAY. Gravel is angular to subangular fine to		0.30	78.20	PID	0.30	0.00ppm	resuits		
medium of clinker and granite.	$\otimes \otimes \otimes \otimes$	-	1	B ES	0.30-0.50 0.30				
\from 0mbgl to 1.8mbgl - live roots.		E		E5	0.30				=======================================
MADE GROUND: Stiff to hard dark brown CLAY		E		PID	1.00	0.00ppm			
clasts in a soft to firm brown mottled orange	XXXXX	E		D ES	1.00 1.00				3
and grey CLAY matrix.		1.40	77.10	D	1.20				=
MADE GROUND: Firm light orangish brown	$\times\!\!\times\!\!\times\!\!\times$	1.70	76.80	D	1.40				=
mottled orange and grey slightly gravelly		E		D UT100	1.90 2.00-2.45	8 blows, 100% Reco	von.		<u> </u>
CLAY. Gravel is subrounded to rounded fine to coarse of chert and sandstone.		F		01100	2.00-2.43	0 blows, 100 /6 Reco	very		=
from 1.4mbgl to 2.2mbgl - decayed roots.		E		D	2.50				
Soft light brown mottled orange and grey		F		_					=
CLAY. (OXFORD CLAY-PETERBOROUGH		E	75.45						<u> </u>
MEMBÉR)	×_^_×	3.05	75.45	D	3.10				=
from 1.9mbgl to 3.05mbgl - with much gypsum	XX	E							=
at 2.8mgbl - orangish brown sandy silty		F							=
clay laminae. sand is fine.	××	3.80	74.70	D	3.90	00 11 050/ 5			<u> </u>
from 2.8mbgl to 3.05mbgl - firm with orangish brown silt partings.	××	4.20	74.30	UT87	4.00-4.45	36 blows, 95% Reco	very		=
1 0		E		D	4.50				=
Stiff brownish grey thinly laminated CLAY with extremely closely spaced sandy CLAY	<u> </u>	-							
laminae and occasional orangish brown and				D	4.90				=
silt partings shell fragments and gypsum		F							=
crystals. Sand is fine. (OXFORD CLAY-PETERBOROUGH MEMBER)		E		D	5.50				=
at 3.05mgbl - light grey silty clay		5.80	72.70	В	5.80-6.40				=
laminae.		5.60	12.10	ь	5.60-6.40				
from 3.2mbgl to 3.65mbgl - no sandy claylaminae.		E							=
from 3.65mbgl to 3.8mbgl - no sandy clay		6.40	72.10						_
laminae.		Ė							3
Very stiff to hard dark greyish brown thinly	ĺ	L							-
laminated slightly organic CLAY with yellow silt partings. (OXFORD CLAY-PETERBOROUGH		E]
MEMBER)		-							
Hard dark grey thinly laminated CLAY. (OXFORD		Ē							
CLAY-PETERBOROUGH MEMBER)		_							-
from 5.6mbgl to 5.8mbgl - sandy with shell		E							
fragments.		Ė							
Stiff brownish grey thinly laminated CLAY		F							=
with much orangish brown and yellow silt partings and gypsum crystals. (OXFORD		Ē]
CLAY-PETERBOROUGH MEMBER)		F							
Borehole Complete at 6.40 m		E]
		E							
		<u> </u>		,	Water Level	Observations		1	
Hole Diameter Detail Chiselling / Slow Progress			Water Strik		tanding Time		Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	;		. ,	(mins)	Level (m)	Depth (m	I .	Sealed (m)
	26/05/15	5	0.90)	5	-	-		
Clients Newsyl Deil					Progress	1			
Client: Network Rail Consultant: WSP Parsons Brinckerhoff	Date		Hole De	pth C	Casing Depth	Water Depth	Remarks		
Dates Drilled: 26/05/2015	26/05/20° 26/05/20°	15 15	0.00 6.40		-	<u> </u>	Start of Hole Refusal	9	
Plant: Sherpa 2 (T820-638)									
SPT Hammer: N/A						<u> </u>			
Date Printed: 11/02/2016	Remarks:	Water se	eepage at 0	.9m. Coo	rdinates wer	e provided by WSF	P/PB using a	hand held	GPS (Gamin
Drilled By: SR+EK		etrex 10) with an ac	curacy of	+/-4metres.	Ground levels are	approximate	and are ba	ased on
Logged By: NC			dinates take by Networ		P/PB and cro	oss-correlated with	LIDAK surve	y intormat	ion
Checked By: JHS		,	.,						



Project:

Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

WS2A15D

Sheet 1 of 1

Ground Level: 73.300mOD Coordinates: 462742.00E

223852 00N

• • • • • • • • • • • • • • • • • • • •		Project	NO: 5	624.2A						223852	.00N
Descripti	on	Legend	Depti (m)	Level	Type		nple / Tes		مال	Casing (Water) Depth	Installations
				(m)	. , , , ,	(m)		est Resu		(m)	1 -
MADE GROUND: Very sti CLAY. Sand is fine to coa angular to rounded fine to limestone and brick. from 0mbgl to 2.2mbgl -	rse. Gravel is coarse of chert		1.00	72.30	PID B ES	0.30 0.30-1.00 0.30	0.60ppm 0.60ppm	ee DCP Resu	ults	. ,	-
Very stiff brown mottled or sandy slightly gravelly CL to medium. Gravel is angu to medium of chert. (OXFO	AY. Sand is fine llar to rounded fine DRD				D ES D UT100	1.90-2.00 2.00-2.45	76 blows 1/	00% Recove	n.		
CLAY-PETERBOROUGHfrom 1.5mbgl to 2.2mbgl black carbonaceous fragmfrom 1.8mbgl to 2.2mbgl sandy.	- with occasional	× × × × × × × × × × × × × × × × × × ×	2.20	71.10	D D	2.90-3.00	76 blows, 10	oo% Recove	rry		
Very stiff dark brownish grorangish brown and yellov (OXFORD CLAY-PETER!from 3mbgl to 3.8mbglfrom 3.5mbgl to 4mbglfrom 3.5mbglfrom 3.5mbgl to 4mbglfrom 3.5mbgl to 4mbglfrom 3.5mbgl to 4mbglfrom 3.5mbglfrom 3.5mbgl to 4mbglfrom 3.5mbgl to 4mbglfrom 3.5mbgl to 4mbglfrom 3.5mbglfrom 3.5mbgl -	v silt partings. BOROUGH MEMBER) with silt partings.	× × × × × × × × × × × × × × × × × × ×	4.00	69.30	D	3.90-4.00					
gypsum crystalsfrom 3.8mbgl to 4mbgl - silty fine sand partings. No Borehole Complete at 4.00	silt partings.	<i>,</i>									
			- - - - - - - - -								
			- - - - -								
			- - - - - - - -								111111111111111111111111111111111111111
			- - - - - - - - -								1
											=
	T = :=:					Water Level	Observation	ons			
Hole Diameter Detail Diameter Depth Casing (mm) (m) Depth (m)	Chiselling / Slow Progress	Date	,	Water Strik	ke (m)	Standing Time (mins)	Stand Level		Casing Depth (m	,	Depth Sealed (m)
(mm) (m) Depth (m) 102 2.00 0.00 87 3.00 65 4.00	(m) (m) (hours)			No G	Froundwa	ter Encountered		V-17	Sopur (III	7	Codiod (III)
Client	ork Poil					Progress	1			· · · · · · · · · · · · · · · · · · ·	
	ork Rail	Date		Hole De	oth	Casing Depth	Water		Remarks		
Dates Drilled: 22/04	Parsons Brinckerhoff 4/2015 pa 1 (T820-630)	22/04/201 22/04/201	5	0.00 4.00		:	-		Start of Hole Completion i	instructed b	y WSP/PB
	2/2016		accurac	y of +/-4met	res. Gro	by WSP/PB us ound levels are s-correlated wi	approxima	ate and are	based on	the coord	inates



Project:

Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

WS2A16C

Sheet 1 of 1

Ground Level: 72.600mOD Coordinates: 462366.00E

			1 TOJCCL	140.0	024.2/					223734	1.00N
Dogoria	otion		Lagand	Dept	h O.D.		San	nple / Test		Casing	
Descrip	puon		Legend	(m)	Level	Туре	Depth	Test Re	eulte	Depth	Installations
			· · · · · · · · · · · · · · · · · · ·		(m)		(m)	See DCP F		(ṁ)	19//89//89
MADE GROUND: Dark angular to subangular fir				0.30	72.30	PID	0.30	0.40ppm	Results		
of clinker limestone and	granite.			E		ES	0.30				=
from 0.0mbgl to 1.2mb	gl - Live and de	ecayed		0.70	71.90						=
roots.			$\otimes\!\!\otimes\!\!\otimes\!\!\otimes$	-		PID	1.00	0.60ppm			-
MADE GROUND: Light coarse SAND. Gravel is			$\times\!\!\times\!\!\times\!\!\times$	1.35	71.25	ES UT100	1.00 1.20-1.65	13 blows, 80% Reco	very		=
fine to coarse of chert a		naea		1.40	71.20						=
MADE GROUND: Very	stiff dark brown	n CLAY	====	1.80	70.80						
clasts in a firm brown me				2.00 2.10	70.60 70.50	D	2.00-3.00				-
CLAY with silt partings r	matrix.			2.20	70.40 70.25						<u> </u>
MADE GROUND: Stiff b				2.35 2.50	70.25						=
with 1no., angular coars	e gravel of ball	ast									=
Stiff light brown mottled				E		UT87 D	3.00-3.45 3.00-4.00	29 blows, 70% Reco	very		=
with 3mm diameter verti persistent for 300mm. In				3.45	69.15						=
(OXFORD CLAY-PETE				F 3.40	30.13						=
Stiff light grey to grey br	own CLAY with	n very		4.00	68.60						
closely to closely space	d partings with	,		4.00	00.60						
greyish white fine seleni (OXFORD CLAY-PETE				Ē							1 1
		,		Ė							
Firm grey brown CLAY (OXFORD CLAY-PETE				_							-
Firm friable pale greyish	white sandy C	Y AY		Ē]
Sand is fine of selenite of	crystals. (OXFC			Ė]
CLAY-PETERBOROUG	SH MEMBER)			E							
Friable brown to orange											-
CLAY. Fine pale sand si occasional coarse grave				Ė							
fragments (calcite ceme	nted). (OXFOF			-							
CLAY-PETERBOROUG	SH MEMBER)			Ē							
Friable brownish grey to				_							-
extremely closely space sized selenite, separating				-							
dark brown friable clay.	(OXFORD			E							
CLAY-PETERBOROÚG	SH MEMBER)			Ē]
Firm brownish grey to da				-							
very closely to closely spartings and probably cl				Ē							<u> </u>
spaced subvertical tight	fissures, both I	lined		Ė							1 3
with 2-3mm selenite crys		D		-							=
•				Ē							
Stiff grey CLAY with a lit discolouration at 3.45m-		ces of		Ė							
				Ė							
			+	Г			Water Level	Observations		1	
Hole Diameter Detail		/ Slow Progress			Water Stril		tanding Time	1	Casing		Depth
Diameter Depth Casing (mm) (m) Depth (m	From (m)	To Time (hours)	Date	9		,,,,,	(mins)	Level (m)	Depth (n		Sealed (m)
					No C	Groundwate	er Encountered	1			
			+				Progress		<u> </u>		
	twork Rail		Date	Э	Hole De	pth C	Casing Depth	Water Depth	Remarks		
	SP Parsons B	rinckerhoff	26/05/201 26/05/201	15	0.00 4.00		-		Start of Hole Completion	e instructed b	ny WSP/PR
	/05/2015 -+ 0 (T000 750)		20/05/20	١٥	4.00		-	1	Completion	iou ucteu D	y WOF/FD
	rt 2 (T820-759) \)									
SPT Hammer: N/A Date Printed: 11/	A /02/2016		Remarks:	Coordin	ates were n	rovided h	v WSP/PR II	sing a hand held G	PS (Gamin e	etrex 10) w	ith an
Drilled By: SW				accurac	y of +/-4me	tres. Grou	ind levels are	approximate and	are based or	the coord	linates
,	v D+MO			taken by Rail.	/ WSP/PB a	and cross-	correlated w	ith LiDAR survey ir	ntormation pro	ovided by	Network
Checked By: JH											
2.1.2.2.1.2.2.2.3.1. Of 1.	-										



East West Rail-Phase 2A

Status: FINAL

Project:

WS2A16C

Sheet 1+ of 1

Ground Level: 72.600mOD Coordinates: 462366.00E

ritchies	Project No: 5624.2A Coordinates: 462366.00E 223734.00N									
		D 11			Sam	nple / Te	et		Casing	
Description	Legend	Depti (m)	O.D. Level (m)	Туре			est Re	sults	(Water) Depth (m)	Installations
crystals, and shell fragments to 15mm diameter at 3.70m in sandy brownish matrix. Below 3.7m stiff grey CLAY with occasional shell fragments and impressions, selenite absent. (OXFORD CLAY-PETERBOROUGH MEMBER). Borehole Complete at 4.00 m						S	See DCP F	Results		
		-			Water Level	Observati	ons			-
Hole Diameter Detail Chiselling / Slow Progress	Date	\Box	Water Stril	ke (m) S	Standing Time	Stan	ding	Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Dale				(mins)	Leve	l (m)	Depth (m	n)	Sealed (m)
			No G	Groundwate	er Encountered					
					Progress	1				
Client: Network Rail	Date	•	Hole De	pth (Casing Depth	Wate	r Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff			<u> </u>				-			
Dates Drilled: 26/05/2015										
Plant: Dart 2 (T820-759)										
SPT Hammer: N/A	<u> </u>					1				
Date Printed: 11/02/2016	Remarks:									
Drilled By: SW										
Logged By: NJD+MO Checked By: JHS										



Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2A16D

Sheet 1 of 1

Ground Level: 72.400mOD Coordinates: 462368.00E

	Fioject	110.5	024.ZA					223732	2.00N
Description	Legend	Dept (m)	Level	Туре	Depth	nple / Test	t Results	Casing (Water) Depth	Installations
MADE GROUND: Very stiff dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of chert and clinkerfrom 0mbgl to 2mbgl - live rootsfrom 0mbgl to 2.9mbgl - decayed roots.	XXXX XXXXX XXXXX XXXXX	0.30	72.10 71.80	D PID B ES B	(m) 0.00-0.10 0.30 0.30-0.60 0.30 0.60-1.20		OCP Results	(ṁ)	-
Very stiff light brown mottled orange and grey slightly sandy slightly gravelly CLAY with silt partings. Sand is fine to medium. Gravel is angular to rounded fine to coarse of chert. (OXFORD CLAY-PETERBOROUGH MEMBER)from 0.3mbgl to 3mbgl - probable	× × × × × × × × × × × × × × × × × × ×	2.00	70.40	ES UT100 D D	1.00 1.20-1.65 1.90-2.00 2.10-2.20 2.50-2.60	16 blows, 1009	6 Recovery		
desiccation. Very stiff light brown mottled orange and grey CLAY with orangish brown silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)from 1.7mbgl to 2mbgl - greyish brown mottled orange and grey.	X X X X X X X X X X X X X X X X X X X	3.20	69.20 68.70	D	2.90-3.00				
Hard dark greyish brown mottled grey thinly laminated slightly organic CLAY with extremely closely spaced orangish brown silt and shell laminae with gypsum crystals. (OXFORD CLAY-PETERBOROUGH MEMBER)from 2.4mbgl to 2.6mbgl - dark brown organic clay at 2.85mbgl - dark brown to black lignite fragment at 3.1mbgl - orangish brown silt and shell laminae. Very stiff to hard thinly interlaminated dark greyish brown mottled orangish brown and grey slightly organic CLAY and dark brown organic CLAY with gypsum crystals and occasional orangish brown silt and shell partings. (OXFORD CLAY-PETERBOROUGH MEMBER) Hard dark grey thinly laminated CLAY with orangish brown silt partings and occasional shell fragments. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 4.00 m		4.00	68.40	D	3.90-4.00				
					Water Level	Observations	3		
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	•	Water Strik	. ()	tanding Time (mins) er Encountered	Level (m	'	٠ ١	Depth Sealed (m)
Client: Network Rail			11.2 5	- 41-	Progress				
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 08/06/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	08/06/201 08/06/201		0.00 4.00	om (Casing Depth - -	Water De	Start of Ho	le n instructed b	y WSP/PB
Date Printed: 11/02/2016 Drilled By: EK Logged By: NJD Checked By: JHS		accurac	y of +/-4met	res. Grou	ind levels are	approximate	eld GPS (Gamin and are based o rey information p	n the coord	linates



Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2A16U

Sheet 1 of 1

Ground Level: 72.800mOD Coordinates: 462368.00E

	Project	110.5	024.ZA					223743	5.00N
Description	Legend	Depti (m)	Level	Туре	Depth	nple / Test	Results	Casing (Water) Depth	Installations
MADE GROUND: Very stiff dark brown very sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of chert. from 0mbgl to 1.9mbgl - live roots. from 0mbgl to 3mbgl - decayed roots.	X - X - X X - X X - X X -	0.30	72.50 72.20	D PID B ES B	(m) 0.00-0.10 0.30 0.30-0.60 0.30 0.60-1.20 1.00		P Results	(ṁ)	
Very stiff light brown mottled orange and grey slightly gravelly silty CLAY. Gravel is angular to rounded fine to coarse of chert. (OXFORD CLAY-PETERBOROUGH MEMBER)from 0.3mbgl to 2.7mbgl - probable desiccation.	× × × × × × × × × × × × × × × × × × ×	2.20	70.60	ES UT100 D UT87	1.00 1.20-1.65 1.90-2.00 2.00-2.45	20 blows, 100% R 36 blows, 50% Re			
Very stiff to hard light brown mottled orange and grey CLAY with orangish brown silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)from 1.8mbgl to 2.2mbgl - greyish brown mottled orange and grey.	X X X X X X X X X X X X X X X X X X X	2.60	70.20	D D	2.50-2.60 2.90-3.00				
Hard orangish brown sandy SILT with much shell fragments and with extremely closely spaced dark brown organic CLAY laminae. Sand is fine. (OXFORD CLAY-PETERBOROUGH MEMBER)	xx _	4.00	69.10 68.80	D	3.90-4.00				
Very stiff to hard thinly interlaminated dark greyish brown mottled orangish brown and grey slightly organic CLAY and dark brown organic CLAY with gypsum crystals and occasional orangish brown silt and shell partings. (OXFORD CLAY-PETERBOROUGH MEMBER)from 3mbgl to 3.35mbgl - becoming firm to stiff.									
at 3.35mgbl - yellowish brown silt and shell laminaefrom 3.35mbgl to 3.7mbgl - becoming stiff to very stiff.		- - - - - - - -							-
Very stiff to hard dark grey thinly laminated CLAY with orangish brown silt partings and occasional shell fragments. (OXFORD CLAY-PETERBOROUGH MEMBER)		- - - - - - - -							-
Borehole Complete at 4.00 m									
		- - - - -			Weter Level	Observations			- - - - - -
Hole Diameter Detail Chiselling / Slow Progress	 		Water Strik			Observations	Casino	.	Donth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date)			tanding Time (mins)	Level (m)	Depth (r	' I	Depth Sealed (m)
			No G	roundwate	er Encountered Progress				
Client: Network Rail	Date	,	Hole De	oth (Casing Depth	Water Dept	h Remarks		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 09/06/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	09/06/201 09/06/201		0.00 4.00		- - -	- -	Start of Hol	e instructed b	y WSP/PB
Date Printed: 11/02/2016 Drilled By: EK Logged By: NJD Checked By: JHS		accurac	y of +/-4met	res. Grou	ind levels are	sing a hand held approximate an th LiDAR survey	d are based o	n the coord	inates



Drilled By:

Logged By: Checked By: SW

ZR

JHS

Borehole Log

accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates

taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network

Sheet 1 of 1

WS2A17C

Project: East West Rail-Phase 2A

Status: FINAL

Project No: 5624.2A

Ground Level: 68.800mOD Coordinates: 461267.00E

223349.00N

Casing Sample / Test Depth O.D. Legend (Water) Depth (m) Description Level (m) Type Depth **Test Results** (m) (m) See DCP Results MADE GROUND: Rail ballast occurring as 0.20-0.50 slightly sandy angular fine to coarse crushed PID ES 0.30 0.30 1.60ppm 0.50 68.30 rock GRAVEL. Sand fine to coarse MADE GROUND: Firm dark greyish brown sandy CLAY. Sand is fine to medium. 1.00 1.00 0.30ppm PID ES UT100 1.20-1.65 2.00 66.80 Firm dark greyish brown mottled CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) UT87 3.00-3.45 4.00 64.80 Firm to stiff dark grey slightly sandy CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER) 4.90 63.90 4.90-5.15 Dark grey clayey silty fine to medium SAND. 5.15 63.65 (KELĽAWAYŚ ŚANĎ) Borehole Complete at 5.15 m Water Level Observations Hole Diameter Detail **Chiselling / Slow Progress** Standing Time Water Strike (m) Depth Standing Casing Date Diameter Depth (m) Casing Depth (m) To (m) Time (hours) (mins) Level (m) Depth (m) Sealed (m) (mm) No Groundwater Encountered Progress Client: Network Rail Date Hole Depth Casing Depth Water Depth Remarks Consultant: WSP | Parsons Brinckerhoff 27/05/2015 27/05/2015 Start of Hole Refusal Dates Drilled: 27/05/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A Date Printed: Remarks: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an 11/02/2016

Rail.



Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2A17D

Sheet 1 of 1

Ground Level: 67.800mOD Coordinates: 461248.00E

	Project	. 100. 5	024.ZA					223333	.00N
Description	Legend	Dept (m)		Tuno		nple / Test		Casing (Water)	Installations
		(111)	(m)	Туре	Depth (m)	Test R	esults	Depth (m)	
TOPSOIL: Firm dark brown gravelly silty CLAY. Gravel is angular to subangular fine to coarse of granite and clinkerfrom 0mbgl to 1.2mbgl - live roots.		0.20	67.60	D B PID ES	0.00-0.10 0.20-0.90 0.30 0.30	See DCP 0.10ppm	Results	(111)	
\lambda.from 0mbgl to 1.8mbgl - decayed roots Firm light brown sandy CLAY. Sand is fine to medium. (OXFORD CLAY-PETERBOROUGH MEMBER)		0.90	66.90	B PID ES UT100	0.90-1.20 1.00 1.00 1.20-1.65	0.10ppm			1
Firm light brown mottled orange and grey CLAY with silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)	× × ×	1.80	66.00 65.60	D D	1.70-1.80 1.90-2.00				
Stiff to hard brownish grey thinly cross laminated CLAY with much orangish brown and yellow sandy silt partings. Sand is fine. (OXFORD CLAY-PETERBOROUGH MEMBER)			64.60	D D UT87	2.60-2.70 2.90-3.00 3.00-3.45				1
Very stiff dark grey thinly laminated CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)from 2.2mbgl to 2.5mbgl - sandy. Sand is fine to mediumfrom 2.8mbgl to 3.2mbgl - silty slightly	* * *	3.20		D	3.45-3.60				
sandy. sand is firm to medium.	[:]	-							1
Dark grey clayey silty fine to medium SAND	1	-							=
with grey sand partings and occasional fossil fragments. (OXFORD CLAY-PETERBOROUGH	<u>i</u>	<u>L</u>							
MEMBER) Borehole Complete at 3.60 m	1	<u> </u>							=
Borefiole Complete at 3.00 m		_							=
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					Water Level	Observations	1		<u>'</u>
Hole Diameter Detail Chiselling / Slow Progres	Date	е	Water Strik	` ,	tanding Time (mins)	Level (m)	Casing Depth (m		Depth Sealed (m)
			No G	Froundwate	er Encountered				
					Progress				
Client: Network Rail	Date	e	Hole De	pth (Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 04/06/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	04/06/20 04/06/20	15 15	0.00 3.60		-	:	Start of Hole Refusal	•	
Date Printed: 11/02/2016 Drilled By: DS Logged By: NJD Checked By: JHS		hand he approxir	eld GPS (Ğa mate and ar	min etrex e based o	(10) with an	ons. Coordinates v accuracy of +/-4m nates taken by WS twork Rail.	etres. Ground	levels are	



Borehole Log Status: FINAL

Project No: 5624.2A

Depth

(m)

0.40

1.20

1.40

1.70

2.40

2 95

4.00

WS2A17U

Sheet 1 of 1

Project: East West Rail-Phase 2A

O.D.

Level

(m)

68.10

67.30

67.10

66.80

66.10

65 55

64.50

Type

PID ES

UT100

D

D

UT87

Depth

(m)

0.30 0.30

1.00 1.00

1.20-1.65

1.90-2.00

2 70-2 80

2 95-4 00

3.00-3.50

Ground Level: 68.500mOD Coordinates: 461265.00E

Sample / Test

1.20ppm

0.40ppm

Test Results

See DCP Results

18 blows, 100% Recovery

41 blows, 100% Recovery

223356.00N

(Water) Depth Installations

Casing

MADE GROUND: Soft black slightly gravelly CLAY. Gravel is subangular fine to medium of clinker.
...from 0mbgl to 1.8mbgl - live roots.
...from 0mbgl to 2.6mbgl - decayed roots.

MADE GROUND: Soft light greyish brown slightly sandy CLAY. Sand is fine.

Firm light orange brown sandy CLAY. Sand is fine to medium. (OXFORD CLAY-PETERBOROUGH MEMBER)

Firm light brown mottled orange and grey CLAY with silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)

Firm grey thinly cross laminated CLAY with much orangish brown hard clayey silt clasts and partings. (OXFORD CLAY-PETERBOROUGH MEMBER)
..from 2.1mbgl to 2.4mbgl - becoming stiff.

Stiff dark grey thinly laminated CLAY with orangish brown and yellow silt partings.
(OXFORD CLAY-PETERBOROUGH MEMBER)
..from 2.7mbgl to 2.95mbgl - no silt
partings.

..from 2.85mbgl to 2.95mbgl - silty sandy. sand is fine to medium.

Dark grey clayey silty fine to medium SAND. (KELLAWAYS SAND) ..from 3.7mbgl to 3.8mbgl - with shell

fragments.

Borehole Complete at 4.00 m

F		
-		
-		
-		
⊢		

Hole	Diamete	er Detail	Chiselli	ng / Slov	w Progress		V
Diameter (mm)	Depth (m)	Casing Depth (m)	From (m)	To (m)	Time (hours)	Date	V
102 87	3.00 4.00	0.00					

Water Strike (m) Standing Time (mins) Standing Casing Depth (mins) Depth (m) Sealed (m)

No Groundwater Encountered

Client: Network Rail

Consultant: WSP | Parsons Brinckerhoff

Dates Drilled: 27/05/2015

Plant: Sherpa 2 (T820-638)

SPT Hammer: N/A

Date Printed: 11/02/2016

Drilled By: PG Logged By: NJD Checked By: JHS

Water Level Observations

Remarks: Hole refused at 4.0mbgl due to ground conditions. Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are based on the coordinates taken by WSP/PB and cross-correlated with LiDAR survey information provided by Network Rail.



Borehole Log

Status: FINAL

Sheet 1 of 1

WSHH2A18D

Ground Level: 68.800mOD

Coordinates: 460787.00E 223182.00N

Project: East West Rail-Phase 2A

Project No: 5624.2A

	,							23102.	UUIN
Description	Description Legend Depth O.D. Sample / Test		0.0	asing					
Description	Legena	(m)	Level	Туре	Depth	Test Re	- I '-	Vater) Depth	Installations
			(m)	В	(m)	rest Re	Suits	(m)	
MADE GROUND: Dark brown very gravelly silty fine to coarse SAND. Gravel is angular to	$\times\!\!\times\!\!\times\!\!\times$	E		ES	0.00-0.50				3
rounded fine to coarse chert and clinker.	$\times\!\!\times\!\!\times\!\!\times$	0.50	68.30	В	0.50-1.20				=
\from 0mbgl to 1.4mbgl - live roots.	<u> X-J-x-</u>	E							3
Very stiff light brown mottled orange and	\times - $$ - \times	-		D	1.00-1.10				_
grey CLAY with orangish brown sandy silt	×_×_×	E		ES	1.00				3
partings. Sand is fine. (OXFOD CLAY-PETERBOROUGH MEMBER)	X-XX	Ė							=
from 0.5mbgl to 1.0mbgl - probable		1.80	67.00	D	1.80-2.00				3
desiccation.	<u> </u>	-							
from 1mbgl to 1.8mbgl - stiff \text{\lambda} from 1.4mbgl to 1.8mbgl - with orangish	<u> </u>	-							=
brown silty fine to coarse sand partings.	×_×_×	E							3
Stiff brown organic CLAY with orangish brown		-		D	2.80-3.00				
and yellow silt and shell partings. (OXFOD	= = =×	3.00	65.80						
CLAY-PETERBOROUGH MEMBER) from 2.1mbgl to 3mbgl - becoming very	$\overline{-}\overline{\times}$	E							3
stiff dark brown	^xx	<u> </u>		D	3.60-3.80				
from 2.7mbgl to 3mbgl - occasional orangish brown sandy silt and shell	X THE	3.80	65.00 64.90	D	3.80-3.90				
partings and crystals. Sand is fine.	A	F 3.30	04.90					-	=
Very stiff dark grey CLAY with occasional		Ė							=
crystal and grey silty sand partings. (OXFOD		Ē							1
CLAY-PETERBOROUGH MEMBER)from 3.6mbgl to 3.8mbgl _ becoming stiff		Ė							
		F							=
Dark grey clayey fine to medium SAND. (KELLAWAYS SAND)		E							
Borehole Complete at 3.90 m		Ē							3
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		Ė							1
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		É							3
	-	<u> </u>	1		Water Lovel	Observations			-
Hole Diameter Detail Chiselling / Slow Progress			Water Strik		tanding Time	1	Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	Э	vvalei Ollif	(III) O	(mins)	Level (m)	Depth (m)		Sealed (m)
(my tin) (modes)			No G	roundwate	er Encountered	` '	/		` '
					Progress				
Client: Network Rail	Date	e	Hole De	oth (Casing Depth	Water Depth	Remarks		
Consultant: WSP Parsons Brinckerhoff	24/06/201 24/06/201		0.00 3.90		- -	-	Start of Hole		
Dates Drilled: 24/06/2015	24/06/201	15	3.90		-	-	Refusal		
Plant: Hand Held WS									
SPT Hammer: N/A	<u> </u>	0 "			14/05/55	. ,	DO (O : :	40)	
Date Printed: 11/02/2016						sing a hand held G approximate and			
Drilled By: AB		taken by				ith LiDAR survey in			
Logged By: NJD		Rail.							
Checked By: JHS									



Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

WS2A18U

Sheet 1 of 1

Ground Level: 69.100mOD Coordinates: 460787.00E

	Fioject	140.5	024.ZA					223182	00N
Description	Legend	Dept (m)	Level	Туре	Depth	nple / Test Test R	esults	Casing (Water) Depth	Installations
	VVV V V		(m)	2	(m)			(ṁ)	
MADE GROUND: Black slightly clayey slightly gravelly SAND with occasional rootlets. Sand is fine to coarse. Gravel is surrounded fine \chalk.		0.40	68.70	D PID ES B	0.00-0.40 0.30 0.30 0.40-0.90	See DCP 0.20ppm	Results		
MADE GROUND: Soft brown slightly sandy gravelly CLAY with a low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse flint and chalk. Cobbles are		0.90	68.20	D PID ES UT100	0.90 1.00 1.00 1.20-1.65	0.20ppm			
rounded flint.		2.00	67.10	D D	1.70 2.00				= - -
Firm light greyish brown mottled CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)at 1.8mgbl - mottling becoming less frequent with depth.									
Firm brownish grey fissile CLAY interbedded with occasional lenses of orangish brown discolouration. Discolouration occurs as staining. (OXFORD CLAY-PETERBOROUGH	×x x x x	2.80	66.30	D UT87	2.80 3.00-3.45				
MEMBER)at 2.7mgbl - discolouration becoming extremely rare with depth.	××	4.00	65.10	D D	3.80 4.00				- - -
Firm dark grey silty CLAY with rare subangular fine gravel size crystals possibly selenite. (OXFORD CLAY-PETERBOROUGH MEMBER)	×	4.50	64.60	D	4.50				
Dark grey slightly clayey SILT with extremely rare subangular fine silt gravel and occasional shell fragments. Shell fragments are up to 10mm wide. (OXFORD CLAY-PETERBOROUGH MEMBER) Borehole Complete at 4.50 m									
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			•		Water Level	Observations		-	. '
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date		Water Strik	ke (m) S	Standing Time (mins)	Standing Level (m)	Casing Depth (m	l l	Depth Sealed (m)
			No G	Groundwat	er Encountered	1			
Client: Network Rail					Progress	T =	Τ		
Consultant: WSP Parsons Brinckerhoff Dates Drilled: 01/06/2015	01/06/201 01/06/201		0.00 4.50	pth (Casing Depth - -	Water Depth	Remarks Start of Hole Completion	e instructed b	y WSP/PB
Plant: Sherpa 1 (T820-630) SPT Hammer: N/A									
Date Printed: 11/02/2016 Drilled By: AB Logged By: ZR Checked By: JHS		accurac	y of +/-4met	res. Grou	und levels are	sing a hand held (approximate and ith LiDAR survey i	l are based on	the coord	inates



Borehole Log

Status: FINAL

Project: East West Rail-Phase 2A

Project No: 5624.2A

WS2A19C

Sheet 1 of 1

Ground Level: 69.200mOD Coordinates: 460262.00E

riceines	Project	NO: 50	524.2A					:	222991	.00N
		Deptl	n O.D.	Sample /			st			
Description	Legend	(m)	Level	Туре			est Resu	ulto	(Water) Denth	Installations
	~~~		(m)	В	(m) 0.00-0.40				(m)	
MADE GROUND: Black slightly clayey gravelly SAND with a low cobble content and occasional				PID B	0.00-0.40	0.10ppm	e DCP Resu	nt5		
rootlets. Sand is fine to coarse. Gravel is	XXXXX	0.40	68.80	ES B	0.30 0.40-0.80					3
subangular to subrounded fine to coarse	$\otimes \otimes \otimes \otimes \otimes$	- 0.80	68.40	D	0.80					
concrete and brick. Cobbles are subangular brick. Rootlets are up to 5mm thick.		_		PID	1.00	0.20ppm				
•				ES UT100	1.00 1.20-1.65					=
MADE GROUND: Dark brownish red slightly clayey sandy GRAVEL with a high cobble										3
content. Sand is fine to medium. Gravel is		1.80	67.40	D D	1.70 1.80					=
subangular fine to coarse brick. Cobbles are subangular brick.	× <u>^</u> × <u>×</u> ××	-		В	2.00-2.90					<u> </u>
	$\frac{\times \times \times \times \times \times}{\times \times \times}$									=
Firm dark grey CLAY inter bedded with frequent lenses of orangish brown	<u> </u>									=
discolouration / staining and occasional	XXXXXX	- - - 2.90	66.30	D	2.90-3.00					=
silty lenses. Silt occurs within the		3.00	66.20	U	2.90-3.00					-
discoloured lenses. (OXFORD CLAY-PETERBOROUGH MEMBER)										3
		_								=
Dark grey clayey SILT with extremely rare subangular fine siltstone gravel. (KELLAWAYS		- - -								
CLAY)										
Dark grey clayey fine SAND.(KELLAWAYS SAND)										=
Borehole Complete at 3.00 m		-								=
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					Water Level	Observatio	ns			<u> </u>
Hole Diameter Detail Chiselling / Slow Progress	_		Water Strik	ke (m) S	Standing Time	1		Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	•		,	(mins)	Level	٠	Depth (m)	)	Sealed (m)
102 2.00 0.00 87 3.00			No G	roundwat	er Encountered	i				
5. 6.66										
					Progress					
Client: Network Rail	Date	. 1	Hole Dep	oth (	Casing Depth	Water	Depth R	Remarks		
Consultant: WSP   Parsons Brinckerhoff	03/06/201	5	0.00 3.00		-	-	S	start of Hole		
Dates Drilled: 03/06/2015	03/06/201	5	3.00		-	-	R	Refusal		
Plant: Sherpa 1 (T820-630)										
SPT Hammer: N/A	- Bomorles:	Coordin	atoo waxa =	rovided 1	WANGE /EE	oina o har -	hold CDC	(Comin -	rov 10\	th on
Date Printed: 11/02/2016		accuracy	of +/-4met	res. Gro	by WSP/PB us und levels are	approxima	te and are	based on	the coord	inates
Drilled By: DS	1				-correlated w					
Logged By: ZR Checked By: JHS		ixaii.								
Checked By: JHS										



Logged By: Checked By: ZR

JHS

### Borehole Log Status: FINAL

#### **WS2A19D**

Sheet 1 of 1

Ground Level: 72.100mOD Coordinates: 460286.00E

222987.00N

#### Project: East West Rail-Phase 2A ritchies Project No: 5624.2A

Descriptio		Legend	Depth	0.D.		San	nple / Test	Casi (Wat	- 71
Descriptio	11	Legend	(m)	Level (m)	Туре	Depth (m)	Test Re	sults Dep	th Installations
MADE GROUND: Soft dark with rare gravel, rare pocke occasional rootlets. Gravel fine brick and concrete. Roo 5mm thick.	ets of silt and is subrounded		-	,,	D B PID ES	0.00-0.30 0.00-1.20 0.30 0.30	See DCP R 0.40ppm		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
from 1.5mbgl to 2mbgl - po	ockets of silt				PID D ES D	1.00 1.00 1.00 1.20	0.20ppm		
occur in thin 10mm bands.					D UT100	2.00 2.00-2.45			
MADE GROUND: Dark browith rare subangular fine co			- 2.50 - - - - -	69.60	D	2.50			- - - -
Firm light greyish brown mo (OXFORD CLAY-PETERBO	ottled CLAY. OROUGH MEMBER)		3.30	68.80	D	3.30			- - - - -
from 4mbgl to 4.5mbgl - m less frequent with depth	ottling becomes				UT87	4.00-4.45			
Firm brownish grey fissile C with occasional lenses of or discolouration. Discolouration staining. (OXFORD CLAY-F MEMBER)	rangish brown on occurs as		- 4.50 	67.60	D	4.50			- - - - - - - - - - -
WEWDER)					D	5.50			=
Firm dark grey silty CLAY w fossil fragments and occasi medium gravel possibly sele pyrite. Fossil fragments con nodules up to 20mm wide. (	onal subangular enite crystals and nprise shell	×× ×x	5.80	66.30	D	5.80			-
CLAY-PETERBOROUGH North from 5.8mbgl to 6mbgl - fo crystals and pyrite observed from 6.8mbgl to 7mbgl - py	MEMBER) possil fragments, d.	× × × × × × × × × × × × × × × × ×	7.00	65.10	D D	6.80 7.00			-
Dark grey clayey SILT with fine sand. (KELLAWAYS Sat 7.5mgbl - 50mm sand b fossils. fossils comprise not fragments up to 20mm wide Borehole Complete at 7.80	AND) pand with abundant dules and shell	( × × × × × × × × × × × × × × × × × × ×	7.80	64.30	D	7.80			
	-		_			Water I evel	Observations		
Hole Diameter Detail	Chiselling / Slow Progress			Water Strik		Standing Time		Casing	Depth
Diameter Depth Casing (mm) (m) Depth (m)	From To Time (m) (m) (hours)	Date	•		` ′	(mins)	Level (m)	Depth (m)	Sealed (m)
102 3.00 0.00 87 5.00 75 7.80				No G	roundwat	er Encountered			
Client: Netwo	rk Rail	_				Progress			
	Parsons Brinckerhoff	02/06/201		Hole De	pth (	Casing Depth	Water Depth	Remarks Start of Hole	
Dates Drilled: 02/06/2	2015-03/06/2015 a 1 (T820-630)	02/06/201 03/06/201 02/06/201 03/06/201	5 5 5 5	0.00 7.80 1.20 1.20		<u> </u>	-	Completion instruct End of shift Start of Shift	ed by WSP/PB
Date Printed: 11/02/2 Drilled By: DS Logged By: ZR	2016	;	accuracy	of +/-4met	res. Grou	und levels are	e approximate and	PS (Gamin etrex 10 are based on the conformation provided	ordinates



### Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

#### **WS2A19U**

Sheet 1 of 1

Ground Level: 70.000mOD Coordinates: 460265.00E

11001		Project	NO: 50	624.2A					223000	0.00N
Description		Legend	Deptl (m)	h O.D. Level	Type		nple / Tes		Casing (Water	I Installations
		3. 122.2.3	( ' ' ' )	(m)	i ype	(m)	Te	est Results	beptn (m)	
MADE GROUND: Black slightly cla gravelly SAND with a low cobble of is fine to coarse. Gravel is subang to coarse brick concrete and rare to Cobbles are subangular brick.	content. Sand ular fine				D B PID ES	0.00-0.10 0.00-1.20 0.30 0.30	0.40ppm 0.20ppm	ee DCP Results	/	
MADE GROUND: Soft slightly san CLAY. Sand is fine to coarse. Grasubangular fine brick and concrete	vél is		1.20	68.80 68.30	ES D UT100 D	1.00 1.20 1.20-1.65 1.70				= = = = = = = = = = = = = = = = = = = =
Firm light greyish brown mottled C (OXFORD CLAY-PETERBOROUfrom 1.7mgbl to 1.9mgbl - mottlin less frequent with depth	GH MEMBER)		1.90    	68.10	D	1.90				- - - - - - -
Firm brownish grey fissile CLAY in with occasional lenses of orangish discolouration. Discolouration occustaining. (OXFORD CLAY-PETER MEMBER)	brown urs as	×x ×x ×x	3.10	66.90	D D	2.90 3.10				
Firm dark grey silty CLAY with occ fossil fragments and occasional su medium gravel possibly selenite cr	ıbangular	××			UT87	4.00-4.45				<u>-</u>
Fossil fragments comprise shell no 20mm wide. (OXFORD CLAY-PE MEMBER)	odules up to	×_×_×	- - - - - - 4.90	65.10	В	4.50-4.90				
Borehole Complete at 4.90 m										
Hole Diameter Detail Chise	elling / Slow Progress					Water Level	1			
Diameter Depth Casing From (mm) (m) Depth (m) (m)		Date	•	Water Strik	` ,	Standing Time (mins)	Level	0	Casing epth (m)	Depth Sealed (m)
102 3.00 0.00 87 4.90				No G	roundwat	ter Encountered				
Client: Network Rail		Date	, [	Hole De	oth	Casing Depth	Water	Depth Ren	narks	
Dates Drilled: 02/06/2015 Plant: Sherpa 1 (T8 SPT Hammer: N/A	ns Brinckerhoff 20-630)	02/06/201 02/06/201	5 5	0.00 4.90			-	Start Com	t of Hole npletion instructed I	
Date Printed: 11/02/2016 Drilled By: DS Logged By: ZR Checked By: JHS		1	accuracy	y of +/-4met	res. Gro	und levels are	approxima	ate and are ba	amin etrex 10) wased on the coord tion provided by	dinates



### Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

#### **WS2A20C**

Sheet 1 of 1

Ground Level: 68.800mOD Coordinates: 459862.00E

			o, .					222042	0011
5		Depth	n O.D.		San	nple / Test		Casing	
Description	Legend	(m)	Level	Туре				(Water)	Installations
	2322354	(,	(m)		(m)	Test Re	esults	(m)	
MADE GROUND: Dark brown sandy angular to	$\times\!\!\times\!\!\times\!\!\times$	-		D	0.00-0.10	See DCP F	Results		
subangular clinker and limestone GRAVEL.		0.30	68.50	PID D	0.30 0.30-0.80	0.20ppm			=
from 0mbgl to 2.8mbgl - live roots/from 0mbgl to 3.8mbgl - decayed roots/	$\times\!\!\times\!\!\times\!\!\times$	E		ES	0.30				=
g g ,	XXXXX	0.80	68.00	D	0.80-1.20				=
MADE GROUND: Light brown gravelly fine to coarse SAND. Gravel is angular to rounded		-		PID D	1.00 1.00-1.10	0.10ppm			-
fine to coarse of chert sandstone and brick.		1.40	67.40	ES D	1.00 1.30-1.40				<u> </u>
Firm grey slightly sandy slightly gravelly		-		В	1.40-2.00				=
CLAY with orangish brown sandy silt partings.		E							=
Sand is fine to coarse. Gravel is angular to	X ~ X	2.00	66.80	UT100	2.00-2.45	19 blows, 100% Red	covery		_
rounded fine to coarse of limestone and	<u>×</u> ×	E							=
chert. (KELLAWAYS SAND)from 1.3mbgl to 1.4mbgl - no sand and		-							=
gravel.	<u>××</u>	E		D	2.90-3.00				=
Light grey angular to rounded fine to coarse	××	-		UT87	3.00-3.45	22 blows, 100% Red	covery		_
GRAVEL of limestone and chert with medium	===	3.20	65.60						=
cobble content in a firm light brown mottled		E							<u> </u>
orangish brown and grey very sandy CLAY		Ė							=
matrix. Cobbles are subangular of limestone. (KELLAWAYS CLAY)				D	3.90-4.00				
1		F							=
Firm grey mottled orange CLAY with orangish brown silt partings. (KELLAWAYS CLAY)		Ė		D	4.60-4.70				=
		4.70	64.10	ט	4.00-4.70				
Firm to stiff dark grey thinly laminated CLAY with occasional brown silt partings.		Ė.							4
(KELLAWAYS CLAY)	1	E							]
i.at 3.5mgbl - iron pyrites crystals.	1	F							=
from 3.7mbgl to 4.7mbgl - becoming stiff to		Ė							=
very stiff dark greyfrom 4.5mbgl to 4.7mbgl - becoming very		E							] ]
stiff to hard.		F							=
Borehole Complete at 4.70 m		E							]
·		F							1
		Ē.							3
		F							=
		Ė							]
		E							=
		F							=
		E							]
		F							
		E							]
		-							
		Ė							
		F							]
		F							
		E							
		1	1	1	Water Level	Observations		1	
Hole Diameter Detail Chiselling / Slow Progress			Water Stril	ke (m)	Standing Time	1	Casing		Depth
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	9		- ()	(mins)	Level (m)	Depth (m		Sealed (m)
102 2.00 0.00			No G	roundwa	ter Encountered		. `		. ,
87 4.70									
					Duagues	1			
Client: Network Rail	D	, ,	Uale D	oth	Progress	Motor Dead	Doma-l-		
Consultant: WSP   Parsons Brinckerhoff	11/06/201		Hole De	μτη	Casing Depth	Water Depth	Remarks Start of Hole		
Dates Drilled: 11/06/2015	11/06/201 11/06/201	15	0.00 4.70		-	] :	Refusal	5	
Plant: Sherpa 1 (T820-630)									
SPT Hammer: N/A						<u> </u>			
Date Printed: 11/02/2016	Remarks:	Coordina	ates were p	rovided	by WSP/PB u	sing a hand held G	SPS (Gamin e	etrex 10) w	ith an
Drilled By: AB		accuracy	of +/-4met	res. Gro	ound levels are	approximate and	are based or	the coord	linates
Logged By: NJD		taken by Rail.	wsp/PB a	ind cross	s-correlated w	ith LiDAR survey ir	ntormation pro	ovided by	network
Checked By: JHS									
Oncored by. Ji lo									



### Borehole Log

Status: FINAL

East West Rail-Phase 2A

Project No: 5624.2A

Project:

**WS2A20D** 

Sheet 1 of 1

Ground Level: 68.600mOD Coordinates: 459845.00E

Heemes	Project	No: 50	624.2A				222835.00N			
Description	Logond	Deptl	h O.D.		San	nple / Test		Casing		
Description	Legend	(m)	Level (m)	Туре	Depth (m)	Test F	Results	Depth (m)	Installations	
MADE GROUND: Brown sandy gravelly angular to subangular COBBLES of brick and limestone. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick and mortar. \(\text{\text{\text{.from 0mbgl to 1.2mbgl - live roots.}}\)  MADE GROUND: Light brown very gravelly clayey fine to coarse SAND. Gravel is angular to rounded fine to coarse of brick and chert.		0.90	67.70 67.40 67.20 66.80	B PID ES B PID ES UT100 D UT87	0.00-0.90 0.30 0.30 0.90-1.20 1.00 1.00 1.20-1.65 1.20-1.40 1.70-1.80 1.90-2.00	See DCi 0.80ppm 0.20ppm 49 blows, 90% Re	P Results			
MADE GROUND: Firm light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to medium of brick clinker and chert.		2.60	66.00	UT87	2.00-2.45	19 blows, 50% Re	ecovery			
Firm light brown mottled orange and grey slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to rounded fine to coarse of chert. (ALLUVIUM)from 1.4mbgl to 3.4mbgl - decayed rootsfrom 1.65mbgl to 1.8mbgl - becoming gravelly.	X X X X X X X X X X X X X X X X X X X	3.00	65.60 64.40	D D	2.90-3.00 3.90-4.00 4.15-4.25					
Firm light brown mottled orange and grey CLAY with silt partings and calcareous nodules. (KELLAWAYS CLAY)		4.30	64.30	D D D	4.25-4.30 4.25 4.25					
Firm greyish brown mottled orange and grey CLAY with orangish brown silt partings and occasional calcareous nodules and gypsum crystals. (KELLAWAYS CLAY)	 	- - - - - - -								
Firm dark grey CLAY with orangish brown and yellow silt partings. (KELLAWAYS CLAY)from 3.2mbgl to 3.8mbgl - becoming stiff to very stifffrom 3.8mbgl to 4.25mbgl - becoming very stiff to hard.		-								
Very weak dark grey clayey silty LIMESTONE. Recovered as sandy angular and tabular fine to coarse Gravel. Sand is fine to coarse. CORNBRASH LIMESTONE Borehole Complete at 4.30 m										
		E							- - -	
	+	Γ			 Water Level	Observations			1 1	
Hole Diameter Detail Chiselling / Slow Progress Diameter Depth Casing From To Time	Date	<u>,</u>	Water Stril	ke (m) S	tanding Time	Standing	Casin	g	Depth	
Diameter (mm)         Depth (m)         Casing (permission)         From (m)         To (m)         Time (hours)           102         2.00         0.00         87         3.00         65         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30 <td>Date</td> <td>,</td> <td>No G</td> <td>Groundwate</td> <td>(mins) er Encountered</td> <td>Level (m)</td> <td>Depth (</td> <td>m)</td> <td>Sealed (m)</td>	Date	,	No G	Groundwate	(mins) er Encountered	Level (m)	Depth (	m)	Sealed (m)	
Client: Network Rail					Progress	1				
Consultant: WSP   Parsons Brinckerhoff Dates Drilled: 23/04/2015 Plant: Sherpa 1 (T820-630) SPT Hammer: N/A	23/04/20 ⁻ 23/04/20 ⁻	15	Hole De 0.00 4.30	pth (	Casing Depth - -	Water Dept	h Remarks Start of Ho Refusal	ole		
Date Printed: 11/02/2016 Drilled By: AB Logged By: NJD Checked By: JHS		accuracy	y of +/-4me	tres. Grou	ind levels are	sing a hand held e approximate an ith LiDAR survey	nd are based o	on the coord	dinates	



## Borehole Log

Sheet 1 of 1

**WS2A20U** 

Status: FINAL

Ground Level: 69.000mOD

Coordinates: 459864.00E

459864.00E 222853.00N

Project: East West Rail-Phase 2A

Project No: 5624.2A

	Project	110.5	024.ZA					222853	3.00N
Description	Legend	Dept (m)	Level	Туре	Depth	nple / Test	Results	Casing (Water) Depth	Installations
	· · · · · · · · · · · · · · · · · · ·		(m)	D	(m) 0.00-0.10		ICP Results	(m)	8///89///89
MADE GROUND: Dark brown gravelly silty fine to coarse SAND. Gravel is angular to rounded \fine to coarse of chert and clinker.		0.30	68.70	PID B ES	0.30 0.30-1.20 0.30	0.60ppm	CP Results		
MADE GROUND: Firm brown very sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of chert clinker and brick. MADE GROUND		1.20	67.80	PID D ES	1.00 1.00-1.10 1.00	0.00ppm 32 blows, 100%	Receiver		
from 0.8mbgl to 1.2mbgl - becoming sandy.		=		UT100	1.20-1.65	32 DIOWS, 100%	Recovery		=
Firm light brown mottled orange and grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of chert and limestone. (ALLUVIUM)	× × ×	2.00	67.25 67.00	D ES D UT87	1.65-1.75 1.80 1.90-2.00 2.00-2.45	19 blows, 100%	Recovery		-
from 1.65mbgl to 1.75mbgl - becoming very sandy very gravelly.	<u>×_×</u> _×	2.90	66.10	ES D	2.50-2.60 2.80 2.90-3.00				- - - -
Firm light brown mottled orange and grey CLAY with silt partings and occasional calcareous nodules. (KELLAWAYS CLAY)				J	2.00 0.00				-
Firm grey mottled orangish brown CLAY with silt partings. (KELLAWAYS CLAY)		4.00	65.00 64.80	ES D D	3.80 3.90-4.00 4.00-4.20				=
Firm dark grey CLAY. (KELLAYWAYS CLAY)from 3.3mbgl to 3.8mbgl - becoming firm to stiff.		4.20	04.80						
from 3.8mbgl to 4mbgl - becoming stiff to very stiff.	1	<u> </u>							<del> </del>
Very weak dark grey clayey silty LIMESTONE. Recovered as sandy angular and tabular fine to coarse gravel. Sand is fine to coarse.									
(CORNBRASH LIMESTONE)		E							
Borehole Complete at 4.20 m		Ē							]
		-							4
		E							=
		E							
		E							]
		Ē							1 1
		-							
		F							-
		Ė							1 1
		F							
		Ē							
		F							=
		E							
		Ē							]
		-							=
Hole Diameter Detail Chiselling / Slow Progress	1	ı	\\\-\:\ \\\\-\:\\\\\\\\\\\\\\\\\\\\\\\\			Observations			D"
Diameter Depth Casing From To Time (mm) (m) Depth (m) (m) (m) (hours)	Date	9	Water Strik	ke (m)  S	tanding Time (mins)	Standing Level (m)		·	Depth Sealed (m)
102 2.00 0.00 87 3.00 75 4.20			No G	Froundwate	er Encountered		-1 %1		· /
75 4.20									
Client: Network Rail					Progress	I			
Consultant: WSP   Parsons Brinckerhoff	Date		Hole De	pth (	Casing Depth	Water De			
Dates Drilled: 17/06/2015	17/06/20 ⁻ 17/06/20 ⁻	15 15	0.00 4.20		-	-	Start of Ho Refusal	oie	
Plant: Sherpa 1 (T820-630) SPT Hammer: N/A									
Date Printed: 11/02/2016	Remarks:	Instruct	ed by PB .la	mes to ta	ke extra FS	Samples at 1m	intervals. Coor	dinates were	e
Drilled By: AB		provided	d by WSP/P	B using a	a hand held G	PS (Gamin etr	ex 10) with an a	accuracy of	
Logged By: NJD							ed on the coordi ation provided b		
Checked By: JHS			- 4114 01033	Jonald	.c with Lib/All	. Sarvey miletille	allon provided t	, 110.WOIR I	
550kG 2y. 0110									



Checked By:

JHS

### Borehole Log Status: FINAL

#### **WS2ALLCU**

Sheet 1 of 1

Ground Level: 68.037mOD Coordinates: 461903.00E

223579.00N

#### Project: East West Rail-Phase 2A ritchies Project No: 5624.2A

5		Depth	n O.D.		Sar	nple / Test		Casing	
Description	Legend	(m)	Level (m)	Туре	Depth (m)	Test Re	sults	-(Water)   Depth   (m)	Installations
MADE GROUND: Dark brown gravelly silty fine to medium SAND. Gravel is angular to rounded fine coarse of clinker chert and brick. from 0mbgl to 1.2mbgl live roots.		0.30	67.74	D PID B ES	0.00 0.30 0.30-1.20 0.30	See DCP R 0.60ppm	Results		
MADE GROUND: Firm dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of clinker coal and brick.		1.60	66.44	PID ES D	1.00 1.00 1.40 1.60-2.60	0.20ppm			1
MADE GROUND: Stiff to hard dark brown CLAY clasts in a soft varying to firm brown mottled orange and grey CLAY with silt partings.		X X X X X X X X X X X X X X X X X X X		D UT100	1.90 2.00-2.45 2.50	18 blows, 70% Reco	very		
Firm dark grey slightly gravelly CLAY with black organic partings. Gravel is rounded fine to coarse of chert. (ALLUVIUM) \from 2.6mbgl to 3.2mbgl decayed roots.	X	3.00	65.44 65.04	D UT87	2.70 2.70 3.00-3.45	13 blows, 100% Rec	overy		- - - -
Firm grey mottled orangish brown CLAY with silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)	×x	3.80	64.24	D D	3.60 3.90				-
Firm light orangish brown mottled grey slightly sandy CLAY. Sand is fine to medium. (OXFORD CLAY-PETERBOROUGH MEMBER)from 4.mbgl to 4.2mbgl - becoming sandyfrom 4.4mbgl to 4.7mbgl - sandy with very closely spaced light orangish brown sandy clayey angular to subrounded fine to coarse		4.70 5.10	63.34 62.94 62.64	D D D	4.50 4.90 5.20				
gravel laminae of chert sandstone and fossil fragments.  Extremely to very weak thinly laminated		- - - - -							
greyish brown silty fine to medium calcareous SANDSTONE with shell fragments. (KELLAWAYS	S	- - - - -							
Dark grey silty fine to medium SAND with occasional shell fragments. (KELLAWAYS SAND) Borehole Complete at 5.40 m	)!	- - - - -							-
		- - - - -							
		- - - -							
		- - - - - -							
		<u> </u>			Water I	Observations		1	
Hole Diameter Detail Chiselling / Slow Prog	ress	1	Moto - Or "			1	0	. 1	Dontk
Diameter Depth Casing From To Tim (mm) (m) Depth (m) (m) (m) (hou	e Dat	е	Water Stri	ke (m)  S	tanding Time (mins)	e Standing Level (m)	Casing Depth (n		Depth Sealed (m)
y (y 20pm () () () (1100			No C	Groundwate	er Encountered		-,(		(")
Oliver New 1 B II					Progress		<u> </u>		
Client: Network Rail Consultant: WSP   Parsons Brinckerhoff	Dat		Hole De	pth (	Casing Depth	Water Depth	Remarks		<del></del>
Dates Drilled: 01/06/2015  Plant: Sherpa 2 (T820-638)  SPT Hammer: N/A	01/06/20 01/06/20	15 15	0.00 5.40		<u>-</u>	:	Start of Hole Refusal	e	
Date Printed: 11/02/2016 Drilled By: EK Logged By: ZR Checked By: UHS	Remarks:	hand hel	ld GPS (Ğa nate and ar	min etrex e based o	(10) with an	ons. Coordinates we accuracy of +/-4me inates taken by WS stwork Rail.	tres. Ground	d levels are	)



### Borehole Log

Status: FINAL

Project: East West Rail-Phase 2A

Project No: 5624.2A

#### **WS2AFCMGD**

Sheet 1 of 1

Ground Level: 79.860mOD Coordinates: 463459.00E

	Project	. 100.5	024.ZA					224090	.00N
Description	Legend	Dept (m)	Level	Туре	Depth	nple / Test Test Ro	eculte	Casing (Water) Depth	Installations
MADE GROUND: Black slightly clayey SAND & GRAVEL with a low cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse flint, brick and crushed rock possibly limestone. Cobbles are subrounded concrete and flint.		0.60	79.26	PID ES	0.30 0.30 1.00	See DCP 0.40ppm		(m)	
Firm dark brownish grey slightly mottled CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)		1.20	78.66	ES UT100 D	1.00 1.20-1.65 1.70	15 blows, 40% Reco	overy		-
Firm light brown mottled orange and grey CLAY. (OXFORD CLAY-PETERBOROUGH MEMBER)from 1.2mbgl to 1.6mbgl - live rootsfrom 1.2mbgl to 2.6mbgl - decayed rootsfrom 1.8mbgl to 2mbgl - with dark orangish brown silt partings.		2.00	77.86 76.66	D D UT87	2.90 3.00-3.45	23 blows, 85% Reco	overy		
Firm to very stiff greyish brown mottled orange thinly laminated CLAY with much dark orangish brown silt partings. (OXFORD CLAY-PETERBOROUGH MEMBER)	X			D	3.90				
Hard dark greyish brown thinly laminated slightly organic CLAY with shell fragments. (OXFORD CLAY-PETERBOROUGH MEMBERat 4mbgl - golden iron pyrites crystals. \at 4.7mbgl - becoming very shelly laminae.		4.80	75.06	D	4.90				
Very stiff dark brownish grey thinly laminated CLAY with occasional shell and fossil fragments. (OXFORD CLAY-PETERBOROUGH MEMBER)from 5.35mbgl to 5.45mbgl - with calcareous nodules.				D D	5.35 5.90				
from 5.45mbgl to 7.5mbgl - bvecoming hard, silty and slightly sandy. Sand is finefrom 6.5mbgl to 6.9mbgl - with extremely closely spaced silty fine to medium sand laminaefrom 7.1mbgl to 7.5mbgl - with extremely closely spaced silty fine to medium sand laminae.		7.50	72.36 72.26	D D	6.60 6.90 7.50				
Dark grey silty fine to medium SAND with sandy clay partings. (KELLAWAYS SAND) Lat 7.5mbgl - black shiny coal laminae.  Borehole Complete at 7.60 m									1
		F							=
Hole Diameter Detail Chiselling / Slow Pro	ime Date	e	Water Strik		water Level anding Time (mins)		Casing		Depth
(mm) (m) Depth (m) (m) (m) (h 102 3.00 2.00 87 5.00 75 7.00 65 7.60	26/05/15	5	1.20	)	5	Level (m)	Depth (n	11)	Sealed (m)
Client: Network Rail					Progress			'	
Consultant: WSP   Parsons Brinckerho Dates Drilled: 26/05/2015 Plant: Sherpa 2 (T820-638) SPT Hammer: N/A	Off 26/05/20 26/05/20		Hole De 0.00 7.60	oth C	Casing Depth - 2.00	Water Depth	Remarks Start of Hole Refusal	e	
Date Printed: 11/02/2016  Drilled By: SR  Logged By: ZR+NJD  Checked By: JHS		were pro +/-4meti	ovided by W res. Ground	/SP/PB us levels are	sing a hand h e approximat	t 7.6mbgl due to g neld GPS (Gamin e and are based o survey informatio	etrex 10) with	an accura ates taken	cy of by



Checked By:

JHS

## Borehole Log

WS2AFCMGU

Sheet 1 of 1

Status: FINAL

Project: East West Rail-Phase 2A

Ground Level: 80.283mOD Coordinates: 463455.00E

224105.00N

Project No: 5624.2A

		Dontk	n O.D.		Sam	nple / Test	(	Casing	
Description	Legend	Depth (m)	Level (m)	Туре	Depth (m)	Test Re		Water) Depth (m)	Installati
FOPSOIL: Dark brown gravelly fine SAND.	XXXXXX	- 0.00		-		See DCP R	esults	(111)	-
Gravel is fine to coarse subangular to		0.20	80.08	D PID	0.20 0.30	0.00ppm			-13
ounded flint.		-		ES	0.30				=
Soft to firm light greyish brown mottled		-							=
CLAY. (OXFORD CLAY-PETERBOROUGH		<del>-</del>		PID	1.00	0.00ppm			
(IEMBÉR)		1		D ES	1.00 1.00				Ξ
		=		D	1.20				=
		F							=
		_		D	2.00				_=
		‡							Ξ
		2.50	77.78	D	2.50				=
irm dark greyish brown occasionally mottled		2.30	11.10	D	2.30				=
CLAY with a slight organic odour. (OXFORD		<u> </u>		_					=
LAY-PETERBOROŬGH MEMBÈR)	xxxxxxx	3.00	77.28	D UT100	3.00 3.00-3.45	100 blows, 40% Reco	overv		_
ight grey extremely weak SILTSTONE with	X X X X X X X X	E				, , , , , , , , , , , , , , , , , , , ,	,		Ξ
ccasional shell fragments. Shell fragments	/	3.45	76.83	D	3.45				=
re up to 10mm wide. (OXFORD		Ė							=
LAY-PETERBOROUGH MEMBER)		Ė.							-
orehole Complete at 3.45 m		E							]
		-							
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			·		Water Level	Observations			
Hole Diameter Detail Chiselling / Slow Progress iameter Depth Casing From To Time	Date	, T	Water Stril	ke (m) S	tanding Time	Standing	Casing		Depth
(mm) (m) Depth (m) (m) (hours)					(mins)	Level (m)	Depth (m)		Sealed (m)
102 3.45 0.00			No G	Froundwate	er Encountered	1			
Niente Network D. 7					Progress				
Client: Network Rail	Date	е	Hole De	pth (	Casing Depth	Water Depth	Remarks		
Consultant: WSP   Parsons Brinckerhoff	26/05/20 26/05/20	15	0.00 3.45		-	-	Start of Hole		
Dates Drilled: 26/05/2015	26/05/20	15	3.45		-	-	Refusal		
Plant: Sherpa 2 (T820-638)									
SPT Hammer: N/A									
Date Printed: 11/02/2016	Remarks:	Hole refu	used at 3.4	5mbgl du	e to ground o	onditions.Coordina	tes were provi	ded by W	/SP/PB
Orilled By: EK		using a h	hand held (	SPS (Gan	nin etrex 10)	with an accuracy of	f +/-4metres. G	Fround le	vels are
					on the coordi ovided by Ne	nates taken by ŴS	P/PB and cros	s-correla	ted with
Logged By: ZR		LIDAK SI	urvey iriioff	παιιστι ρΓ	ovided by ine	LWUIK Rail.			
Phocked By: ILIS	1								



Engineer:

#### **BOREHOLE LOG**

Borehole No: RC2ABROB-D Sheet 2 of 3

1:50

70.60 mOD

Scale:

East West Rail GRIP 3 RC Project Name: Survey Grid System: OSGB Hole Type: Project No: JHS 5624 Co-ordinates: 460393.00 mE Checked By:

Client: **EWR Alliance** 223026.00 mN Approved By: RS WSP|Parsons Brinckerhoff

Ground Level:

Log Status: **FINAL** Date Started: 03/05/2016 Orientation: 090 deg. Print Date: 10/10/2016 04/05/2016 Inclination: Final Denth

Date Started. 03/03/201	0				Onematio	11.				090 u	ieg. Fili	ii Dai	С.		10/10/	2010
Date Completed: 04/05/201	16				Inclination	1:				90 d	leg. Fin	al Dep	pth:		20	0.00m
			Donth			Samn	lina C	orina	and In S	itu Toet	tina		тсп			
			Depth (Thick-	Level		Samp	IIIIg, C	Uning	anu m 3	ilu iesi	ınıg	_	TCR SCR	If min If ave		Well/
Stratum Desc	cription	Legend	ness)	(m)	Depth		Dia	Rec	Blows	<b>T</b>	T			If ave	Water	Backfil
			(m)	()	(m)	Туре	(mm)	%	(mins)	Test	Test Result	Units	%	(mm)		l
[CORNBRASH LIMESTONE FO	DEMATIONI	+ -	()				1									
	portion of fossil fragments.	/	<b>t</b>													
Strong grey fossiliferous LIMES		/ 🗀 🗀	_													
grey clayey gravelly coarse SAN			L													
Gravel is subrounded, coarse of			+													
Discontinuities: Widely spaced,			t													
degrees), planar, open, rough.	Subilionzoniai (6-13	Т'Т	<b>-</b>		10 20 11 70	С		100					100	20		
[CORNBRASH LIMESTONE FO	DEMATIONI		<del>(2</del> .10)		10.20 - 11.70 10.20 - 11.70			100					62 62	160		
[CORNBRASH LIMESTONE FC	DRIVIATION				10.20 - 11.70	l ICC							02	300		
			+		11.20 - 11.40	С										
			t													
		Т'Т	1													
			]-													
			Ŧ.													
Stiff thinly laminated green grey	silty CLAY		<del>1</del> 2.00	58.60												
[CORNBRASH LIMESTONE FO		X	F													
	portion of fossil fragments.		(0.60)										100			
12:00 12:00 2011	person er reces magnierse.	×_^_	L		11.70 - 13.20			100					24			
Strong light grey fossiliferous LII	MESTONE	==	12.60	58.00	11.70 - 13.20	RC							24			
		<del></del>	12.75	57.85												
[CORNBRASH LIMESTONE FO			-													
Stiff thinly laminated green grey		$\hat{\Box}$	13.00	57.60												
[CORNBRASH LIMESTONE FO			I													
12.75 - 13.00m : Low proport		ΙЩ	₽											00		
Strong grey fossiliferous LIMES	pyrite growth.	/ <del>                                    </del>	(1.06)		13.32 - 13.66	l c								30 215		
			+(1.00)											400		
Widely spaced, subhorizontal (6 filled, rough to smooth.	5-9 degrees), open to clay												100	100		
	DMATIONI		ᅪ		13.20 - 14.70	C		100					56			
[CORNBRASH LIMESTONE FO		<del></del>	14.06	56.54	13.20 - 14.70			100					53			
Stiff thinly laminated grey silty C		×	+		10.20	''										
[CORNBRASH LIMESTONE FO		×_×_	上													
14.06 - 15.10m : Low pro	portion of fossil fragments,	<u>×</u> ×	T													
			(1.04)													
		×	F													
		×	+													
		×	15.10	55.50												
Strong light grey fossiliferous LII			15.25	55.35												
[CORNBRASH LIMESTONE FO		/ <u>×</u> —	(0.30)	00.00									100			
Stiff thinly laminated greenish gr		×	15.55	55.05	14.70 - 16.20			100					40			
[CORNBRASH LIMESTONE FO		/T_T	十10.00	33.03	14.70 - 16.20	RC							20			
Moderately strong dark grey fos			15.82	54.78												
[CORNBRASH LIMESTONE FO		\( \sigma_{\sigma} \)	16.00	54.60												
	: High proportion of sand.		10.00	54.60												
Stiff thickly laminated greyish gr			+													
Gravel is subrounded, fine to me			<b>_</b>		16.20 - 16.45	С										
[CORNBRASH LIMESTONE FO		/	<u> </u>											40		
Strong light grey fossiliferous LII			(1.20)											320		
Discontinuities: Widely spaced,	`		+										100	600		
degrees), undulating to planar, of			t		16.20 - 17.70	С		100					55			
[FOREST MARBLE FORMATIO	NJ		<b>-</b>		16.20 - 17.70								43		1	
Weak grey fossiliferous SILTST	ONE.	××××	17.20	53.40											1	
FOREST MARBLE FORMATIO		/÷ · -•	17.35	53.25												
Stiff dark green mottled yellow b		' <u>  </u>	t													
Gravel is subrounded, fine of lim			F										$\sqcup$			
[FOREST MARBLE FORMATIO			(1.05)													
17.35 - 18.40m : Moderate pro																
17.00 To. Tom: Moderate pro	and pyrite growth.	<u>:</u> : <u>:</u>	-													
	and pyrito growth.		t										100			
Strong white area for a life area.	IMESTONE	-	18.40	52.20	17.70 - 19.20	С		100					100 49		-	
Strong white grey fossiliferous L			L		17.70 - 19.20			100					49		1	
Discontinuities: widely spaced, s		<del>                                      </del>	Ŧ		10.20										1	
degrees) to subvertical (77-84 d		+	+												1	
stepped, open, smooth to rough			T													
[WHITE LIMESTONE FORMAT			上,											30	1	
18.40 - 20.00m : Weathering ind	uicated by gypsum growth.	$\mu$	(1.60)											265 500		
		-	+										100	500	1	
		+++	t		19.20 - 20.00	С		100					100 56			
		1	1-		19.20 - 20.00			100					56		1	
			Ł		19.72 - 19.90											
		+	20.00	50.60									$\vdash$		-	
			1													i
		1		1			1				L					

Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.



Client:

Engineer:

Date Started:

#### **BOREHOLE LOG**

Ground Level:

Borehole No: RC2ABROB-D Sheet 3 of 3

Project Name: East West Rail GRIP 3

Project No: 5624

EWR Alliance

03/05/2016

WSP|Parsons Brinckerhoff

Survey Grid System: OSGB Co-ordinates: 460393.00 m

460393.00 mE 223026.00 mN

70.60 mOD

Hole Type: Checked By:

Checked By: JHS Approved By: RS

RC

1:50

Scale: Log Status:

Log Status: FINAL
Orientation: 090 deg. Print Date: 10/10/2016

e Started: 03/05/2016 e Completed: 04/05/2016				Inclination					90 d		าt Dat al De _l			10/10/ 20	).00
5 Completed: 04/03/2010				Titolination		· ·		and In S			ai De				7.00
Stratum Description	Legend	Depth (Thick- ness) (m)	Level (m)	Depth (m)	Туре	Dia (mm)	Rec		Test	Test Result	Units	TCR SCR RQD %	If min If ave If max (mm)	Water	W Bad
Borehole Terminated at 20.00m		(111)		20.00 - 20.04		()	,,	()	С	50 / 20		70	()		
		_		20.00 20.01					Ü	00720					
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Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.

Office: BAM Ritchies, Ray Lamb Way, Erith, Kent, DA8 2LB



#### **BOREHOLE INFORMATION SHEET**

Borehole No RC2ABROB-D Sheet 1 of 2

East West Rail GRIP 3 Project Name:

5624

Survey Grid System: Co-ordinates:

OSGB

RC Hole Type: Checked By: JHS

Project No: Client:

**EWR Alliance** 

460393.00 mE 223026.00 mN

Approved By: RS

Engineer: WSP|Parsons Brinckerhoff

70.60 mOD Ground Level:

Log Status: **FINAL** Date: 10/10/2016

20.00m

Date Started: 03/05/2016 Orientation:

090 deg. 90 deg. Final Depth:

Date Completed: 04/05/2016 Inclination:

Depth Related Exploratory Hole Information
Barrel Drill Bit Lead Driller Logger

		() I	T I	044		T DI-			lated Explor	atory H									
From (m) 0.00	To (		Type IP	Start 03/05/2016	End 03/05/2016	Pla Insul		Barrel N/A	Drill Bit N/A	+	Lead E Simon R		LO	gger VC	Han	d dug ins	pection pit	marks	
1.20	2.1		WLS	03/05/2016	03/05/2016	digging	g tools				Simon R			NC		dowless S			
1.20	2.	70	WLS	03/05/2016	03/05/2016	GEO					Simon K	operts	'	NC			•		
2.70	20.	04	RC	04/05/2016	04/05/2016	COMA	CCHIO				Simon R	oberts	"	NC	Rota	ary Cored	: Coordinate	es were pro	ovided by WSP/PB
						GEO	0205								usin	g a hand tracy of +	held GPS (I /-4metres. (	Samın etre Sround lev	x 10) with an
															аррі	roximate :	and are inte	rpolated, e	xploratory hole
																ed outside work Rail.		survey are	ea provided by
															IVE	work itali.			
			Boring	g-Drilling Pro	aress					Hole	Diamete	er by Depth				Casino	Diameter I	ov Denth	
Date	Tir			Casing (m)			Remar	ks	Depth (m)		(mm)		narks	Depth	n (m) Di	ia. (mm)		Rema	arks
03/05/2016			10.20	2.70	1.73	Start of End of													
04/05/2016	6 08:	00	10.20	2.70	1.75	Start													
04/05/2016	3 17:	00	20.04	2.70	2.01	End of	f shift												
													Wate	er Added	Records		-		
									From (m)	То	(m)	/olume (litres)				Rem	arks		
				Date 15							L. T ***	D.1-"					<b>=</b> 1 . =	- 6 - 71	
From (m)	To (m)	1	Depth	Related Rer	narks Remarks				From (m)		hiselling (m)	Details Ouration (hh:mm)	Tool	From	(m) To (		ing Flush D	etails Flush	Colour
1 10111 (111)	10 (111)	+			r cilial ro				1 10/11 (111)	10	(111)	ruration (IIII.IIIII)	1001	2.70	4.2	20 8	0 - 80	i iuði i	brown
														4.20	5.7	70   8	0 - 80		grey
														5.70 7.20			0 - 80 0 - 80		grey grey
														8.70	10.	20 8	0 - 80		grey
														10.2 11.7			0 - 80 0 - 80		grey grey
														13.2		70 8	0 - 80		grey
														14.7 16.2			0 - 80 0 - 80		grey grey
			18/-/-	. 01-11				1	N 4 11		4 - H - C	D' M		10.2	0 17.				grey
Date	Strike (r	n) Casina (m)		r Strikes Depth (m) Seale	ed (m)	Remarks	s	Type Pi				Pipe Work  Pipe Type	Remarks	From	(m) To (		Backfill Deta		scription
	<u> </u>	, ,	, ,	- 1				71.	,	, - (		7 1 7 7 7		0.00	1.2	20	905 Aris	ings	, i
														1.20	) 20.	00	903 Ber	itonite	
Depth (m)	Туре	N Value	Caeina /n	n) Water (m)	SWPen/mm\	Blowe1 In	Den1/mm		dard Penetr				Pen4(mm)	Blower I	Pen5/mm	Blower	Pen6/mm	Hammon	Energy Ratio%
1.20	S	N=7	0.00	Dry	0	1	75	1	75	1	75	1	75	2	75	3	75	TBC	Lifergy Ralio%
2.70	S	N=14	2.70	1.00	0	3	75	3	75	3	75	3	75	4	75	4	75	TBC	
20.00	С	50 / 20	2.70	2.01	0	25	75	0	-55	50	75	0	75	0	75	0	-205	TBC	
								1											
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Reason for Hole Termination: Scheduled depth achieved



#### **BOREHOLE INFORMATION SHEET**

Borehole No RC2ABROB-D Sheet 2 of 2

East West Rail GRIP 3 Project Name:

5624

Survey Grid System: Co-ordinates:

Hole Type: Checked By:

Date:

Project No:

**EWR Alliance** 

223026.00 mN

090 deg.

OSGB

460393.00 mE

JHS Approved By: RS

Client: Engineer:

WSP|Parsons Brinckerhoff

70.60 mOD Ground Level:

Log Status: **FINAL** 10/10/2016

RC

Date Started: 03/05/2016 Orientation:

Date   Depth Related Remarks   Depth (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To (m)   To	re provided by WSP/PI netrex 10) with an d levels are ed, exploratory hole by area provided by pth Remarks
From (m)   To (m)   To (m)   Type   Start   End   Plant   Barrel   Drill Bit   Lead Driller   Logger   Remark	re provided by WSP/PI n etrex 10) with an d levels are ed, exploratory hole ry area provided by  pth Remarks  sh Colour
1.20	re provided by WSP/PI n etrex 10) with an d levels are ed, exploratory hole ry area provided by  pth Remarks  sh Colour
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Boring-Drilling Progress  Boring-Drilling Progress  Hole Diameter by Depth  Casing Diameter by Depth (m) Dia. (mm) Remarks  Depth (m) Casing (m) Depth Water (m) Remarks  Depth (m) To (m) Volume (litres)  Prom (m) To (m) Duation (thum) To (m) Duation (thum) To (m) Remarks  Depth Related Remarks  From (m) To (m) Duation (thum) To (m) Duation (thum) To (m) Remarks  Water Strikes  Monitoring Installation Pipe Work  Backfill Details	n etrex 10) with an d levels are ed, exploratory hole y area provided by  pth Remarks  sh Colour
Boring-Drilling Progress  Boring-Drilling Progress  Hole Diameter by Depth  Casing Diameter by Depth  Date Time Depth (m) Casing (m) Depth Water (m) Remarks  Depth (m) To (m) Volume (litres)  From (m) To (m) Volume (litres)  Depth Related Remarks  Chiselling Details  From (m) To (m) Duration (thirmin) To (m) Remarks (p) Flux (m) Remarks (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Remarks (m) Flux (m) Flux (m) Remarks (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Flux (m) Fl	d levels are ed, exploratory hole ey area provided by  pth  Remarks  sh Colour
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Boring-Drilling Progress  Date Time Depth (m) Casing (m) Depth Water (m) Remarks  Depth (m) Dia. (nm) Dia. (nm) Remarks  From (m) To (m) Volume (litres)  Depth Related Remarks  From (m) To (n) Duration (ith-min) To (m) Remarks  From (m) To (m) Duration (ith-min) To (m) Remarks  Water Strikes  Monitoring Installation Pipe Work  Backfill Details	pth Remarks
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Prom (m)   To (m)   Volume (litres)   Remarks	sh Colour
Prom (m)   To (m)   Volume (litres)   Remarks	sh Colour
Prom (m)   To (m)   Volume (litres)   Remarks	sh Colour
Prom (m)   To (m)   Volume (litres)   Remarks	sh Colour
Prom (m)   To (m)   Volume (litres)   Remarks	sh Colour
From (m) To (m) Volume (litres) Remarks    Depth Related Remarks   Chiselling Details   Drilling Flush Details	sh Colour
From (m)   To (m)   Remarks   From (m)   To (m)   Duration (hh.mm)   To (m)   Returns (%)   Flux	sh Colour
From (m)   To (m)   Remarks   From (m)   To (m)   Duration (hh.mm)   To ol   From (m)   To (m)   Returns (%)   Flux	sh Colour
From (m)   To (m)   Remarks   From (m)   To (m)   Duration (hh:mm)   To (m)   Returns (%)   Flux	sh Colour
From (m)   To (m)   Remarks   From (m)   To (m)   Duration (hh.mm)   To ol   From (m)   To (m)   Returns (%)   Flux	sh Colour
From (m)   To (m)   Remarks   From (m)   To (m)   Duration (hh.mm)   To ol   From (m)   To (m)   Returns (%)   Flux	sh Colour
17.70	
Water Strikes Monitoring Installation Pipe Work Backfill Details	grey
	Ē 1
Date Strike (m) Casing (m) Time (mins)Depth (m) Sealed (m) Remarks Type Pipe ID From (m) Io (m) Dia(mm) Pipe Type Remarks From (m) Io (m) Legend	
	Description
Standard Penetration Test Results	
Depth (m) Type N Value Casing (m) Water (m) SWPen(mm) Blows1 Pen1(mm) Blows2 Pen2(mm) Blows3 Pen3(mm) Blows4 Pen4(mm) Blows5 Pen5(mm) Blows6 Pen6(mm) Han	mer Energy Ratio%
	1

Reason for Hole Termination: Scheduled depth achieved



Client:

Engineer:

Date Started:

#### **BOREHOLE LOG**

Borehole No: RC2ABROB-U Sheet 1 of 3

East West Rail GRIP 3 Project Name:

5624

Project No:

**EWR Alliance** WSP|Parsons Brinckerhoff

460379.00 mE 223048.00 mN Approved By:

OSGB

Hole Type: Checked By:

RC JHS

RS

Ground Level: 70.60 mOD Scale: 1:50

Log Status: **FINAL** 10/10/2016

11/05/2016 Orientation: 090 deg. Print Date: 13/05/2016 Inclination: 90 deg. Final Depth:

Survey Grid System:

Co-ordinates:

TOPSOIL: Soft dark brown mottled orange brown silty gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine of flint and charcoal.	lows lows nins)	Testing	inal De	TCR SCR RQD	If ave	Water	0.00m Well/
Stratum Description  Legend (Thickness) (m) (m) (m) (m) (m) (m) (m) (m) (m) (m	lows nins) Test		ult Units	SCR RQD	If ave	Water	Well/
TOPSOIL: Soft dark brown mottled orange brown silty gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine of flint and charcoal.	nins) lest	Test Res	ult Units	RQD		Water	. VVCII/
gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine of flint and charcoal.				%	If max (mm)		Backfi
Firm blue grey mottled orange brown slightly gravelly	l PID	PID 1.00	ppm				
sandy CLAY. Sand is fine to medium. Gravel is subangular to subrounded, fine of ironstone and charcoal.			φρ				
1,50 69,10 1.20 -1.65 D	PID		ppm	1			
Firm thinly laminated brown mottled yellow brown slightly sandy CLAY. Sand is fine. No recovery from 1.20-1.50m. [OXFORD CLAY - PETERBOROUGH MEMBER]  [OXFORD CLAY - PETERBOROUGH MEMBER]  [1.20 - 1.65]  [1.20 - 1.65]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]  [1.20 - 2.70]	3	5 N-3		80 80			
1.20 - 2.70 WS 113 100 [	[0]						
[OXFORD CLAY - PETERBOROUGH MEMBER] 2.60 - 4.00m : Low proportion of fossil fragments.	s	S N=14			-		
(1.40)				64 64 -			
Dense dark greyish brown silty clayey fine SAND. [KELLAWAYS FORMATION - SAND MEMBER]  4.00 - 7.20m: Low proportion of fossil fragments.					-		
4.50 - 4.70 B 4.20 - 5.70 C 4.20 - 5.70 RC 5.50 B				93 93 -			
(3.20)					-		
5.70 - 7.20 C RC 100				77 72 -			
Stiff thinly laminated dark brown silty CLAY.  [KELLAWAYS FORMATION - CLAY MEMBER]  7.20 - 9.60m: Low proportion of fossil fragments.					_		
7.20 - 8.70 C RC 100				100 100 -			
					-		
X   X   X   X   X   X   X   X   X   X				100 33 20			
Strong grey fossiliferous LIMESTONE with >3cm bands of shelly clayey medium SAND. Discontinuities: Widely							

Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.



WSP|Parsons Brinckerhoff

Engineer:

#### **BOREHOLE LOG**

Borehole No: RC2ABROB-U Sheet 2 of 3

1:50

70.60 mOD

Scale:

Project Name:East West Rail GRIP 3Survey Grid System:OSGBHole Type:RCProject No:5624Co-ordinates:460379.00 mEChecked By:JHS

Client: EWR Alliance 223048.00 mN Approved By: RS

Ground Level:

 Date Started:
 11/05/2016
 Orientation:
 Description:
 Log Status:
 FINAL

 090 deg.
 Print Date:
 10/10/2016

Date Completed: 13/05/2016				Inclination	1:				90 d	eg. Fin	al De	pth:		20	0.00m
		Depth			Sampl	ing, C	oring	and In S	itu Test	ting		TCR	If min		
Stratum Description	Legend	(Thick- ness) (m)	Level (m)	Depth (m)	Туре	Dia (mm)	Rec %	Blows (mins)	Test	Test Result	Units	SCR RQD %	If ave If max (mm)	Water	Well/ Backfi
spaced, subhorizontal (9-15 degrees) undulating open rough.		-													
[CORNBRASH LIMESTONE FORMATION]		-													
		Ŧ													
		E		10.60 - 10.87	С		400					87			
		-		10.20 - 11.70 10.20 - 11.70			100					69 66	40		
		(2.80)											305 570		
		E													
		‡													
		E													
		E										80			
Stiff greenish grey slightly gravelly CLAY. Gravel is		12.40	58.20	11.70 - 13.20			100					43			
subrounded, medium to coarse of limestone. [CORNBRASH LIMESTONE FORMATION]		(0.50)		11.70 - 13.20 12.40 - 12.63								41			
Strong grey LIMESTONE.		12.90 13.00	57.70 57.60												
CORNBRASH LIMESTONE FORMATION] Stiff greenish grey silty CLAY.	/ <u>×</u> _×_	(0.45)	37.00												
[CORNBRASH LÍMESTONE FORMATION]	XX	13.45	57.15												
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		-		13.50 - 13.80	С								45		
with a 15cm band of soft shelly sandy CLAY from		(0.75)		13.20 - 14.70	С		100					100 27	188 330		
13.90-14.05m. Sand is fine. Discontinuities: Widely spaced, subhorizontal (10-13 degrees), undulating,		14.20	56.40	13.20 - 14.70			100					20	000		
open, rough.	/×_×_	-14.20	30.40												
Firm thinly laminated greyish brown silty CLAY.	<u>×_×</u>	F													
[CORNBRASH LIMESTONE FORMATION]	<u>×_×</u>	E													
	<u>×</u> _×	(1.54)		15.00	D										
	<u>×</u> _×	<u> </u>										83			
	<u>×</u> _×	E		14.70 - 16.20 14.70 - 16.20			100					9			
Strong brownish grey LIMESTONE.	X	15.74	54.86												
[CORNBRASH LIMESTONE FORMATION]		15.90	54.70												
Firm brownish grey silty CLAY. [FOREST MARBLE FORMATION]	FŦ	16.20	54.40												
Strong pale green to pale grey fossiliferous LIMESTONE. Discontinuities: Widely spaced, subhorizontal (7-10		Ł													
degrees) to subvertical (78 degrees), planar to stepped,		‡		16.38 - 16.96	С								70		
open, rough. [FOREST MARBLE FORMATION]		(1.25)		16.20 - 17.70	С		100					100 80	325 580		
		}		16.20 - 17.70	RC							61			
	X	17.45	53.15												
Firm grey brown becoming dark brown at 17.60m silty CLAY.	<u>×_×</u>	(0.55)													
[FOREST MARBLE FORMATION]  17.45 - 18.00m : High proportion of fossil fragments.	<u>×</u> ×	E													
Very weak thinly laminated dark green mottled orange		18.00 (0.30)	52.60												
brown MUDSTONE. Non-intact from 18.00-18.30m. Weathering indicated by desiccated nature.	F	18.30	52.30	17.70 10.20	С		100					100 29			
[FOREST MARBLE FORMATION]  18.00 - 18.30m : Pyrite growth present.	H	‡		17.70 - 19.20 17.70 - 19.20	RC		100					29			
Strong white grey mottled green LIMESTONE. Non-intact		E		18.65 - 18.80	С										
from 18.90-19.20m. Discontinuities: Widely spaced, subhorizontal (8-13 degrees), planar to undulating, open,		(1.70)											NI 200		
rough.		¥'''											400		
[WHITE LIMESTONE FORMATION]		F		19.20 - 20.00	С		100					100 94			
	H	1		19.20 - 20.00			'30					94			
		20.00	50.60											-	
			1												1

Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.



Engineer:

Date Started:

#### **BOREHOLE LOG**

Ground Level:

Borehole No: RC2ABROB-U Sheet 3 of 3

RC

JHS

Project Name: East West Rail GRIP 3

11/05/2016

WSP|Parsons Brinckerhoff

Project No: 5624

Client: EWR Alliance

All'anna

Survey Grid System: OSGB
Co-ordinates: 460379.00 mE

460379.00 mE 223048.00 mN

70.60 mOD

Checked By:

Hole Type:

Approved By: RS

Scale: 1:50 Log Status: FINAL

Orientation: 090 deg. Print Date: 10/10/2016

oleted: 13/05/2016				Inclination					90 d		al De _l			20	0.0
Stratum Description	Legend	Depth (Thick-	Level	D. H				and In S	itu Test	ting Test Result		TCR SCR	If min If ave	Water	В
	Legend	ness) (m)	(m)	Depth (m)	Туре	Dia (mm)	Rec %	Blows (mins)	Test		Units	RQD %	If max (mm)	vvater	В
Borehole Terminated at 20.00m		_		20.00 - 20.03					С	50 / 20					
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Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.

Office: BAM Ritchies, Ray Lamb Way, Erith, Kent, DA8 2LB



#### **BOREHOLE INFORMATION SHEET**

Borehole No RC2ABROB-U Sheet 1 of 2

East West Rail GRIP 3 Project Name:

WSP|Parsons Brinckerhoff

Survey Grid System: OSGB Hole Type:

Project No:

5624

Co-ordinates:

Checked By: Approved By:

Client: Engineer: **EWR Alliance** 

223048.00 mN 70.60 mOD Ground Level:

460379.00 mE

Log Status: **FINAL** 

RC

JHS

RS

10/10/2016 Date:

Date Started: 11/05/2016 Orientation:

090 deg. 90 dea

Dept   Feeliste   Dept   Dep	ate Start	tea:		1/05/20	010					Orienta	ation:			U	90 deg.				
Marrier   Torigon   Tori	ate Com	pleted	: 1	3/05/20	)16										90 deg.	Fin	al Dept	h:	20.00n
1.20	Erom (m)	To /-	m)	Type	Stort	End	Diont							ager				lemarke	
2.70	0.00			IP IP									LC	NC	Hand	dug insp			
2.70				MI C			digging tools			Cin	non Dob	orto			Minde	oudooo C	amala		
Building Progress	1.20	2.7	١ ا	WLS	11/05/2016	11/05/2016				Sin	non Rob	erts		NC	vvinac	owiess Sa	ampie		
Boring-Drilling Progress	2.70	20.0	)3	RC	12/05/2016	13/05/2016	COMACCHIO			Sin	non Rob	erts		NC					
Date   Time   Depth (m)   Casing (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (m)   Depth (							GEO205								using	a hand h acv of +/-	neld GPS -4metres	(Gamın etre Ground lev	x 10) with an
Both															appro	ximate a	nd are inte	erpolated, e	xploratory hole
Boring-Orilling Progress																	the LiDAF	R survey are	a provided by
Date   Time															, telwi	one reall.			
Date   Time																			
Date   Time		1		Borin	a-Drillina Pro	aress				Hole Dia	ameter h	ov Denth		1		Casing	Diameter	by Denth	
	Date							arks	Depth (m)				narks	Depth	(m) Dia				ırks
17:00				2 70	2.70	1.00													
	12/05/2016	08:0	00	2.70	2.70	1.00	Start of shift												
	12/05/2016																		
Prom (m)   To (m)   Volume (itres)   Remarks   Chiselling Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Drilling Flush Details   Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush D	3/05/2016				2.70	4.14													
Prom (m)   To (m)   Volume (itres)   Remarks   Chiselling Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Details   Drilling Flush Drilling Flush Details   Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush Drilling Flush D																			
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Strike (m)   Casing (m)   Time (mins)   Depth (m)   Sealed (m)   Remarks   Type   Pipe   D   From (m)   To (m)   Dia(mm)   Pipe Type   Remarks   From (m)   To (m)   Dia(mm)   Pipe Type   Remarks   From (m)   To (m)   Dia(mm)   Pipe Type   Remarks   Pen5 (mm)   Remarks   Pen5 (mm)   Pipe Type   Remarks   Pen5 (mm)   Pipe Type   pe Type Type Type Type Type Ty	orri (m)	10 (M)	1			remarks			From (m)	10 (m	) Dura	uon (nh:mm)	1001					FIUSN	
														4.20	5.70	80	- 80		grey
Strike (m)   Casing (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Strike (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Type   N Value   Casing (m)   Water (m)   Strike (m)   Strike (m)   Strike (m)   Type   Typ																			
Strike (m)   Type   N Value   Casing (m)   Water (m)   SWPen(mm)   Blows1   Pensi (mm)   Pensi														8.70	10.20	0 80	- 80		grey
Monitoring Installation Pipe Work   Backfill Details   Date   Strike (m)   Casing (m)   Time (mins)   Depth (m)   Sealed (m)   Remarks   Type   Pipe ID   From (m)   To (m)   Dia(mm)   Pipe Type   Remarks   From (m)   To (m)   Legend   Description   Des																			
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Standard Penetration Test Results    Standard Penetration Test Results   Standard Penetration Test Results	Date	Strike (m	) Casing (m			ed (m)	Remarks	Type P					Remarks	From (	m) To (m				scription
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oth (m)         Type         N Value         Casing (m)         Water (m)         SWPen(mm)         Blows1         Pen2(mm)         Blows3         Pen3(mm)         Blows4         Pen4(mm)         Blows5         Pen5(mm)         Blows6         Pen6(mm)         Hammer         Energy Rat           1.20         S         N=3         0.00         Dry         0         1         75         0         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         1         75         75         1         75																			
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	20.00	C					25 75												
												<u> </u>							

Reason for Hole Termination: Scheduled depth achieved



#### **BOREHOLE INFORMATION SHEET**

Borehole No RC2ABROB-U Sheet 2 of 2

East West Rail GRIP 3 Project Name:

Survey Grid System: Co-ordinates:

OSGB 460379.00 mE Hole Type: Checked By:

RC JHS

Project No:

5624

223048.00 mN Ground Level: 70.60 mOD Approved By: RS **FINAL** 

Log Status: Date:

Client: **EWR Alliance** Engineer:

WSP|Parsons Brinckerhoff

Orientation:

090 deg.

10/10/2016

11/05/2016 Date Started:

Date Com	npleted:	13/05	5/2016						lination			90	deg. F	inal Dep	oth:	20.00m
From (m)	To (m	) Type	Start	End	Plant	Depth Re Barrel	Drill B	loratory l it	Lead	Driller	Lo	gger NC			Remarks	
0.00	1.20	IP	11/05/2016		Insulated digging tools	N/A	N/A			Roberts			Hand dug ir		it	
1.20	2.70	WLS	11/05/2016	11/05/2016	COMACCHIO GEO205					Roberts		NC	Windowless	Sample		
2.70	20.03	RC	12/05/2016	13/05/2016	COMACCHIO GEO205				Simon	Roberts		NC	Rotary Core	ed: Coordina	ates were pro	ovided by WSP/PB ex 10) with an
					OLO203								accuracy of	+/-4metres	. Ground leve	els are
													drilled outsi	de the LiDA	iterpolated, e AR survey are	xploratory hole ea provided by
													Network Ra	il.		
		E	l Boring-Drilling Pr							ter by Depth					er by Depth	
Date	Time	Depth (	m) Casing (m)	Depth Water (	m) Rema	arks	Depth (	m) Dia	ı. (mm)	Re	marks	Depth (m)	Dia. (mm	)	Rema	arks
							From (r	m) T	o (m)	Volume (litres		er Added Red		marks		
							1 10111 (1	, '	~ (111 <i>)</i>	.oranie (iides	7		1/6	ai No		
			epth Related Re	marke					Chieollin	ng Details		T	D.	illing Flush	. Detaile	
From (m)	To (m)	L	reptir Neiateu N	Remarks			From (r			Duration (hh:mn	n) Tool	From (m)	To (m) R	eturns (%)	Flush	Colour
												17.70 19.20		80 - 80 80 - 80		grey grey
Date	Strike (m)		Water Strikes mins) Depth (m) Sea	iled (m)	Remarks	Type Pi				n Pipe Work		From (m)	To (m)	Backfill De Legend		scription
54.0	(,	()		(11)	Tromanio	1,500		. ()	,	,po .yp.	, romano	1	,	Logona	500	Semparem
5 " ( )				Shows 4 de	la		ndard Pen				la il		ı, de	ala a	Sh.	5 5 5 5 5
Depth (m)	Type r	value Casi	ng (m) vvater (m	) SvvPen(mm) E	Blows1 Pen1(mr	n) Blows2	Pen2(mn	n) Blows	3 Pen3(	mm) Blows4	Pen4(mm)	Blows5 Pens	o(mm)  Blows	6 Penb(m	im) Hammer	Energy Ratio%
					I		1				1				-	

Reason for Hole Termination: Scheduled depth achieved



Project No:

Engineer:

Date Started:

#### **BOREHOLE LOG**

Borehole No: RC2AMF-D Sheet 1 of 3

RC

JHS

RS

East West Rail GRIP 3 Project Name:

5624

05/05/2016

Client: **EWR Alliance** 

WSP|Parsons Brinckerhoff

Co-ordinates: 223113.00 mN

Survey Grid System:

Ground Level:

460664.00 mE

OSGB

Hole Type: Checked By:

Approved By: 67.00 mOD

Scale: 1:50

Log Status: **FINAL** 

Orientation: 090 deg. Print Date: 10/10/2016

Date Completed: 09/05/2016				Inclination	:				90 d	eg. Fin	al De _l	pth:		20	0.00m
		Depth			Sampli	ing, C	oring	and In S	itu Test	ting		TCR	If min		
Stratum Description	Legend	(Thick- ness) (m)	Level (m)	Depth (m)	Туре	Dia (mm)	Rec %	Blows (mins)	Test	Test Result	Units	SCR RQD %	If ave If max (mm)	Water	Well/ Backfil
TOPSOIL: Greyish brown, slightly gravelly, slightly clayey fine to coarse SAND. Gravel is subrounded, fine of Quartz.  0.00 - 0.50m: Low proportion of rootlets.  Firm grey mottled orange brown slightly sandy CLAY.  Sand is fine.  [OXFORD CLAY - PETERBOROUGH MEMBER]		(0.50)	66.50	0.00 - 0.50 0.30	B ES				PID	0.20	ppm				
,		(1.00)		1.00	D ES				PID	0.00	ppm				
Stiff very thinly laminated brown mottled orange brown silty CLAY. [OXFORD CLAY - PETERBOROUGH MEMBER]	X X X	1.50	65.50	1.20 - 1.65 1.20 - 1.65 1.20 - 2.70	D L	113	100		S	N=8		100			
1.50 - 3.35m : Low proportion of rootlets. Soft from 2.70-3.15m.	×			1.20 - 2.70 1.20 - 2.70	RC WS	113	100	[0]				-			
	×	-	63.65	2.70 - 3.15 2.70 - 3.15	D				S	N=13		100			
Firm becoming very soft from 4.20m grey silty CLAY.  [OXFORD CLAY - PETERBOROUGH MEMBER]  3.35 - 4.55m : Low proportion of >20mm fossil fragments.  Becoming sandy at 3.75m.	× × × × × × × × × × × × × × × × × × ×	- 3.35 (1.20)	63.05	2.70 - 4.20 2.70 - 4.20 3.50	C RC D		100								
Brownish grey silty fine to medium SAND.  [KELLAWAYS FORMATION - SAND MEMBER]  4.55 - 6.70m : Moderate proportion of fossil fragments,		4.55	62.45	4.20 - 5.70 4.20 - 5.70 5.00 - 5.50	C RC B		100					100			
Stiff thinly laminated dark brown silty CLAY.  [KELLAWAYS FORMATION - CLAY MEMBER]  6.70 - 9.40m : Low proportion of fossil fragments.	X	6.70	60.30	5.70 - 7.20 5.70 - 7.20 7.00	C RC D		100					100			
Infrequent 10mm sized pockets of pyrite growth.	× × × × × × × × × × × × × × × × × × ×	(2.70)		7.20 - 8.70 7.20 - 8.70 8.00	C RC D		100					100			
	× × × × × × × - × × × × × × ×		F7.00	9.00	D							70 20			
Moderately strong dark grey fossiliferous LIMESTONE with >30mm bands of soft CLAY. Discontinuities: Widely spaced, subhorizontal (6-10 degrees), planar, open, rough.		9.40	57.60	8.70 - 10.20 8.70 - 10.20	C RC		100					10	100 225 350		

Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.



#### **BOREHOLE LOG**

Borehole No: RC2AMF-D Sheet 2 of 3

Project Name:East West Rail GRIP 3Survey Grid System:OSGBHole Type:RCProject No:5624Co-ordinates:460664.00 mEChecked By:JHS

Client: EWR Alliance 223113.00 mN Approved By: RS

Engineer: WSP|Parsons Brinckerhoff Ground Level: 67.00 mOD Scale: 1:50 Log Status: FINAL

 Date Started:
 05/05/2016
 Orientation:
 090 deg.
 Print Date:
 10/10/2016

 Date Completed:
 09/05/2016
 Inclination:
 90 deg.
 Final Depth:
 20.00m

Date Completed: 09/05/2016				inclination	:				90 a	ieg. Fin	ai De	ptn:		20	i.uum
		Depth			Sampl	ing, C	oring	and In S	itu Test	ting		TCR	If min		
Stratum Description	Legend	(Thick- ness) (m)	Level (m)	Depth (m)	Туре	Dia (mm)	Rec %	Blows (mins)	Test	Test Result	Units	SCR RQD %	If ave If max (mm)	Water	Well/ Backfi
[CORNBRASH LIMESTONE FORMATION]		-40.00	50.00												
Strong grey becoming white grey at 10.90m fossiliferous LIMESTONE. Discontinuities: Widely spaced, subhorizontal (9-13 degrees), stepped to undulating, open, rough.  [CORNBRASH LIMESTONE FORMATION]		-10.20 - - - -(1.00) - -	56.80	10.20 - 11.70 10.20 - 11.70			100					100 80 72	80 440 800		
Soft dark grey silty gravelly CLAY. Gravel is subrounded, coarse of limestone. [FOREST MARBLE FORMATION]	×	_11.20 _ _(0.50)	55.80	10.86 - 11.06	С										
11.20 - 11.70m : High proportion of fossil fragments.		11.70	55.30										40		
Strong light grey fossiliferous LIMESTONE.		(0.40)											170		
Discontinuities: Widely spaced, subhorizontal (8-10 degrees) to subvertical (80-84 degrees), planar to		 _12.10	54.90										300		
undulating, open, smooth.	<u> </u>	- -12.30	54.70									100			
[FOREST MARBLE FORMATION]	/==	- -12.50	54.50	11.70 - 13.20			100					35			
Very stiff dark brownish grey CLAY. [FOREST MARBLE FORMATION] Moderately strong light grey calcareous MUDSTONE.	<u>×</u> _×	_ _(0.50) _		11.70 - 13.20	RC							23			
[FOREST MARBLE FORMATION]		13.00	54.00												
Stiff thinly laminated dark grey silty CLAY. [FOREST MARBLE FORMATION] Strong grey fossiliferous LIMESTONE with >50mm		- - - (1.10)		13.28 - 13.50	С								20 235		
bands of soft grey shelly CLAY. Discontinuities: Medium spaced, subhorizontal (8-11 degrees), planar, open, rough.				13.20 - 14.70	С		100					87 43	450		
[FOREST MARBLE FORMATION]  13.50 - 13.70m : No recovery. Stiff thinly laminated dark grey silty CLAY.	X	 _14.10 	52.90	13.20 - 14.70			100					24			
[FORESŤ MARBLE FORMAŤION]	×														
Strong light grey fossiliferous LIMESTONE. [WHITE LIMESTONE FORMATION] Dense dark grey clayey fine to coarse SAND.		15.20 (0.30) 15.50	51.80 51.50	15.23 - 15.47 14.70 - 16.20 14.70 - 16.20			100					100 25 23			
[WHITE LIMESTONE FORMATION] 15.50 - 16.00m : Moderate proportion of fossil fragments.  Strong white grey LIMESTONE. Discontinuities: Widely		(0.50) - - 16.00	51.00												
spaced, subhorizontal (10-15 degrees) to subvertical (70-80 degrees), planar to undulating, open, rough. [WHITE LIMESTONE FORMATION]												100	10 230 450		
		_		16.20 - 17.70 16.20 - 17.70			100					100 38 33	100		
Dense dark green clayey fine SAND. [WHITE LIMESTONE FORMATION]		-17.30 - - - - - - (1.15)	49.70												
Light brown silty clayey GRAVEL. Gravel is subangular,	, x,		48.55	17.70 - 19.20 17.70 - 19.20			100					100 30 30			
coarse of mudstone.  [WHITE LIMESTONE FORMATION]  Strong light grey fossiliferous LIMESTONE.  Discontinuities: Medium spaced, subhorizontal (6-8		-18.70 - - - - -	48.30	18.74 - 19.00	С								250		
degrees), planar, open, rough. [WHITE LIMESTONE FORMATION]		(1.30)		19.20 - 20.00 19.20 - 20.00			100					100 100 100	250 325 800		
		_ <del>-2</del> 0.00	47.00												
														_	

Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.



Engineer:

Date Started:

#### **BOREHOLE LOG**

Survey Grid System:

Borehole No: RC2AMF-D Sheet 3 of 3

East West Rail GRIP 3 Project Name:

5624

05/05/2016

Project No: Client: **EWR Alliance**  Co-ordinates:

OSGB 460664.00 mE

Hole Type: Checked By:

JHS RS

RC

WSP|Parsons Brinckerhoff Ground Level: 223113.00 mN Approved By: 67.00 mOD

Scale: 1:50

Log Status:

**FINAL** 

Orientation: 090 deg. Print Date: 10/10/2016

ompleted: 09/05/2016				Inclination					90 d		al Dep			20	0.00
		Depth (Thick- ness)	Level		Sampli	1		and In S	itu Test	ing		TCR	If min		W
Stratum Description	Legend	ness) (m)	(m)	Depth (m)	Туре	Dia (mm)	Rec %	Blows (mins)	Test	ting Test Result	Units	RQD %	If ave If max (mm)	Water	Ba
Borehole Terminated at 20.00m		- ,		20.00 - 20.05					С	50 / 30					
		-													
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Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.

BAM Ritchies, Ray Lamb Way, Erith, Kent, DA8 2LB



#### **BOREHOLE INFORMATION SHEET**

Borehole No RC2AMF-D Sheet 1 of 2

Project Name: East West Rail GRIP 3 Survey Grid System:

**OSGB** 460664.00 mE

223113.00 mN

Hole Type:

Project No:

Engineer:

5624

Co-ordinates:

Checked By: JHS Approved By: RS

Client:

**EWR Alliance** 

WSP|Parsons Brinckerhoff

Ground Level: 67.00 mOD

FINAL Log Status:

RC

20.00m

Date: 10/10/2016

05/05/2016 Date Started:

Orientation:

90 deg. Final Depth:

090 deg. Date Completed: 09/05/2016 Inclination:

Depth Related Exploratory Hole Information

Barrel Drill Bit Lead Driller

N/A N/A Simon Roberts From (m) 0.00 To (m) 1.20 Start 05/05/2016 End 05/05/2016 Plant Remarks Type IP Logger NC Insulated digging tools COMACCHIO Hand dug inspection pit 1.20 05/05/2016 05/05/2016 Simon Roberts NC GEO205 COMACCHIO Rotary Cored: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are interpolated, exploratory hole drilled outside the LiDAR survey area provided by 2.70 20.05 RC 05/05/2016 09/05/2016 Simon Roberts NC GEO205 Network Rail.

		Borin	g-Drilling Pro	gress				Hole Diame	ter by Depth			Casing	Diameter by Depth
Date	Time	Depth (m)	Casing (m)	Depth Water (m	) Rema	arks	Depth (m)	Dia. (mm)	Rem	narks	Depth (m)	Dia. (mm)	Remarks
05/05/2016	07:30				Start of shift								
05/05/2016	17:00	11.70	2.70	2.22	End of shift								
06/05/2016	08:00	11.70	2.70	2.00	Start of shift								
06/05/2016	14:00	16.20	2.70	2.89	End of shift								
09/05/2016	08:00	16.20	2.70	3.02	Start of shift								
09/05/2016	17:00	20.05	2.70	4.44	End of shift								
										10/-1-	. A data d D		
											r Added Reco		
							From (m)	To (m)	Volume (litres)			Rema	arks
		Depti	h Related Rei	marks				Chisellin	g Details			Drilli	ing Flush Details

		Бер	iii i (Ciaicc	i i temant	3				OH	3CIIII IG	Details				Drilling r lus	on Details	
From (m)	To (m)			Rem	narks		Fr	om (m)	To (n	1) D	uration (hh:mm)	Tool	From (m)	To (m)	Returns (%)	Flush	Colour
													2.70	4.20	80 - 80		grey
													4.20	5.70	80 - 80		grey
													5.70	7.20	80 - 80		grey
													7.20	8.70	80 - 80		grey
													8.70	10.20	80 - 80		grey
													10.20	11.70	80 - 80		grey
													11.70	13.20	80 - 80		grey
													13.20	14.70	80 - 80		grey
													14.70	16.20	80 - 80		grey
													16.20	17.70	80 - 80		grey
		Wa	ter Strikes	3			-				Pipe Work				Backfill [	Details	
Date	Strike (m)	Casing (m) Time (mins	Depth (m)	Sealed (m)	Remarks	Type	Pipe ID	From (m)	To (m)	Dia(mm	Pipe Type	Remarks	From (m)	To (m)	Legend	Des	cription

•	•	Wate	er Strikes	3							Pipe Work				Backfill	Details
Date Strike (m	) Casing (m)	Time (mins)	Depth (m	Sealed (m)	Remarks	Type	Pipe ID	From (m)	To (m)	Dia(mm)	Pipe Type	Remarks	From (m)	To (m)	Legend	Description
			•										0.00 1.20	1.20 20.00	905	Arisings Bentonite

ŀ		_								Sta	andard	Penetra	tion Tes	t Results								
Ī	Depth (m)	Туре	N Value	Casing (r	n) Water	(m) SWF	en(mm)	Blows1	Pen1(mm)	Blows	2 Pen2	2(mm) E	3lows3	Pen3(mm)	Blows4	Pen4(mm)	Blows5	Pen5(mm)	Blows6	Pen6(m	m) Hammer	Energy Ratio%
-	1.20 2.70 20.00	S S C	N=8 N=13 50 / 30	0.00 2.70 2.70	0.00 Dry 4.44	)	0 0 0	1 5 25	75 75 75 75	1 4 0	1 7	75 75 75 55	2 3 50	75 75 75 75	2 4 0	75 75 75 75	2 3 0	75 75 75 75	2 3 0	75 75 -195	TBC TBC TBC	Ellergy Ivalio //

Reason for Hole Termination: Scheduled depth achieved



#### **BOREHOLE INFORMATION SHEET**

Borehole No RC2AMF-D Sheet 2 of 2

Project Name: East West Rail GRIP 3

Survey Grid System:

OSGB Hole Type:

Project No:

Date Completed:

From (m) 0.00 5624

Co-ordinates:

Checked By:

Final Depth:

Client: Engineer:

EWR Alliance

WSP|Parsons Brinckerhoff

Start 05/05/2016 End 05/05/2016 223113.00 mN Ground Level: 67.00 mOD

460664.00 mE

Approved By: RS

Log Status: Date: FINAL 10/10/2016

20.00m

RC

JHS

Date Started: 05/05/2016

To (m)

09/05/2016 Inclination:

Plant

Orientation: 090 deg. Inclination: 90 deg.

Depth Related Exploratory Hole Information

Barrel Drill Bit Lead Driller Logger Remarks

N/A N/A Simon Roberts NC Hand dug inspection pit

0.00	1.2	0	ĬΡ	05/05/2016	05/05/201	6 Insulated	N/A		N/A	Simon	Roberts	1	NC	Hand dug	ginspection	pit	
1.20	2.70	0	WLS	05/05/2016	05/05/201	digging tools COMACCHIO				Simon	Roberts		NC	Windowle	ess Sample		
2.70	20.0	05	RC	05/05/2016	09/05/201	GEO205				Simon	Roberts	1	NC	approxim	ate and are tside the Li□	nates were pro PS (Gamin etrex es. Ground leve interpolated, ex AR survey area	vided by WSP/PB : 10) with an Is are ploratory hole a provided by
			Borin	g-Drilling Pr	ogress					Hole Diame	ter by Depth			Ca	sing Diame	ter by Depth	
Date	Tim	е			Depth Wate	r (m) Rema	ırks	De	pth (m)	Dia. (mm)		marks	Depth (m)			Remai	ks
												Wate	er Added Red	cords	•		
								Fro	om (m)	To (m)	Volume (litres	(*)		F	Remarks		
			Depti	Related R	emarks	'				Chisellin	ng Details	•			Drilling Flus	h Details	
From (m)	To (m)				Remarks			Fro	om (m)		Duration (hh:mm	n) Tool	From (m)	To (m)	Returns (%)		Colour
													17.70 19.20	19.20 20.00	80 - 80 80 - 80		grey grey
		'		er Strikes				'	Monito	ring Installatio	n Pipe Work	-			Backfill [	Details	
Date	Strike (m	) Casing	(m) Time (mins)	Depth (m) Se	aled (m)	Remarks	Type P	ipe ID	From (m)	To (m) Dia(n	nm) Pipe Type	Remarks	From (m)	To (m)	Legend	Des	cription
Depth (m)	Туре	N Valu	ue Casing (i	n) Water (n	)) SWPen(mm	Blows1  Pen1(mr				tion Test Resultions Pen3(		Pen4(mm) i	Blows5 Pens	5(mm) Blo	ws6  Pen6(i	mm) Hammer	Energy Ratio%

Reason for Hole Termination: Scheduled depth achieved



#### **BOREHOLE LOG**

Borehole No: RC2AMF-U Sheet 1 of 3

RC

JHS

 Project Name:
 East West Rail GRIP 3
 Survey Grid System:
 OSGB
 Hole Type:

 Project No:
 5624
 Co-ordinates:
 460672.00 mE
 Checked By:

 Project No:
 5624
 Co-ordinates:
 460672.00 mE
 Ch

 Client:
 EWR Alliance
 223149.00 mN
 Ap

223149.00 mN Approved By: RS
Ground Level: 67.80 mOD Scale: 1:50

 Engineer:
 WSP|Parsons Brinckerhoff
 Ground Level:
 67.80 mOD
 Scale:
 1:50

 Log Status:
 FINAL

 Date Started:
 10/05/2016
 Orientation:
 090 deg.
 Print Date:
 10/10/2016

Date Completed: 11/05/2016 Inclination: Final Depth: 20.00m 90 dea Sampling, Coring and In Situ Testing Depth If min Well/ (Thick Level SCR Stratum Description Depth Dia Rec Blows RQD ness) Backfil Test Result Units (mm) (m) % TOPSOIL: Soft dark brown mottled orange brown silty gravelly sandy CLAY. Sand is fine to medium. Gravel is (0.50) 0.30 ES subangular to subrounded, fine to medium of charcoal PID 0.40 ppm -0.50 67.30 0.50 D Soft blue grey mottled orange brown silty sandy gravelly <u>. ۲</u> CLAY. Sand is fine. Gravel is subrounded, fine of <u>১</u>ং ironstone and charcoal. 1.00 [OXFORD CLAY - PETERBOROUGH MEMBER] 1.00 ES <u>×</u> (1.40) PID 0.00 ppm <u>></u>¢ 1 20 - 1 65 D S 1.20 - 1.65 N=8 <u>.</u> ٥٥ 100 - 1.90 65.90 Firm thinly laminated silty sandy CLAY. Sand is medium. [OXFORD CLAY - PETERBOROUGH MEMBER] 100 1.20 - 2.70 113 1.20 - 2.70 RC Эζ. 113 100 1.20 - 2.70 WS [0] 1.90 - 2.70m : Small pockets of gypsum growth. (0.80) × 2.70 65.10 Soft grey mottled orange brown silty sandy CLAY. Sand X. D 2.70 - 3.15 [OXFORD CLAY - PETERBOROUGH MEMBER] (0.70) 2.70 - 3.15 × S N = 13100 64.40 3.40 100 Firm brownish grey very sandy CLAY. Sand is fine to 270-420 2.70 - 4.20 RC [OXFORD CLAY - PETERBOROUGH MEMBER] (0.80)3.40 - 4.20m: Low proportion of fossil fragments. D 4.00 4 20 63.60 Dense dark brown silty clayey fine to medium SAND. [KELLAWAYS FORMATION - SAND MEMBER] 4.20 - 6.40m : Low proportion of fossil fragments. 100 4.20 - 5.70 C RC 100 4.20 - 5.70 (2.20)5.00 - 6.00 В 100 61.40 5.70 - 7.20 100 Stiff very thinly laminated dark brown silty CLAY [KELLAWAYS FORMATION - CLAY MEMBER] 5.70 - 7.20 RC × × 7.00 D × × × × (2.80) 100 100 7.20 - 8.70× 7.20 - 8.70 RC 8.00 × × × D 9.00 × 9 20 58 60 100 Strong grey fossiliferous LIMESTONE with >10cm bands 26 shelly clayey GRAVEL. Gravel is subrounded, fine to 8.70 - 10.20 100 18 medium of limestone. Discontinuities: Widely spaced, RC 8.70 - 10.20subhorizontal (8-13 degrees), planar, open, rough. [CORNBRASH LIMESTONE FORMATION]

Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.



Engineer:

#### **BOREHOLE LOG**

Borehole No: RC2AMF-U Sheet 2 of 3

1:50

67.80 mOD

Scale:

East West Rail GRIP 3 RC Project Name: Survey Grid System: OSGB Hole Type: Project No: JHS 5624 Co-ordinates: 460672.00 mE Checked By:

223149.00 mN Client: **EWR Alliance** Approved By: RS WSP|Parsons Brinckerhoff

Ground Level:

Log Status: **FINAL** Date Started: 10/05/2016 Orientation: 090 deg. Print Date: 10/10/2016

Date Started. 10/05/2016				Orientatio	11.				090 0	eg. Pili	it Date	e.		10/10/	2016
Date Completed: 11/05/2016				Inclination	:				90 d	eg. Fina	al Dep	oth:		20	.00m
		Depth			Samni	ina C	orina	and In S	itu Toe	tina	$\neg$	TCR			
		(Thick-	Level		Campi	IIIg, O	- Ining		110 103	,g	$\overline{}$	SCR	If min If ave		Well/
Stratum Description	Legend	ness)	(m)	Depth	Туре	Dia	Rec	Blows	Test	Test Result	Units		If max	Water	Backfil
		(m)		(m)	.,,,,	(mm)	%	(mins)		Took Freedom	00	%	(mm)		
Strong grey fossiliferous LIMESTONE with >10cm bands		_													
shelly clayey GRAVEL. Gravel is subrounded, fine to	HH	┢								'					
medium of limestone. Discontinuities: Widely spaced,	H-	F								'					
subhorizontal (8-13 degrees), planar, open, rough.		✝													
[CORNBRASH LIMESTONE FORMATION]	$\Box$	F								'					
		Ł		10.65 - 10.95	С					'		100	20		
		(2.80)		10.20 - 11.70	C		100			'		73	320		
		<u>t</u>		10.20 - 11.70	RC					'		69	620		
		⊦								'					
		Ł								'					
		-								'					
	$\perp$	F								'					
	H	+,,,,,	00							'					
Firm thinly laminated brownish grey silty CLAY.	×	12.00	55.80							'					
[FOREST MARBLE FORMATION]	×_^_	⊦								'					
12.00 - 13.00m : Low proportion of fossil fragments.	<u>×</u> _×	F		11.70 - 13.20	С		100			'		89 17			
		<del>[(</del> 1.00)		11.70 - 13.20			100			'		13			
	<u>×</u> _×	F		11110 10.20	''					'					
	×	L		İ						1					
Madaustali, atraca light area fassiliferana I IMECTONIC	X	13.00	54.80												
Moderately strong light grey fossiliferous LIMESTONE. Discontinuities: Closely spaced, subhorizontal (10-12		Ė											40		
degrees), planar to stepped, open, rough.	$\Box$	(0.55)								'			55		
[FOREST MARBLE FORMATION]		<u> </u>								'			70		
Stiff thinly laminated dark brown silty CLAY.		13.55	54.25												
[FOREST MARBLE FORMATION]	×	(0.35)										100			
13.55 - 13.90m : Low proportion of fossil fragments.	严重	13.90	53.90	13.20 - 14.70	С		100			'		20	10		
Very strong grey LIMESTONE. Discontinuities: Closely		14.10	53.70	13.20 - 14.70	RC					'		8	10 85 160		
spaced, subhorizontal (10-14 degrees), stepped to	× ×	t								'					
undulating, tight, rough.	×	(0.60)								'					
[FOREST MARBLE FORMATION]															
Stiff thinly laminated dark brown silty CLAY.		14.70 14.80	53.10												
[FOREST MARBLE FORMATION]	×	<del>+</del> 14.80	53.00							'					
14.40 - 14.70m : Low proportion of fossil fragments.	$/\!\!/\!\!\!/ \times$	15.05	52.75							'					
Very strong dark grey fossiliferous LIMESTONE. [FOREST MARBLE FORMATION]	$H \rightarrow T$									'					
Stiff thinly laminated dark brown silty CLAY.	//	⊦		15.20 - 15.50	С					'		100	50		
[WHITE LIMESTONE FORMATION]	HH	(0.95)		14.70 - 16.20	С		100					51	100		
Strong light grey fossiliferous LIMESTONE with >5cm	' <del>                                    </del>	T(0.00)		14.70 - 16.20	RC							35	150		
bands of shelly clayey fine SAND. Discontinuities:		}-													
Medium spaced, subhorizontal (10-15 degrees),	<u></u>	16.00	51.80							'					
undulating to planar, open to clay filled, smooth to rough.	1×	10.00	01.00							'					
\[WHITE LIMESTONE FORMATION]	/ <u>×_</u> ×_	(0.65)								'					
Stiff thinly laminated dark brown silty CLAY. No recovery	$\overline{\times}$	F(0.03)								'					
16.20-16.50m.	×	16.65	51.15												
[WHITE LIMESTONE FORMATION]		10.00	51.15												
16.00 - 16.65m : Moderate proportion of fossil fragments.	/	+		16.20 - 17.70	С		100			1		80 40	NI		
Strong white grey fossiliferous LIMESTONE.		(0.75)		16.20 - 17.70			100			'		37	15		
Discontinuities: Closely spaced, subvertical (80-85 degrees), tight to open, rough.		}-								'			30		
[WHITE LIMESTONE FORMATION]	4	17.40	50.40							'					
Dense dark green slightly clayey fine SAND.		-								'					
[WHITE LIMESTONE FORMATION]		(0.50)								'					
[		17.90	49.90												
Strong green to white grey fossiliferous LIMESTONE.		17.90	49.90	17.07.40.4-						1					
Discontinuities: Medium spaced, subhorizontal (7-13		t		17.97 - 18.17	С					1					
degrees), planar to undulating, open, rough.		}		1						1		100			
[WHITE LIMESTONE FORMATION]		Ł		17.70 - 19.20			100			1		54			
		+		17.70 - 19.20	RC					1		50			
		F		İ						1			40		
		(2.10)								1			140		
		† ´								1			240		
		Į.								1					
		+		[						1		100			
		T		19.20 - 19.85			400			1		100			
		Ł		19.20 - 20.00 19.20 - 20.30			100			1		100			
		+_		20.00						1					
		<del>2</del> 0.00	47.80	[						1					
										L	$ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{ld}}}}}}}}}$				

Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.



Engineer:

#### **BOREHOLE LOG**

Borehole No: RC2AMF-U Sheet 3 of 3

East West Rail GRIP 3 Project Name:

WSP|Parsons Brinckerhoff

Survey Grid System: 5624 Co-ordinates:

OSGB 460672.00 mE

RC Hole Type: JHS Checked By:

Approved By:

Project No: Client: **EWR Alliance** 

223149.00 mN 67.80 mOD

Scale: 1:50

Ground Level:

Log Status: **FINAL** 

RS

Date Started: 10/05/2016 Orientation: 090 deg. Print Date: 10/10/2016 Date Completed: 11/05/2016 Inclination: 90 deg Final Depth: 20.00m

Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Depth (Photes)   Dept	Very dense dark grey silty fine SAND.  IWHITE LIMESTONE FORMATION!  20.00 - 20.04  C 50 / 20  C 50 / 20	Date Completed: 11/05/2016			Inclination	:				90 d	leg. Fin	al De	pth:		20	0.00m
Very dense dark grey silty fine SAND.  INHITE LIMESTONE FORMATION!  C 50 / 20	Very dense dark grey silty fine SAND.  IWHITE LIMESTONE FORMATION!  20.00 - 20.04  C 50 / 20  C 50 / 20		Depth			Sampli	ing, C	oring	and In S	itu Tes	ting		TCR	If min		147.1
Very dense dark grey silty fine SAND.   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.30)   (20.	Very dense dark grey silly fine SAND.  WHITE LIMESTONE FORMATION] 20.00 - 20.30m - High proportion of fossil fragments.  Borehole Terminated at 20.00m  47.50  47.50  C 50/20  C 50/20		ness)		Depth (m)	Туре	Dia (mm)	Rec %	Blows (mins)	Test	Test Result	Units	RQD %	If ave If max (mm)	Water	Back
		Very dense dark grey silty fine SAND. WHITE LIMESTONE FORMATIONI	(Thick- ness) (m)	(m)	Depth (m)	Туре				Test	Test Result	Units	SCR RQD %	If ave If max (mm)	Water	We Back

Stratum depths measured along borehole axis.

Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.

BAM Ritchies, Ray Lamb Way, Erith, Kent, DA8 2LB



#### **BOREHOLE INFORMATION SHEET**

Borehole No RC2AMF-U

East West Rail GRIP 3 Project Name:

Survey Grid System:

Sheet 1 of 2

Project No:

Engineer:

5624

Co-ordinates:

Checked By:

Hole Type:

Client:

**EWR Alliance** 

WSP|Parsons Brinckerhoff

223149.00 mN 67.80 mOD Ground Level:

**OSGB** 

460672.00 mE

Approved By: RS

RC

JHS

FINAL

Log Status: 10/10/2016 Date:

10/05/2016 Date Started:

Orientation: 090 deg. 11/05/2016 Date Completed: Inclination: 90 deg Final Depth: 20.00m Depth Related Exploratory Hole Information Barrel Drill Bit Lead Driller Plant Remarks From (m) 0.00 To (m) 1.20 Type IP Start 10/05/2016 End 10/05/2016 Lead Driller Simon Roberts Logger NC land dug inspection pit Insulated N/A digging tools COMACCHIO 1.20 10/05/2016 10/05/2016 Simon Roberts NC GEO205 COMACCHIO 20.04 RC 10/05/2016 11/05/2016 Simon Roberts NC 2.70 Rotary Cored: Coordinates were provided by WSP/PB using a hand held GPS (Gamin etrex 10) with an accuracy of +/-4metres. Ground levels are approximate and are interpolated, exploratory hole drilled outside the LiDAR survey area provided by GEO205 Network Rail. Boring-Drilling Progress
Depth (m) Casing (m) Depth Water Hole Diameter by Depth Casing Diameter by Depth Time 08:00 17:00 08:00 Remarks Start of shift Depth (m) Dia. (mm) Depth (m) Dia. (mm) Remarks 10/05/2016 10/05/2016 11/05/2016 End of shift Start of shift 14.70 14.70 11/05/2016 nd of shift Water Added Records From (m) To (m) Volume (litres) Remarks Chiselling Details

To (m) Duration (hh:mm) Depth Related Remarks Drilling Flush Details From (m) 2.70 4.20 5.70 7.20 8.70 10.20 To (m) 4.20 5.70 7.20 8.70 10.20 11.70 From (m) To (m) Remarks Colour From (m) To (m) Tool Flush Returns (%) 80 - 80 grey grey grey grey 80 - 80 80 - 80 80 - 80 80 - 80 80 - 80 grey grey grey grey 11.70 13.20 14.70 16.20 13.20 14.70 16.20 17.70 80 - 80 80 - 80 80 - 80 80 - 80 grey grey Monitoring Installation Pipe Work
Type | Pipe ID | From (m) | To (m) | Dia(mm) | Pipe Type | Remarks | From (m) Water Strikes Backfill Details Date Strike (m) Casing (m) Time (mins) Depth (m) Sealed (m) Remarks To (m) 905 903 Description 1.20 ration Test Results Standard Penel | Pen5(mm) | Blows6 | Pen6(mm) | Hammer | Energy Ratio% | 75 | 2 | 75 | TBC | 75 | 4 | 75 | TBC | 75 | 0 | -205 | TBC | Blows4 Pen4(mm) Blows5
2 75 2
3 75 4
0 75 0 Depth (m) Type asing (m) Water (m) SWPen(mm) Blows1 Pen1(mm) Blows2 Pen2(mm) Blows3 Pen3(mm) 1.20 2.70 20.00 0.00 2.70 2.70 Dry 1.00 2.40 75 75 75 S S C N=8 N=13 75 75 -55 75 75 75 0 0 2 50 0 50 / 20 25

Reason for Hole Termination: Scheduled depth achieved



Engineer:

#### **BOREHOLE INFORMATION SHEET**

Borehole No RC2AMF-U Sheet 2 of 2

East West Rail GRIP 3 Project Name:

Survey Grid System: OSGB Co-ordinates: 460672.00 mE Hole Type: Checked By: JHS

Project No: 5624 Client: **EWR Alliance** 

223149.00 mN

Approved By: RS

RC

Ground Level:

Log Status: **FINAL** Date: 10/10/2016

Date Started: 10/05/2016

WSP|Parsons Brinckerhoff

Orientation: 090 deg.

67.80 mOD

Date Completed: 11/05/2016 Inclination: 90 deg. Final Depth: 20.00m Depth Related Exploratory Hole Information

From (m)	To (	m)	Туре	Start	End	Plant	Barrel	Drill Bit	Lead	Driller	Lo	gger	1	Remarks	
0.00	1.2	0	IP	10/05/2016	10/05/2016	Insulated	N/A	N/A		Roberts	- I	NC	Hand dug ins		
1 20	2.7	_	WLS		10/05/2019	digging tools			Simon	Roberts		NC.			
1.20	2./	١ ا	VVLS	10/05/2016	10/05/2016	COMACCHIO GEO205			Simon	Nobelis	'	NC	Windowless		
2.70	20.0	04	RC	10/05/2016	11/05/2016	COMACCHIO			Simon	Roberts	1	NC	Rotary Cored	l: Coordinates were p	rovided by WSP/PB
						GEO205							using a hand	held GPS (Gamin et	rex 10) with an
													approximate	and are interpolated, the LiDAR survey a	exploratory hole
													drilled outside	e the LiDAR survey a	rea provided by
													Network Rail.		
												1		5: 5	
Date	Tim	- I	Depth (m)	g-Drilling Pro	gress Depth Water (	m) Rema	arke	Depth (m)	Dia. (mm)	eter by Depth	narks	Depth (m)		Diameter by Depth	narks
Date	- "	ic	Deptil (III)	Casing (III)	Doptii Water (	III) IXEIIIE	aino	Depair (III)	Dia. (IIIII)	Iten	IIdiko	Deput (III)	Dia. (IIIII)	IXCII	idiks
												<u> </u>			
								From (m)	To (m)	Ivalues (ites)		er Added Red	ords Rem	arka	
								From (m)	To (m)	Volume (litres)	)		Reili	idiks	
			Do-4	h Related Re	marke			-	Chicallin	ng Details			D-:::	ling Flush Details	
From (m)	To (m)	1	⊔epti		narks Remarks			From (m)	To (m)	Duration (hh:mm	Tool	From (m)		ling Flush Details urns (%) Flush	Colour
	(111)							(111)	, o (iii)		, 1001	17.70	19.20 8	0 - 80	grey grey
												19.20	20.00 8	0 - 80	grey
								1							
								L	<u> </u>	<u> </u>					
Date	Strike (m	1) Caeina		er Strikes Depth (m) Seal	ed (m)	Remarks	Type Di		ring Installatio	on Pipe Work mm) Pipe Type	Remarks	From (m)		Backfill Details egend Details	escription
Date	Strike (II	i) Casing	(III) TIIIIe (IIIIIIs)	Deptii (III) Seai	su (III)	Remarks	Type	pe ibili loili (ili,	10 (III) Dia(I	iiii) Fipe Type	Remarks	T TOTTI (III)	10 (111)	egena Di	escription
					<u> </u>				tion Test Resi					<u>'</u>	
Depth (m)	Туре	N Valu	ue Casing (	m) Water (m)	SWPen(mm) E	Blows1 Pen1(mr	m) Blows2	Pen2(mm) E	Blows3 Pen3	(mm) Blows4	Pen4(mm)	Blows5 Pen5	(mm) Blows6	Pen6(mm) Hamme	er Energy Ratio%
														<u>                                     </u>	
		_		_											

Reason for Hole Termination: Scheduled depth achieved

### WINDOWLESS SAMPLE LOG



Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E 467288 N 225360 Investigation WLŚ C5759

Section 2A Location: Scale 88.80mAOD Level: 1:50.00

Logged By Client: East West Rail Alliance Start: 31/07/2017 Dates: TΗ End: 31/07/2017

							L110. 31/01/20	01/01/2017		
(m)	Water	Samp	les & In Situ Te	esting	Sample	Install	Description	Depth	Level	Logond
(m)	Levels	No/Type	Depth (m)	Result	Sample	แเรเสแ	Description	(m)	(mAD)	Legend
-		B B ES	0.20				BALLAST: Light grey angular to sub-rounded coarse GRAVEL of igneous material and clinker. Approximately 5% undersized. [CLEAN BALLAST]  BALLAST: Dark grey very sandy angular to sub-angular fine to coarse GRAVEL of igneous material, clinker and slag. Approximately 50% undersized with fines of ash and degraded ballast. [VERY DIRTY BALLAST non-cohesive]	0.05 0.20 (0.45) 0.65	88.75 88.60 88.15	
1 -		B D ES	1.00 1.20 - 1.60				TRACK BED LAYERS: Light brown gravelly slightly clayey calcareous SAND. Gravel is angular to sub-rounded fine to coarse of igneous material, limestone and siliceous material.	(0.95)		1
		D H D	1.60 - 1.70 1.60 1.70 - 1.80	H 90 H 82 H 82			Firm greenish grey locally dark grey slightly grávelly slightly sandy calcareous CLAY with moderate hydrocarbon odour and occasional comminuted shell fragments (<3mm) with rare partially decomposed organic material (5mm). Gravel is angular	1.60	87.20	
2 -	<b>⊉</b>	H H D	1.70 1.80 1.90	H 100			to sub-rounded fine to coarse of impessone and siliceous material. (STEWARTBY MEMBER)  Firm becoming stiff greenish grey slightly sandy calcareous	(0.90)		2  
3 -		H D H	2.20 2.30 2.40	H 112			CLAY with occasional shell fragments (<3mm) and slight hydrocarbon odour (STEWARTBY MEMBER) 2.30-2.45m: Very closely fissured slightly gravelly. Gravel is angular to sub-angular fine to medium of carbonaceous mudstone. 2.45-2.50m: Light brown gravelly slightly clayey sand. Gravel is angular to sub-angular fine to coarse of limestone.  Borefiole completed at 2.50m	- 2.50	86.30	-3
4 -										-4
5 -										- - - -5
-										-
6							×			-6 - - - -
7 -										- -7 -7
ט פרט בשנס										-
8 -	1									_8

C5759 GI SECTION 2A.GPJ

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm and 86mm sample barrels: 1.20-2.50m.

CASING: 113mm to 2.00m.

GROUNDWATER: Groundwater struck at 2.20m. Driller notes groundwater seepage at 0.40m.

BACKFILL: Hole backfilled with bentonite pellets: 1.20-2.50m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet. Window sample barrel refused further penetration at 2.50m.

Groundwater:			
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
31/07/17	2.20	2.00	

Hole Progress:			
Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
31/07/2017 17:00	2.50	2.00	2.20

## CC GROUND INVESTIGATIONS LTD DYNAMIC PROBE LOG EN ISO 22476-2



Scale

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Investigation Project No: Co-ords: E 467288 N 225360 Level: 88.80mAD Date 31/07/2017

Location: Section 2A Specification: DPSH-B

Client: East West Rail Alliance Prop Height: 750mm Rig No. Cone Base Diameter: 50mm T07

								Cone Base Di	ameter: 50	mm	107
Depth (m)	Readings (blows/100mm)	5	10 15	Diagram 20	(N100 Va 25	alues) 30 3	5 40	45 50	Torque (Nm)	Re	marks
- 1									14	Hand dug inspe 0.00-1.20m.	ection pit:
2	1 2 2 50									Dynamic probe 2.47m	completed at
- 3									-	2.47m	
- 4											
- 5									-		
- 6					>						
- <b>7</b>									-		
									<u> </u>		

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-2.47m.



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E 466904 N 225256 Investigation WLŚ C5759

Section 2A Location: Scale Level: 89.30mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 07/08/2017 Dates: TH End: 07/08/2017

								End: 07/08/2	2017		IH	
(m)	Water	Samp	les & In Situ T	esting	Comple	Inotall	Do	arintian	Depth	Level	Lagand	
(m)	Levels	No/Type	Depth (m)	Result	Sample	Install		scription	(m)	(mAD)	Legend	
	-	B B ES	0.20 0.50				BALLAST: Grass over dark gr angular to sub-angular fine to material, clinker, slag and lime undersized with fines of degra DIRTY BALLAST non cohesiv 0.00-0.05m: With occasional i	coarse GRAVEL of igneous estone. Approximately 70% ided ballast and clay. [VERY re] oots and rootlets (<2mm).	0.25 (0.40) 0.65	89.05 88.65		
1 -		B D ES UT100 D D	1.00 1.20 - 1.60 1.60 - 1.70 1.70 - 1.80 1.90				Gravel is angular to sub-round material, clinker, chalk and lin 0.40-0.65m: 1No. wooden rail 0.50-0.65m: With occasional pemBANKMENT FILL: Soft great control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the contro	nestone. sleeper. oockets (<70mm) of soft grey clay. eyish brown mottled greenish grey avelly slightly sandy CLAY. Gravel	_	87.40		1
2 -	- - - -	н	2.20	H 63			mudstone and siliceous mater organic material (<5mm).	rial with rare partially decomposed				2
3 -	- - - - -	ES H H D U70	2.50 2.80 2.90 3.00 - 3.40	H 75			partially decomposed organic sub-rounded to rounded fine t (ALLUVIUM)	material (<5mm). Gravel is	(1.40)			3
	]	D	3.40 - 3.50				Firm light grey mottled greenis CLAY. (STEWARTBY MEMB	sh brown slightly sandy calcareous	3.30	86.00		
4 -		H D H H	3.70 3.90 4.20	H 51 H 58 H 64			Firm greenish brown mottled of slightly sandy calcareous CLA	dark grey and light bluish grey Y with a moderate organic odour It partially decomposed organic	3.60	85.70		4
	-	Н	4.40	H 62					(2.40)			
5 -		D	4.90				5.00-6.00m: With occasional o	comminuted shell fragments				5
7 -	Dry		5.30				Borehole completed at 6.00m		6.00	83.30	-	6 7
8 -											-	8

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm and 76mm sample barrels: 1.20-6.00m.

CASING: 113mm to 2.00m.

GROUNDWATER: Not encountered. Dry on completion.

BACKFILL: Hole backfilled with bentonite pellets: 1.20-6.00m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet.

Groundwater: Dry
Strike Depth
(m) Casing Depth (m) Depth After Observation (m)

**Hole Progress:** Hole Depth (m) Casing Depth (m) Water Depth (m) 2.00 07/08/2017 17:00 6.00

## DYNAMIC PROBE LOG

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Co-ords: E 466904 N 225256 Date

Project Name: East West Rail Phase 2 Ground Project No:

Investigation C5759

89.30mAD Level:

07/08/2017

Probe No

DP2A102 C Sheet 1 of 1

Section 2A Location:

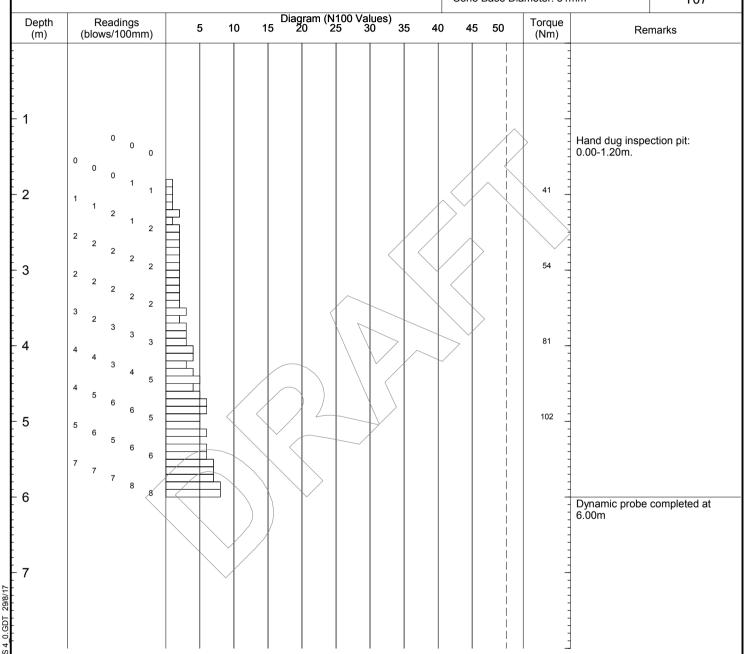
Specification: DPSH-B Hammer Mass: 63Kg

Scale 1:50

East West Rail Alliance Client:

Drop Height: 750mm Cone Base Diameter: 51mm

Rig No. Ť07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.00m.



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E 464894 N 224534 Investigation WLŚ C5759

Section 2A Location: Scale Level: 86.36mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 01/08/2017 Dates: TΗ End: 01/08/2017

(m)	Water	Samp	les & In Situ T	esting	Sample	Install	Description	Depth	Level	Leger
(111)	Levels	No/Type	Depth (m)	Result	Sample	IIIStaii	·	(m)	(mAD)	Lege
-		B B ES	0.20 0.50				BALLAST: Grass over dark grey very sandy angular to sub-rounded fine to coarse GRAVEL of igneous material and clinker. Approximately 50% undersized with fines of ash and degraded ballast with a slight hydrocarbon odour. [VERY DIRTY BALLAST non cohesive]  0.00-0.20m: With frequent rootlets and roots (<2mm).	(0.45) - 0.45 (0.40)	85.91	
		B D ES	1.00 1.20 - 1.60				TRACK BED LAYERS: Light brown gravelly slightly clayey calcareous SAND. Gravel is angular to rounded fine to coarse of igneous material and siliceous material.  EMBANKMENT FILL: Soft bluish grey mottled brown and locally	0.85	85.51	ecessor.
		D D D D	1.60 - 1.70 1.70 - 1.80 1.90				dark grey slightly gravelly slightly sandy CLAY with occasional partially decomposed organic material (<5mm) and slight organic odour. Gravel is sub-rounded to rounded fine to medium of siliceous material.  1.80-2.50m: With frequent partially decomposed organic material (<5mm) and a moderate organic odour.	(1.65)		
-		ES	2.50				Firm greyish brown mottled dark grey slightly gravelly slightly sandy CLAY. Grayel is sub-angular to rounded fine to coarse of	2.50	83.86	
		D	2.90				siliceous material and sandstone with rare partially decomposed organic material (<5mm) with a slight organic odour. (ALLUVIUM)  Firm light bluish grey mottled light brown CLAY. (STEWARTBY	(0.70)	83.16	
		D	3.90				MEMBER) 3.50-3.90m: With occasional gypsum crystals (<1mm) 3.90-4.00m: With frequent partially decomposed organic material	(0.80)	82.36	
		D	4.90				Firm to stiff greyish brown locally mottled orangish brown and light brown slightly sandy CLAY with occasional gypsum crystals (<2mm). (STEWARTBY MEMBER)	(2.00)		
							5.15-5.25m: Very closely fissured light brown and greyish brown.			
;	Dry	D	5.90				5,70-6.00m: With occasional gypsum crystals (<10mm).  Borehole completed at 6.00m	6.00	80.36	
,										
<u>-</u> 										

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm and 76mm sample barrels: 1.20-6.00m.

CASING: 113mm to 2.00m.

GROUNDWATER: Not encountered. Dry on completion.

BACKFILL: Hole backfilled with bentonite pellets: 1.20-6.00m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet.

Groundwater: Dry
Strike Depth
(m)

Casing Depth (m) Depth After Observation (m) **Hole Progress:** 

Hole Depth (m)

Casing Depth (m) 2.00

Water Depth (m)

SCG GI SECTION 2A.GPJ C5759 P0G

01/08/2017 17:00 6.00

## DYNAMIC PROBE LOG

Client:

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Sheet 1 of 1 Co-ords: E 464894 N 224534 Date

Project Name: East West Rail Phase 2 Ground Project No: Investigation

East West Rail Alliance

C5759

Level: 86.36mAD 01/08/2017

Probe No

DP2A105 C

Section 2A Location:

Specification: DPSH-B Hammer Mass: 63Kg

Scale 1:50

Drop Height: 750mm

Rig No.

				D:	- aram	/N1400	Values							
Depth (m)	Readings (blows/100mm)	5	10	15	20 	25	Values 30	⁾ 35	40	45	50	Torque (Nm)	Re	marks
												-		
													Hand dug inspe 0.00-1.20m.	ction pit:
												7		
											,       	20		
								>/		>	>	47		
	2 3 3 3 5 5 5 5											68		
	4 4 5 5											-	Dynamic probe	completed at
												-	0.00111	
												-		

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.00m.



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E 464647 N 224439 Investigation WLŚ C5759

Section 2A Location: Scale 85.83mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 01/08/2017 Dates: TΗ End: 01/08/2017

								End: 01/08/20	1/		111
(m)	Water Levels	Samp No/Type	les & In Situ To	Result	Sample	Install	Des	scription	Depth (m)	Level (mAD)	Legend
-	11	B ES	0.20	resuit			fine to coarse GRAVEL of igne	dy clayey angular to sub-angular eous material, clinker, slag and oundersized with fines of ash, clay DIRTY BALLAST cohesive]	(0.60)		- - - - -
1 -		D ES	0.90 1.10				angular to rounded fine to coa slag and limestone.	h brown very sandy slightly clayey rse GRAVEL of siliceous material, ely to very closely fissured dark ilty calcareous CLAY with 40mm). (PETERBOROUGH	- 0.60 - 0.75	85.23 85.08	× × 1 × × 1 × × 1 × × × 1
2 —		D	1.90				MEMBER) 0.75-1.00m: Locally tending to 1.10-1.50m: With frequent sho 1.20-1.70m: With rare lenses 1.50-2.15m: Very closely fissu	slightly sandy clayey silt. ell fragments (<30mm). (<2mm) of light brown sand.	(1.90)		× × × 2 × × × 2 × × × 2
-		D	2.55				2.45-2.65m: With frequent cor (<30mm). Borehole completed at 2.65m	nminuted shell fragments	2.65	83.18	× × +
5 6 7 7 8 8											-3 -4 -4 -5 -6 -6 -7

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-0.45m. Continuous disturbed sampling using 101mm and 86mm sample barrels: 0.45-2.65m.

CASING: 113mm to 1.00m.

GROUNDWATER: Groundwater struck at 0.45m. Rose to 0.40m in 10mins. Dry on completion.

BACKFILL: Hole backfilled with bentonite pellets: 0.45-2.65m. Inspection pit backfilled with arisings: 0.00-0.45m and surface reinstated.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet. Window sample barrel refused further penetration at 2.65m.

Groundwater:	01:1 5 11	0 : 5 !!	D !! 46
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
01/08/17	0.45		0.40

Hole Progress:			
Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
01/08/2017 17:00	2.65	1.00	

GI SECTION 2A.GPJ

## DYNAMIC PROBE LOG

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Sheet 1 of 1 Date Co-ords: E 464647 N 224439

Project Name: East West Rail Phase 2 Ground Project No:

Investigation C5759

85.83mAD Level:

01/08/2017

Probe No

DP2A107 C

Section 2A Location:

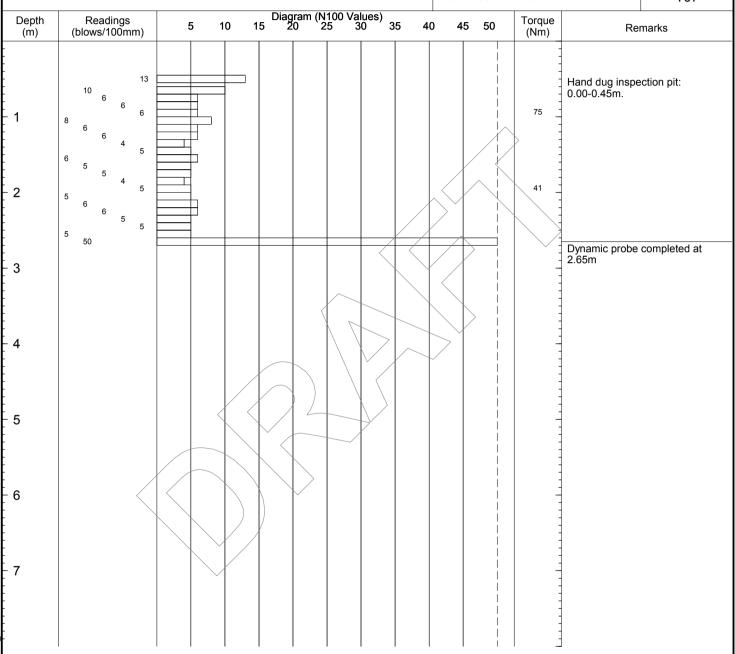
Specification: DPSH-B

Scale 1:50

East West Rail Alliance Client:

Hammer Mass: 63Kg Drop Height: 750mm Cone Base Diameter: 51mm

Rig No. T07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-0.45m. Dynamic probing superheavy (DPSH-B): 0.45-2.65m.

REMARKS: Probing undertaken prior to windowless sampling - see separate sheet.

0.GDT



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E 464211 N 224312 Investigation WLŚ C5759

Section 2A Location: Scale Level: 83.66mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 02/08/2017 Dates: TΗ End: 02/08/2017

								End: 02/08/20	17		ΙП
(m)	Water	Samp	les & In Situ To	esting	Sample	Install	De	scription	Depth	Level	Legend
(111)	Levels	No/Type	Depth (m)	Result	Campic	XXXXXXXX		•	(m)	(mAD)	Logona
		В	0.20						0.10 0.25 (0.50)	83.56 83.41	-
-		B ES	0.50				DIRTY BALLAST non cohesive BALLAST: Dark grey very sar	/e]ldy ashy angular to sub-angular	0.75	82.91	
1 -		B D ES	1.00				ballast. [VERY DIRTY BALLA	ed with fines of ash and degraded	(0.65)	82.26	<u>-</u> 1
2 -		H H D	1.60 1.70 1.90	H 44 H 65			SAND. Gravel is angular to su limestone, chalk, siliceous ma 0.25-0.60m: 1No. Angular cot 0.60-0.75m: With medium cot of red brick.	ub-rounded fine to coarse of aterial and red brick. bble of red brick. bble content. Cobbles are angular	1.40	82.20	-2
		H ES H H	2.40 2.50 2.70	H 58 H 46 H 31			gravelly slightly sandy CLAY v Gravel is angular to rounded limestone and red brick. EMBANKMENT FILL:: Soft lice	ht grey and bluish grey slightly with rare gypsum crystals (<5mm). fine to coarse of siliceous material, the greyish brown mottled light grey			
3 -		D H	2.90 3.20	H 45			organic odour and rare partial	slightly sandy CLAY with a slightly ly decomposed organic material rounded fine to coarse of siliceous			3
		H ES	3.40 3.50	H 30			material, mudstone and limes		(4.00)		-
4 -		D	3.90								4
		ES	4.50								E
5 -		D	4.90								5
		ES	5.40					angish brown and brown CLAY d frequent partially decomposed LUVIUM)	(0.60)	78.26	
6 -	Dry	D	5.90				Borehole completed at 6.00m		6.00	77.66	6
7 -											- - - -7
8 -	•			'	'	' '					L-8

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm, 76mm and 66mm sample barrels: 1.20-6.00m.

CASING: 113mm to 2.00m.

GROUNDWATER: Not encountered.

BACKFILL: Borehole backfilled with bentonite pellets: 1.20-6.00m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet.

Groundwater: Dry
Strike Depth Casing Depth (m) Depth After Observation (m)

**Hole Progress:** 

02/08/2017 17:00

Hole Depth (m) Casing Depth (m) 2.00 6.00

Water Depth (m)

STD AGS 4_0.GDT 29/8/17 CCG GI SECTION 2A.GPJ C5759 P0G

## DYNAMIC PROBE LOG

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Sheet 1 of 1

Probe No

DP2A110 C

Project Name: East West Rail Phase 2 Ground Project No: Investigation

C5759

Level: 83.66mAD

Co-ords: E 464211 N 224312

Date 02/08/2017

Location: Section 2A Specification: DPSH-B

Scale 1:50

Client: East West Rail Alliance

Hammer Mass: 63Kg Drop Height: 750mm Cone Base Diameter: 51mm

Rig No. Ť07

epth (blows/100mm)										one E	Base Dia	meter: 51	mm	T07
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Depth (m)	Readings (blows/100mm)	5	10 15	Diagram 5 20	(N100 ' 25	Values) 30	35	40	45	50	Torque (Nm)	Re	marks
0 0 0 0 7 1 1 1 2 27 1 27 1 27 1 27 1 27												0	Hand dug inspe 0.00-1.20m.	ection pit:
1 1 2 3 2 3 3 3 3 3 3 3 3 3 3 3 4 4 5 5 5 4 4 5 5 5 5												7 _		
3 3 4 4 5 5 Dynamic probe completed at		1 2 3 2 3 3 3 3 3						>				27		
5 Dynamic probe completed at		3 3 3 4 4 5						,				61		
		5											- Dynamic probe 6.00m	completed at

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.00m.

REMARKS: Probing undertaken prior to windowless sampling - see separate sheet.

CC DP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT 29/8/17



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E 463089 N 223982 Investigation WLŚ C5759

Section 2A Location: Scale 76.90mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 02/08/2017 Dates: TΗ End: 02/08/2017

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm, 76mm and 66mm sample barrels: 1.20-4.00m.

CASING: 113mm to 2.00m.

GROUNDWATER: Not encountered.

BACKFILL: Borehole backfilled with bentonite pellets: 1.20-6.00m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet.

Groundwater:			
Date	Strike Depth	Casing Depth	Depth After
	(m)	(m)	Observation (m)

Hole Progress:			
Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
02/08/2017 17:00	4.50	2.00	

CCGI GINT C5759_GI SECTION 2A.GPJ

### YNAMIC PROBE LOG

Client:

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Sheet 1 of 1 Co-ords: E 463089 N 223982 Date

Project Name: East West Rail Phase 2 Ground Project No:

East West Rail Alliance

Investigation C5759

Level: 76.90mAD Specification: DPSH-B

02/08/2017 Scale 1:50

Probe No

DP2A113 C

Section 2A Location:

Hammer Mass: 63Kg Drop Height: 750mm

Rig No.

									Cone Base Diameter: 51mm					
Depth (m)	Readings (blows/100mm)	5	10 15	Diagram ( 20	N100 Valu 25 30	es) 35	40	45	50	Torque (Nm)	Re	marks		
										0 _	Hand dug inspe 0.00-1.20m.	ection pit:		
									>   	7	Dimomio probo	completed at		
											Dynamic probe 4.00m	completed at		
										-				

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-4.00m.



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E 462622 N 223822 Investigation WLŚ C5759

Section 2A Location: Scale 73.99mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 02/08/2017 Dates: TH End: 03/08/2017

I								End: 03/08/20	17		111
(m)	Water Levels	_ ·	les & In Situ To		Sample	Install	Des	scription	Depth (m)	Level (mAD)	Legend
	Leveis	No/Type	Depth (m)	Result			BALLAST: Dark grey very san	dy slightly clayey angular to	(m)	(MAD)	33333 <u>-</u>
		В	0.20				slag and limestone. Approxima	AVEL of igneous material, clinker, ately 50% undersized with fines of	0.30	73.69	
		B ES	0.50				degraded ballast and clay. [VE cohesive]	ERY DIRTY BALLAST non	(0.45)		
		ES					TRACK BED LAYERS: Light b	prown very gravelly slightly clayey ngular to sub-rounded fine to	0.75	73.24	
' =		B D	1.00 1.20 - 1.60				coarse of limestone, chalk, sili				-
		ES UT100	1.20 - 1.00				dark grey and orangish brown CLAY with slight hydrocarbon	slightly gravelly slightly sandy			
		D D	1.60 - 1.70 1.70 - 1.80				decomposed organic material rounded fine to coarse of clink	(<5mm). Gravel is angular to			
2 -		D	1.90				material. 0.90-1.05m: Timber rail sleepe		(2.25)		-2
		Н	2.20	H 40			1.80-2.10m: With rare commir				
		ES	2.50	H 46							
		H	2.80	H 49				/ >			
3 -		H D	2.90 3.10				Firm light bluish grey mottled of slightly sandy CLAY with a slightly	htty organic odour and rare	3.00	70.99	3
		Н	3.40	H 78			partially decomposed organic 3.00-3.35m: Dark grey with fre	material (<5mm). (ALLUVIUM) quent partially decomposed	(1.00)		
		ES H	3.50 3.60	H 55			organic material (<5mm) and r	moderate organic odour.			
4 -	Dry	Н	3.80	H 60			Borehole completed at 4:00m	$\nearrow$	4.00	69.99	4
											_
											_
5					/ <						-
											5 
			/		\						-
6 -											6
											E
											_
7 -											-7
' =											F'
											E
8 _											<u> </u>

GINT SCG

C5759 GI SECTION 2A.GPJ

WS LOG

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm and 86mm sample barrels: 1.20-4.00m.

CASING: 113mm to 2.00m.

GROUNDWATER: Not encountered.

BACKFILL: Borehole backfilled with bentonite pellets: 1.20-4.00m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet.

į	Groundwater:	Dry			Hole Progress:				
	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
3					02/08/2017 17:00	1.80	2.00		
					03/08/2017 17:00	4.00	2.00		
į									
2									

## DYNAMIC PROBE LOG

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Sheet 1 of 1 Date

Probe No

DP2A116 C

Project Name: East West Rail Phase 2 Ground Project No:

Investigation C5759

Level: 73.99mAD Specification: DPSH-B

Co-ords: E 462622 N 223822

02/08/2017 Scale

Location: Section 2A

Hammer Mass: 63Kg Drop Height: 750mm

1:50

Client: East West Rail Alliance

Cone Base Diameter: 51mm

Rig No. T07

		Cone base bianteter. Similin									107		
Depth (m)	Readings (blows/100mm)	5	10	Dia 15	agram ( 20	N100 V 25	alues) 30 (	35 4	0 45	5 50	Torque (Nm)	Re	marks
1	0 0											Hand dug inspe 0.00-1.20m.	ction pit:
2											0		
3											0		
1	0 0											Dynamic probe 4.00m	completed at
5											-		
6											-		
7											-		

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-4.00m.



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E 461701 N 223493 Investigation WLŚ C5759

Section 2A Location: Scale 68.83mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 03/08/2017 Dates: TΗ End: 03/08/2017

								End: 03/08/20	17		ΙП	
(m)	Water		les & In Situ To		Sample	Install	De	scription	Depth	Level	Legend	
(/	Levels	No/Type	Depth (m)	Result		*******		rey sandy slightly clayey angular to	(m)	(mAD)	2090.10	<u> </u>
-		B B ES	0.20 0.50				sub-angular fine to coarse GF and limestone. Approximately and degraded ballast. [VERY 0.00-0.10m: With occasional I	RAVEL of clinker, igneous material 50% undersized with fines of clay DIRTY BALLAST non cohesive] roots and rootlets (<3mm).	0.35	68.48		
1 -		B D ES	1.00 1.20 - 1.60				SAND. Gravel is angular to ro clinker, limestone, igneous ma	brown very gravelly slightly clayey ounded fine to coarse of red brick, aterial and siliceous material. oble content. Cobbles are angular	0.95	67.88		- - -1 - -
2 -		D D D D	1.60 - 1.70 1.70 - 1.80 1.90				EMBANKMENT FILL: Firm gr bluish grey and brown slightly a slight hydrocarbon odour an	eenish grey mottled reddish brown, gravelly slightly sandy CLAY with id rare partially decomposed roots is angular to rounded fine to coarse material and limestone.	1.80	67.03		- - - - - - 2
		H H ES	2.10 2.40 2.50	H 30 H 50 H 38			EMBANKMENT FILL: Firm old locally dark grey slightly sandy 2.20-2.50m: With occasional	y CLĂY. \	(1.60)			-
3 -		H D H	2.60 2.90	H 46								- 3 -
		H ES H	3.20 3.30 3.50	H 44 H 63			Firm dark grey slightly sandy of rare partially decomposed org	CLAY with slight organic odour and anic material (<5mm).	3.40	65.43		
4 -		H D U70	3.80 3.90 4.00 - 4.40	H 71			3.40-3.50m Dark grey with fre organic material (≮5mm), 3.50-3.65m: With occasional   material (≼3mm).	'> ' ' '	(1.00)			- <b>4</b>
		D H	4.40 - 4.50 4.70	H 38	_/			orangish brown and grey sandy	(0.60)	64.43		
5 -		D	4.90						5.00	63.83		- -5 - -
6 -	Dry	D	5.70				SAND MEMBER)  5.75-5.80m: Slightly gravelly. medium of calcareous sandstr. Borehole completed at 5.80m	one.	5.80	63.03		6
7 -												- - - - <b>7</b> - -
8 —												- - - - 8

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm and 76mm sample barrels: 1.20-5.80m. CASING: 113mm to 2.00m.

GROUNDWATER: Not encountered.

BACKFILL: Borehole backfilled with bentonite pellets: 1.20-5.80m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated. REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet. Sample barrel refused further penetration at 5.80m.

Groundwater:			
Date	Strike Depth	Casing Depth	Depth After
	(m)	(m)	Observation (m)

Hole Progress:			
Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
03/08/2017 17:00	5.80	2.00	

SCG C5759 GI SECTION 2A.GPJ

## DYNAMIC PROBE LOG

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

DP2A119 C Sheet 1 of 1

Probe No

Project Name: East West Rail Phase 2 Ground Project No:

Investigation C5759

68.83mAD Level:

Co-ords: E 461701 N 223493 Date 03/08/2017

Section 2A Location:

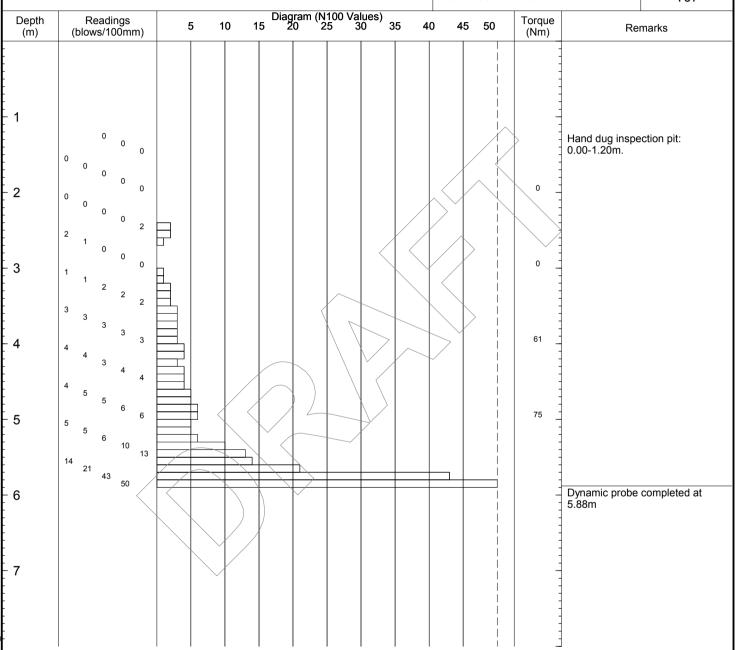
Specification: DPSH-B Hammer Mass: 63Kg

Scale 1:50

East West Rail Alliance Client:

Drop Height: 750mm Cone Base Diameter: 51mm

Rig No. Ť07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-5.88m.



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E 461577 N 223451 Investigation WLŚ C5759

Section 2A Location: Scale 68.73mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 03/08/2017 Dates: TΗ End: 03/08/2017

								End: 03/08/20	17		111
(m)	Water Levels		les & In Situ Te		Sample	Install	Des	scription	Depth (m)	Level (mAD)	Legend
-		B B ES	0.20 0.50	Result			clayey calcareous SAND with (<3mm). Gravel is angular to rigneous material, chalk, siliced TRACK BED LAYERS: Light b	ounded fine to coarse of red brick,	(0.40) - 0.40 - 0.70	68.33	Cancar
1 -		B D ES H	1.00	H 50			siliceous material and chalk.  EMBANKMENT FILL: Firm greelight grey and orangish brown partially decomposed organic angular to sub-rounded fine to chalk, igneous material and sil	slightly sandy CLAY with rare material (<5mm). Gravel is coarse of mudstone, limestone,			1 
2 -		H D H	1.80 1.90 2.10	H 55 H 34			1.80-1.90m: With frequent con	nminuted shell fragments (<5mm).	(2.95)		_2
3 -		ES H D H	2.50 2.90	H 38							-3
		H D ES	3.30 3.50 3.65	H 50			. ,	nminuted shell fragments (<3mm).	3.65	65.08	
4 -		H D H	3.80 4.20	H 53			frequent partially decomposed moderate organic odour. (ALL 4.25-4.45m: Light bluish grey r	organic material (<5mm) and a UVIUM)	(0.80)		4
5 —		H H D	4.40 4.60 4.90	H 64 H 61 H 37			CLAY. (PĔTERBOROUGH ME	·	4.45	64.28	= =   
		Н					5.00-5.30m: Tending to very c	layey sand.	(1.50)		
6 -	Dry	D	5.90				5:80-5.95m: Grey. Calcareous Borehole completed at 5.95m		- 5.95	62.78	-6
7											-7 7 

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm and 76mm sample barrels: 1.20-5.95m. CASING: 113mm to 3.00m.

GROUNDWATER: Not encountered.

BACKFILL: Borehole backfilled with bentonite pellets: 1.20-5.95m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated. REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet. Sample barrel refused further penetration at 5.95m.

Groundwater:			
Date	Strike Depth	Casing Depth	Depth After
	(m)	(m)	Observation (m)

Hole Progress:			
Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
03/08/2017 17:00	5.95	3.00	

GINT SCG C5759 GI SECTION 2A.GPJ

## DYNAMIC PROBE LOG

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Co-ords: E 461577 N 223451 Date

Project Name: East West Rail Phase 2 Ground Project No: Investigation

C5759

68.73mAD Level:

03/08/2017 Scale

Section 2A Location:

Specification: DPSH-B Hammer Mass: 63Kg

1:50

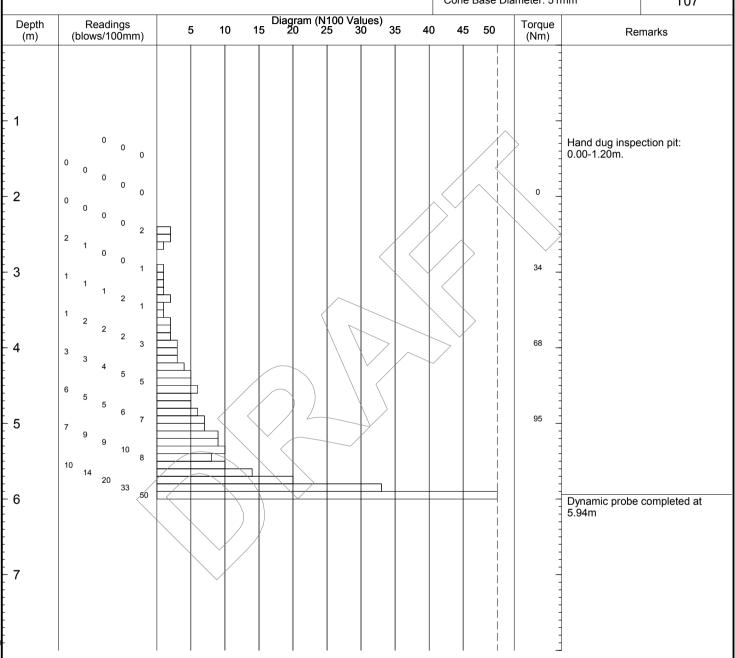
Probe No

**DP2A122 C** Sheet 1 of 1

East West Rail Alliance Client:

Drop Height: 750mm Cone Base Diameter: 51mm

Rig No. Ť07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-5.94m.

REMARKS: Probing undertaken prior to windowless sampling - see separate sheet.

0.GDT



WS2A125 C

Sheet 1 of 2

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No:

Investigation

C5759

Co-ords: E 461476 N 223414

Hole Type WLŚ

Scale

Section 2A Location:

Level:

68.76mAOD

1:50.00

Client: East West Rail Alliance

Dates:

Start: 04/08/2017 End: 04/08/2017 Logged By TH

					End: 04/08/20			
			Sample	Install	Description	Depth	Level	Legend
No/Type	Depth (m)	Result	·	XXXXXXXX	PALLACT C	(m)	(MAD)	
B B ES	0.20 0.50				sub-angular fine to coarse GRAVEL of igneous material, clinker and limestone with occasional roots and rootlets (<3mm). Approximately 50% undersized with fines of degraded ballast. [VERY DIRTY BALLAST non cohesive]	0.30	68.46	3333
B ES D UT100	1.00 1.15 1.20 - 1.60				SAND. Gravel is angular to rounded fine to coarse of limestone, clinker, siliceous material and chalk.  0.90-1.10m: Clayey tending to very clayey.  EMBANKMENT FILL: Soft locally firm grey mottled light bluish	1.10	67.66	
D D H H	1.60 - 1.70 1.70 - 1.80 1.90 2.10	H 34 H 38			slightly sandy CLAY with a slight organic odour and occasional comminuted shell fragments (<3mm). Gravel is angular to rounded fine to coarse of limestone, clinker, siliceous material and mudstone.	(2.10)		
ES H H	2.50 2.80	H 35						
D H	2.90 3.20	H 34			Firm grey mottled dark grey locally orangish brown slightly sandy	3.20	65.56	
ES H	3.50 3.60	H 54			occasional partially decomposed organic material (<5mm). (ALLUVIUM) 3.20-3,40m; Dark grey mottled light grey with frequent partially	(1.34)		
H	3.90 4.20	H 67			3.40-3.53m: Slightly sandy gravelly clay.			
н	4.50	H 25			Greenish brown mottled orangish brown and light grey slightly gravelly sandy calcareous CLAY tending to slightly gravelly very	4.54	64.22	
D	4.90		<			(0.61)		
В	5.15 - 6.00				(PETERBOROUGH MEMBER) Grey very clayey SAND. (KELLAWAYS SAND MEMBER) 5.15-5.40m: Light brown.	5.15	63.61	
В	6.00 - 7.00					(2.15)		
					6.70-7.30m: Tending to stiff sandy clay.			
D	7.40		Y		Stiff grey CLAY with rare comminuted shell fragments (<3mm). (KELLAWAYS SAND MEMBER)	7.30	61.46	
	No/Type  B B S D UT100 D H H D H B B B B B B B B B B B B B B B	No/Type   Depth (m)	B 0.20 B 0.50 ES 1.00 ES 1.15 D 1.20 - 1.60 UT100 D 1.60 - 1.70 D 1.70 - 1.80 D 1.90 H 38  ES 2.50 H 35 H 2.80 D 2.90 H 3.20 H 3.60 H 3.60 H 54 D 3.90 H 4.20 H 67 H 4.50 H 25 D 4.90 B 5.15 - 6.00	No/Type   Depth (m)   Result	No/Type   Depth (m)   Result   Sample   Install	Samples & In Situ Testing   No/Type   Depth (m)   Result	Samples & In Situ Testing   No/Type   Depth (m)   Result	Samples & In Situ Testing   No/Type   Depth (m)   Result

SCG

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm, 76mm and 66mm sample barrels: 1.20-8.00m.

CASING: 113mm to 4.00m.

GROUNDWATER: Groundwater encountered at 7.80m. Rose to 7.50m in 5mins.

BACKFILL/REINSTATEMENT: Bole backfilled with bentonite pellets: 1.20-8.00m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet. Driller notes collapse on completion back to 5.50m.

TION 2A.GPJ								
Groundwater:  Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Hole Progress:  Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
95 04/08/17 901 SM	7.80	4.00	7.50	04/08/2017 17:00	8.00	4.00	7.50	

		ne: Ea	st West I	Rail Pha			ground.co.uk oject No:						eet 2 of ole Type	
	tion:	Inv	estigatio	n			C5759	Co-ords:	E 461	1476 N 22	23414		WLŚ Scale	
Juan	uon.	36	CIION ZA					Level:	68.76	SmAOD			: 50.00	'
lien	t:	Ea	st West I	Rail Allia	ince			Dates:		04/08/20 04/08/20		Lo	gged By TH	y
n)	Water Levels		les & In Situ Depth (m		Sample	Install	De	scription			Depth (m)	Level (mAD)	Legend	
		NO/Type	Deptil (III	) Result							8.00	60.76		 [
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<b>oun</b> Da	dwater:	Strike (n	Depth C	asing Dep (m)	th De	epth After ervation (	Hole Progress:  Date	Hole Depth (m)	Casing (m	Depth Wa	iter Depth (m)			
٥		(n	n)	(m)	Obs	ervation (	1	(m)	(m	٦)	(m)			

## DYNAMIC PROBE LOG

Location:

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Co-ords: E 461476 N 223414 Date 04/08/2017

Probe No

DP2A125 C Sheet 1 of 1

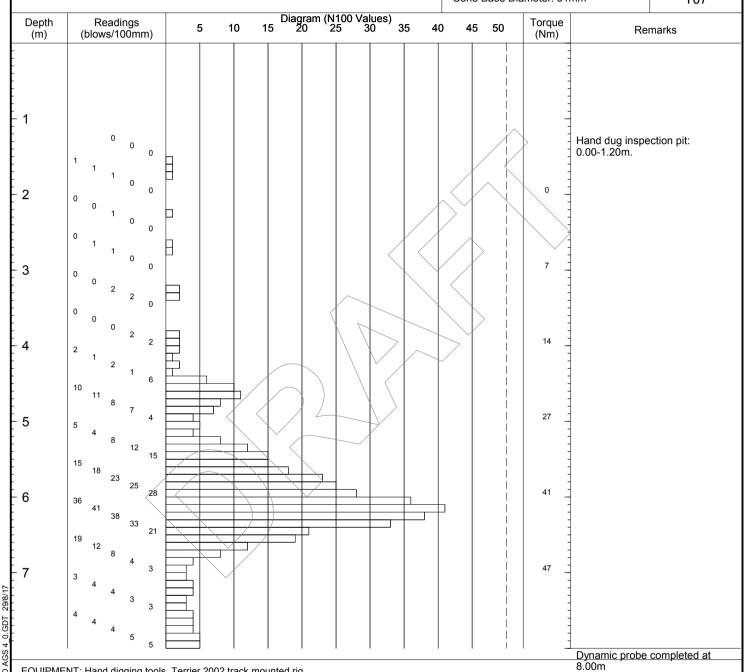
Project Name: East West Rail Phase 2 Ground Project No: Investigation C5759 68.76mAD Level:

Specification: DPSH-B Section 2A

Scale 1:50 Hammer Mass: 63Kg

Drop Height: 750mm East West Rail Alliance Client:

Rig No. Cone Base Diameter: 51mm T07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-8.00m.



Borehole No.

**WS2A100U** 

Sheet 1 of 1

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

East West Rail Alliance

Project Name: East West Rail Phase 2 Ground Project No:

Investigation

C5759

Co-ords: E N

Hole Type WLŚ Scale

1:40.63

Section 2A Location:

Client:

Level:

mAOD

Logged By

Start: 06/09/2017 Dates:

								End: 06/09/2	017		MB	
(m)	Water Levels		les & In Situ T		Sample	Install	ı	Description	Depth (m)	Level (mAD)	Legend	
- - - -	Levels	No/Type B ES D	Depth (m)  0.20 - 0.30  0.20  0.25	Result				MADE GROUND: Dark brown slightly sandy SILT with frequent roots and rootlets.  MADE GROUND: Stiff friable brown slightly gravelly slightly sandy CLAY with occasional roots. Gravel is angular to rounded	0.05	(IIIAD)		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
- - -		B ES D	0.50 - 0.60 0.50 0.60					fine to coarse of siliceous material and calcareous nodules.  Very stiff brown mottled light bluish grey slightly gravelly slightly sandy CLAY with occasional roots. Gravel is angular to rounded fine to coarse of siliceous material.  Stiff to very stiff very closely to closely fissured light brown	0.60			
- - -	-	B ES D	1.00 - 1.20 1.00 1.10					mottled bluish grey CLAY with occasional roots and pockets (<10mm) of off white silt.	(1.90)			
-		D	1.70		_				(1100)			
? — - - -		U70	2.00 - 2.40						0.50			
- - -		D	2.70					Stiff very closely fissured brown mottled greenish brown CLAY with frequent pockets (<40mm) of off white silt and occasional fossils.	2.50			
3 <del></del> - - -								3.00-3.50m: Occasional pockets (<25mm) of off white silt.  Stiff laminated and very closely fissured dark brown CLAY with	(1.00)			
- - -		D U70	3.70 4.00 - 4.40					occasional fossils.				-
- - - -									(1.50)			
-		D	4.70					Stiff to very stiff very closely fissured grey CLAY with occasional fossils.	5.00			
-	Dry.	D	5.40					Borehole completed at 5.60m	(0.60)			-
- - - - -												

EQUIPMENT: Hand digging tools. LMSR-H Modular Dynamic Sampling and Probing rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm and 76mm sample barrels: 1.20-5.60m.
CASING: None used.
GROUNDWATER: Not encountered.
INSTALLATION: 50mm ID HDPE slotted pipe with washed gravel response zone: 1.00-5.60m. 50mm ID HDPE plain pipe with bentonite pellet seal: 0.10-1.00m.
Raised borehole helmet set in concrete: 0.00-0.10m. Gas valve fitted.

Groundwater: Dry.
Strike Depth
(m) Casing Depth (m)

Depth After Observation (m)

**Hole Progress:** 

06/09/2017 17:00

Hole Depth (m) 5.60

Casing Depth (m) 0.00

Water Depth (m)

SCG GI SECTION 2A.GPJ P0G

STD AGS 4_0.GDT 18/9/17

#### CC GROUND INVESTIGATIONS LTD Probe No DYNAMIC PROBE LOG DPSH2A100 U Sheet 1 of 1 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 06/09/2017 C5759 Level: mAD Section 2A Specification: DPSH-B Scale Location: 1:50 Hammer Mass: 63Kg Drop Height: 750mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 50mm GO2 Diagram (N100 Values) 20 25 30 Depth Readings Torque 10 40 5 45 50 Remarks (blows/100mm) (Nm) (m) 0.00-1.20m: Dynamic probe undertaken from base of hand dug pit. 0 2 0 3 0

27

Dynamic probe completed at

6.00m

 $\hbox{EQUIPMENT: Hand digging tools. LMSR-H Modular Dynamic Sampling and Probing rig.}\\$ 

5

6

7

0.GDT

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.00m.

REMARKS: Probing undertaken adjacent to windowless sample borehole WS2A100U - see separate sheet.



Borehole No.

**WS2A103U** Sheet 1 of 1

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No:

Investigation C5759 Co-ords: E N

Hole Type WLŚ

Section 2A Location:

Level: mAOD

1:40.63

Scale

Client: East West Rail Alliance Logged By Start: 05/09/2017 Dates: MB End: 05/09/2017

							End: 05/09/2	J1/		IVID
(m)	Water		les & In Situ T	esting	Sample	Install	Description	Depth	Level	Legend
()	Levels	No/Type	Depth (m)	Result	· · · · · · ·		·	(m)	(mAD)	
- - - -		D ES B	0.20 0.50 - 0.70				MADE GROUND: Firm friable dark brown slightly gravelly slightly sandy CLAY with frequent roots. Gravel is sub-angular to rounded fine to coarse siliceous material.  MADE GROUND: Stiff light brown mottled brown and grey slightly gravelly slightly sandy CLAY with occasional roots.	0.30 (0.40)		
1 —		D ES	0.50				Gravel is angular to rounded fine to coarse of siliceous material.  Stiff to very stiff locally closely fissured light brown mottled brown and light bluish grey slightly gravelly CLAY with occasional roots. Gravel is sub-angular to rounded fine to	0.70		
- - -		B D ES	1.00 - 1.20				coarse of siliceous material.	(0.85)		
2 —		D ES	1.70				Stiff extremely closely to very closely fissured brown mottled light grey CLAY with occasional pockets (<30mm) of gypsum crystals and occasional fossils.  1.90-2.85m: Thinly laminated.	1.55		
- - - - -			0.00					(1.30)		
3 -		D D U70	2.80 2.90 3.00 - 3.40				Firm thinly laminated very closely fissured brown mottled greenish brown CLAY with occasional fossils.	2.85		3
4		D	3.70					(1.85)		4
5 —	Dry.	D	4.60				Borehole completed at 4.70m	4.70		-5
6 <del>-</del> - - - -										-6

EQUIPMENT: Hand digging tools. LMSR-H Modular Dynamic Sampling and Probing rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm and 76mm sample barrels: 1.20-4.70m.

CASING: 113mm diameter to 2.00m.

GROUNDWATER: Not encountered.

INSTALLATION: 50mm ID HDPE slotted pipe with washed gravel response zone: 1.00-4.70m. 50mm ID HDPE plain pipe with bentonite pellet seal: 0.10-1.00m.

Raised borehole helmet set in concrete: 0.00-0.10m. Gas valve fitted.

Groundwater: Dry.
Strike Depth Casing Depth (m) Depth After Observation (m)

**Hole Progress:** 

05/09/2017 17:00

Hole Depth (m) 4.70

Casing Depth (m) Water Depth (m) 2.00

CCG GI SECTION 2A.GPJ LOG

AGS 4 0.GDT

#### CC GROUND INVESTIGATIONS LTD Probe No DYNAMIC PROBE LOG DPSH2A103 U Sheet 1 of 1 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 05/09/2017 C5759 Level: mAD Section 2A Specification: DPSH-B Scale Location: 1:50 Hammer Mass: 63Kg Drop Height: 750mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 50mm GO2 Diagram (N100 Values) 20 25 30 Depth Readings Torque 10 40 5 45 50 Remarks (m) (blows/100mm) (Nm) 0.00-1.20m: Dynamic probe undertaken from base of hand dug pit. 0 2 0 3 0 Dynamic probe completed at 5 4.80m 6 7 0.GDT EQUIPMENT: Hand digging tools. LMSR-H Modular Dynamic Sampling and Probing rig. METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-4.80m. REMARKS: Probing undertaken adjacent to windowless sample borehole WS2A103U - see separate sheet.



Borehole No.

**WS2A106D** Sheet 1 of 1

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Investigation

C5759

Co-ords: E N

Hole Type WLŚ

Section 2A Location:

Level:

mAOD

Scale 1:40.63

Client: East West Rail Alliance

Dates:

Start: 11/09/2017

Logged By MR

	Water	Samo	les & In Situ T	estina		_	_	Depth	Level	
1)	Levels	No/Type	Depth (m)	Result	Sample	Install	Description	(m)	(mAD)	Legend
		тол туро	Bopar (III)	rtoodit			TOPSOIL: Soft dark brown slightly sandy CLAY with occasional			11/2 1/2
4		D	0.20			$\vdash$	roots.	<u></u>		
₫			0.20				Soft to firm brown mottled light brown and light grey CLAY with			
1			0.50 0.70	11.04			occasional roots and occasional pockets (<30mm) of off white silt.	(0.65)		
4		B D	0.50 - 0.70 0.50	H 61		$\vdash$	Siit.			
		ES					-	0.80		
4		Н	0.80	H 67			Firm light brown mottled light grey and locally light orangish	0.00		
$\dashv$		H	1.00 - 1.20			:- <del>                                   </del>	brown CLAY with occasional pockets (<30mm) of off white silt and rare gypsum crystals (<2mm).			
1		B D	1.00	H 86			and rare gypsum crystals (<2mm).	(0.70)		<u> </u>
4		ES	1.10							
Ⅎ		H						1.50		
4							Firm very closely fissured greyish brown mottled orangish brown	1.50		
$\exists$		D	1.70				CLAY with occasional gypsum crystals (<2mm), occasional pockets (<20mm) of off white silt and occasional fossils and			
1			0				shell fragments.			<u> </u>
$\dashv$		U70	2.00 - 2.40				one magnicito.			<u></u>
┪		070	2.00 - 2.40							
4							·			
$\dashv$					-			(1.90)		
j								(1.50)		
7			0.70			l':-				
4		D	2.70							
ゴ										
4										
Ⅎ										
1								3.40		
4							Firm to stiff very closely fissured locally laminated dark greyish brown CLAY with occasional fossils and shell fragments	0.10		
					/		(<10mm).	(0.60)		<u> </u>
4		D	3.70				( ) ( )	(0.00)		
Ⅎ					///	KH.	<i>;</i> } /	4.00		
コ		U70	4.00 - 4.40			$\mathbb{N}$	Stiff very closely to closely fissured dark grey CLAY with	4.00		
4							occasional fossil and shell fragments (<10mm).			
Ⅎ										
7			/							<u> </u>
+										
1		D	4,70	ĺ		$\land \exists \land$				
4			< <				·			
ᅥ			\ '		)			(2.00)		
7										
$\dashv$										<u> </u>
1				\ \	Y /					
4										
4		D	5.70		<b>Y</b>					
1							.]			
$\dashv$	Dry.					<del>                                      </del>	Borehole completed at 6.00m	6.00		
₫							Boronoie completed at 0.00m			
4										
4										

EQUIPMENT: Hand digging tools. LMSR-H Modular Dynamic Sampling and Probing rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm and 76mm sample barrels: 1.20-6.00m.

CASING: 113mm diametre to 4.00m.

GROUNDWATER: Groundwater seepage at 2.00m.

INSTALLATION: 50mm ID HDPE slotted pipe with washed gravel response zone: 1.00-6.00m. 50mm ID HDPE plain pipe with bentonite pellet seal: 0.10-1.00m.

Raised borehole helmet set in concrete: 0.00-0.10m. Gas valve fitted.

Groundwater: Dry.
Strike Depth Casing Depth (m) Depth After Observation (m)

**Hole Progress:** 

11/09/2017 17:00

Hole Depth (m)

Casing Depth (m)

Water Depth (m)

SCG GI SECTION 2A.GPJ

6.00

4.00

#### CC GROUND INVESTIGATIONS LTD Probe No DYNAMIC PROBE LOG DPSH2A106 D Sheet 1 of 1 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 11/09/2017 C5759 Level: mAD Section 2A Specification: DPSH-B Scale Location: 1:50 Hammer Mass: 63Kg Drop Height: 750mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 50mm GO2 Diagram (N100 Values) 20 25 30 Depth Readings Torque 10 40 5 45 50 Remarks (blows/100mm) (Nm) (m) 0.00-1.20m: Dynamic probe undertaken from base of hand dug pit. 0 2 14 3 14 27 5 6 Dynamic probe completed at 6.00m 7 0.GDT EQUIPMENT: Hand digging tools. LMSR-H Modular Dynamic Sampling and Probing rig. METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.00m. REMARKS: Probing undertaken adjacent to windowless sample borehole WS2A106D - see separate sheet.



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation WS C5759

Section 2A Location: Scale mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 02/11/2017 Dates: EC End: 02/11/2017

								End: 02/11/20	)1/		LO
(m)	Water		les & In Situ T		Sample	Install	Des	scription	Depth	Level	Legend
()	Levels	No/Type	Depth (m)	Result				•	(m)	(mAD)	
	1	D	0.10				rootlets (<3mm).	htly sandy CLAY with frequent	0.20		
-	1	D	0.30				EMBANKMENT FILL: Firm to	stiff brown mottled dark orangish	0.45		
-	1	ES B	0.50 - 0.70	H 124			brown slightly sandy slightly gr	avelly CLAY with occasional nded fine to coarse of siliceous	/		-=
-	1	D	0.50				material.		0.70		<u></u>
1 -	3	ES H	1.00 - 1.20	H 124			EMBANKMENT FILL: Stiff light orangish brown slightly gravell	tly brown mottled light grey and	(0.70)		
-	}	В	1.00				Gravel is sub-angular to round	ed fine to coarse of siliceous	( , ,		
-	1	D ES	. ==				material. Stiff fissured lightly brown mot	llad light gray CVAV with	ر 1.40		
-	1	H	1.50				Stiff lissured lightly brown mot	CLAY FORMATION].	1.70		
-	1	D	4.00				Stiff fissured orangish brown n	nottled dark orangişh brown	/		
2 -	1	D UT100	1.90 2.00 - 2.45				CLAY. [STEWARTBY MEMBE Stiff fissured locally laminated		'		<del>*</del> <del>*</del> <del>*</del> <del>*</del> <del>*</del> <del>*</del> <del>*</del> <del>*</del> <del>*</del> <del>*</del>
-	1						sand sized gypsum crystals ar	d with occasional yellow silt			
-		_					laminae. [STEWARTBY MEM	BER].			
-	1	D	2.55								× × ×
3 —	1							/ /	(2.30)		
3 -							Ĭ ,				-X-X-1-3
											x _x
-	1	D	3.50								<u></u>
-	1										<del></del>
4 -		LITAGO	4.00 4.45					> °	4.00		× 4
-	1	UT100	4.00 - 4.45				Stiff to very stiff fissured dark to shells. [PETERBOROUGH ME				<u> </u> ;
-	1						. /	•			
-	1	D	4.55								
	}					/					<u> </u>
5 —	1								(0.00)		5
-	1								(2.30)		
-	1		F F0 /		\						;
-	1	D	5.50								‡
-											
6 -	1	U70	6.00 - 6.45				ľ				
-	]						Stiff to very stiff fissured dark t	prownish grev CLAY	6.30		[=== <u></u>
	1	D	6.50	\ /			[PETERBOROUGH MEMBER	].			[ <del>-</del> <u>-</u> <u>-</u> -
-	1			\ \	Y /				(0.70)		<del></del>
7 -	Dry.	D	6.90						7.00		
.	±,.						Borehole completed at 7.00m				
	1										
	1										
-	]										E
8 –		I		l			<u> </u>		I		I L ₈

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm, 86mm and 76mm sample barrels: 1.20-7.00m.

CASING: 128mm to 4.00m.

GROUNDWATER: None encountered.

BACKFILL: Borehole backfilled with bentonite pellets: 1.20-7.00m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: PID testing undertaken: 0.00m - 0.00ppm, 0.50m - 0.00ppm.

REMARKS: Dynamic Probe undertaken adjacent to sampling - see separate sheet.

Groundwater:			
Date	Strike Depth	Casing Depth	Depth After
	(m)	(m)	Observation (m)

Hole Progress:			
Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
02/11/2017 17:00	7.00		



Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation WS C5759

Section 2A Location: Scale Level: mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 01/11/2017 Dates: MB End: 01/11/2017

							End: 01/11/2	017		טועו
(m)	Water		les & In Situ To	esting	Sample	Install	Description	Depth	Level	Legend
(111)	Levels	No/Type	Depth (m)	Result	Campic	motan	·	(m)	(mAD)	Logona
		D ES B D ES	0.20 0.50 - 0.60 0.50				MADE GROUND: Soft to firm dark brown slightly sandy slightly gravelly CLAY with frequent rootlets. Sand is fine. Gravel is sub-angular to rounded fine to medium of siliceous material.  MADE GROUND: Stiff to very stiff light brown mottled light grey slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is sub-angular to rounded fine to coarse of limestone and siliceous material.	1 1		
1 -		D ES	1.00				MADE GROUND: Stiff to very stiff locally fissured light brown mottled light grey slightly sandy slightly gravelly CLAY with rare sand sized gypsum crystals and occasional roots. Gravel is	」 (0.75)		1
1		D	1.50				angular fine of siliceous material.  1.35m: 1no lense of orange sandy silt (<20mm). Sand is fine.  Very stiff fissured light brown mottled light grey CLAY with occasional sand sized gypsum crystals and with trace roots.			
2 -		B UT100	2.00 2.00 - 2.45				3,7	(2.15)		
3 -		D	2.55							3
		D	3.50				Stiff fissured light brown locally mottled light grey CLAY with occasional sand sized gypsum crystals.	3.50		
4 -		UT100	4.00 - 4.45					(1.40)		4 
5 —		D	4.55				Stiff locally very stiff fissured dark greyish brown locally grey CLAY with occasional shells and with rare fine sand sized	4.90		5
		D	5.20			(	gypsum-crystals.			
6 -		D U70	5.50 6.00							
		D	6.50					(2.85)		
7 -		D	7.50							
		U U	7.50				(continued on next sheet)	7.75		
<u> </u>										

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm, 86mm and 76mm sample barrels: 1.20-11.20m.

CASING: 128mm to 4.00m.

GROUNDWATER: None encountered.

BACKFILL: Bole backfilled with bentonite pellets: 1.20-11.20m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: PID testing undertaken at: 0.20m - 0.00ppm, 0.50m - 0.00ppm, 1.00m - 0.00ppm.

REMARKS: Dynamic Probe undertaken adjacent to sampling - see separate sheet.

G C5759 GI SECTIO	Groundwater: Date	<b>Dry.</b> Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Hole Progress: Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
CC WS LOG									

roject i	lame: Ea	ast West Ra				Dccground.co.uk Project No:	Co-ords:	. E N			ole Typ	f 2 e
ocation		vestigation ection 2A				C5759	Level:	mAOD			WS Scale	
lient:	Ea	ast West Ra	ail Allia	nce			Dates:	Start: 01/11/2	2017		: 50.00 gged E	
Wa	ter Sam	ples & In Situ T	esting					End: 01/11/	2017 Depth	Level	MB	Т.
m) Lev	els No/Type U70	Depth (m) 8.00 - 8.45	Result	Sample	Install	Verv stiff fissured dark gre	Description  yish brown CLAY	with occasional	(m)	(mAD)	Legend	ļ
	D	9.50				shells. (continued from pre	vious sheet)		(1.15)			=
		8.50				Variable for a second along the second	OLAN	(th	8.90			}
' =						Very stiff fissured dark broshells.	wnish grey CLAY	with occasional				ŧ
	D	9.50										=======================================
0 =									(2.30)			
		40.50					/ ) `					1
	D	10.50				_					 	1
1 — D	y. D	11.10				Borehole completed at 11.	20m		11.20			ŧ
												E
2 –												Ė
												F
3 –												
												Ė
4 -			Ì									
5 –												
=												E
6 -												
=												F
7 -												E
]												F

Borehole No. WS2AMGOB_1L

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Sheet 1 of 1

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation WS C5759

Section 2A Location: Scale mAOD Level: 1:50.00

Client: Logged By East West Rail Alliance Start: 19/10/2017 Dates: EC End: 20/10/2017

								End: 20/10/201	/		
(m)	Water Levels		oles & In Situ T		Sample	Install	Description		Depth (m)	Level (mAD)	Legend
-	Levels	B ES B	0.20 0.50	Result			TOPSOIL: Grass over: Light brown sligt sandy clayey SILT. Gravel is sub-angula coarse of siliceous material. 0.00-0.10m: Occasional roots and rootle 0.40-0.70m: Light brown mottled orangi Firm grey mottled orangish brown slight	ular to rounded fine to  tlets (<3mm). gish brown silty clay.	0.70)	(IIII (D)	\(\lambda \lambda
2 —		B ES ES UT100 D H D H	1.00 1.20 1.20 - 1.65 1.65 - 1.70 1.65 1.70 1.75 1.85	H 41 H 49 H 41					1.90)		* * * 1 * * * 1 * * * 1 * * * 1 * * * 2 * * 2 * * 2 * * 2
3 —		D H H D H UT100	1.83 1.90 2.40 2.55 2.70 2.80 3.00 - 3.45	H 48 H 55 H 87			2.50-2.60m: With rare locally occassion (<2mm). Stiff locally stiff dark brown thinly lamina CLAY. 2.63-2.80m: Sandy. Stiff thinly laminated dark grey silty CLA	hated slightly sandy silty	2.60 2.90		× × × × × × × × × × × × × × × × × × ×
4 -		D H D	3.45 - 3.50 3.70 3.90	H 101			2.90-4.60m: Occasional locally frequent and silt lenses (<1mm).	nt greyish brown fine sand			X
5 —		D U70	4.90 5.00 - 5.40					(-	4.10)		- X - X - X - X - X - X - X - X - X - X
6 —		D	5.90				6.00-7.00m: With rare shell fragments (brown fine sand and silt lenses (<1mm)				- X - X - X - X - X - X - X - X - X - X
7 -	Dry	D	6.90				Borehole completed at 7.00m		7.00		× × 7 × × 7
8 —											<u> </u>

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm, 86mm and 76mm sample barrels: 1.20-7.00m. CASING: 128mm to 3.00m.

GROUNDWATER: None encountered.

BACKFILL: Bole backfilled with bentonite pellets: 1.00-7.00m. Inspection pit backfilled with arisings: 0.00-1.00m and surface reinstated. REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet. Driller notes 76mm barrel refusal at 7.00m

Groundwater:	Dry		
Date	Štrike Depth (m)	Casing Depth (m)	Depth After Observation (m)

Hole Progress:			
Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
20/10/2017 17:00	7.00	3 00	

#### CC GROUND INVESTIGATIONS LTD Probe No DYNAMIC PROBE LOG HDP2A104 U Sheet 1 of 1 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 01/11/2017 C5759 Level: mAD Section 2A Specification: DPSH-B Scale Location: 1:50 Hammer Mass: 63Kg Drop Height: 750mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 51mm T07 Diagram (N100 Values) 20 25 30 Depth Readings Torque 5 10 40 45 50 Remarks (m) (blows/100mm) (Nm) Hand dug inspection pit: 0.00-1.20m. 14 2 0 3 0 14 5 14 6 Dynamic probe completed at 6.00m 7

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

0.GDT

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# CC GROUND INVESTIGATIONS LTD DYNAMIC PROBE LOG EN ISO 22476-2 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Sheet 1 of 2 Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 01/11/2017 C5759 Level: mAD Location: Section 2A Specification: DPSH-B Scale 1:50 Hammer Mass: 63Kg Drop Height: 750mm Rig No. Client: East West Rail Alliance Cone Base Diameter: 51mm

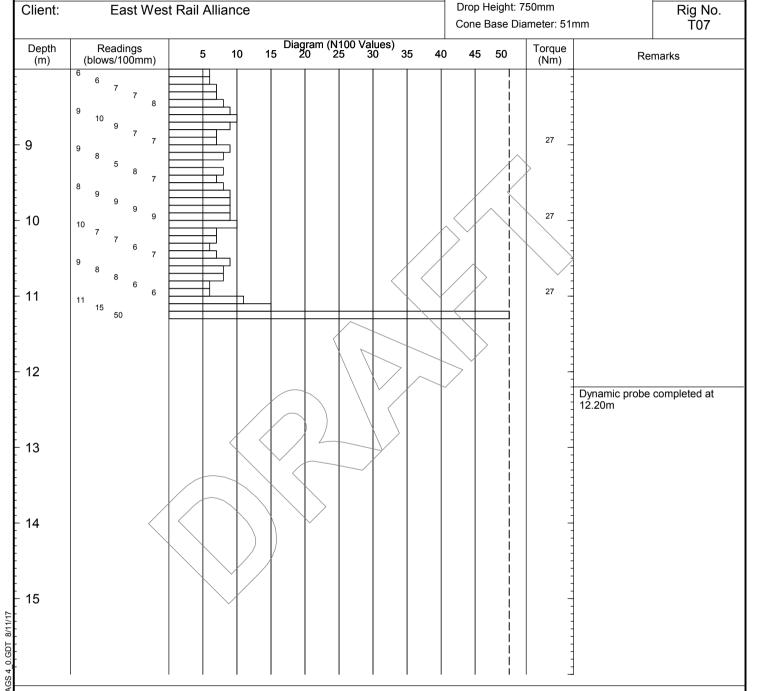
								Cone I	Base Dia	ameter: 51	mm	T07
Depth (m)	Readings (blows/100mm)	5	10 15 Dia	agram (N100 20 25	Values) 30	35	40	45	50	Torque (Nm)	Re	marks
										-		
										-		
	4 5 5									=	Hand dug inspe 0.00-1.20m.	ection pit:
	5 3 4								\ \ \	-		
2	5 5 4 4									0 -		
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EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

CC DP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT 8/11/17

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.00m.

#### CC GROUND INVESTIGATIONS LTD Probe No DYNAMIC PROBE LOG SHDP2A108 D Sheet 2 of 2 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 01/11/2017 C5759 Level: mAD Section 2A Specification: DPSH-B Scale Location: 1:50 Hammer Mass: 63Kg



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.00m.

## DYNAMIC PROBE LOG

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Sheet 1 of 1

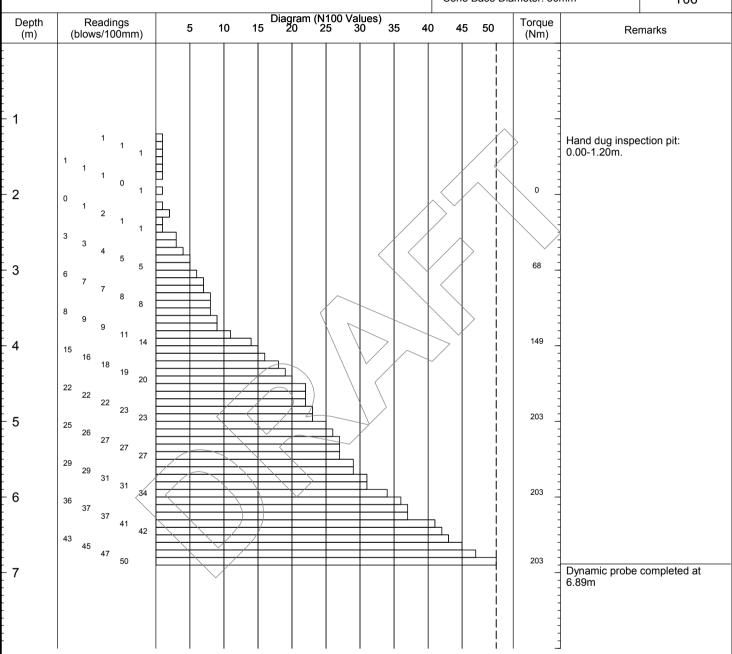
Probe No

SHDP2AMGOB 1L

Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 19/10/2017 C5759 Level: mAD

Section 2A Specification: DPSH-B Scale Location: 1:50 Hammer Mass: 64Kg

Drop Height: 750mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 50mm Ť06



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

0.GDT

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.98m.

	o∠ / 39105 , rax: U1452 /3922	PIT LOG			P2ATFB_ Sheet 1 of
	e: East West Rail Phas	20 , Email: info@ccground.co.uk se 2 Ground Project No:	Co-ords: E N		Date
tion:	Investigation Section 2A	C5759	Level: mAOD		09/11/201
ocation:	Section 2A		Dimensions:	m	Scale 1 : 12.5
lient:	East West Rail Allia	nce	0.80m E		Logged B
Water	Samples & In Situ Testing			Donth	Level
m)  . ⊢	No/Type Depth (m) Result	Descri		Depth (m)	(mAD) Legend
		TOPSOIL (Grass over): Firm brown slightl roots and rootlets (<5mm).	y sandy silty CLAY with occasional	(2.22)	1/ 2/ 1/2.
1				(0.20)	<u>\\ \langle \tau_1 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle \tau_2 \\ \langle </u>
-		Firm orangish brown mottled grey slightly	sandy silty CLAY with occasional	0.20	
-		gypsum crystals (<1mm).			* -× - -x -x X .x .x
					<del>  × · · ·</del>
					<del>  X - X -</del>     <del>  X - X -</del>
1				(0.60)	<del>  × · ×  </del>
+					
1					
Dn/				0.80	— <u>×</u> —× — × — ×
- Dry		Inspection pit completed at 0.80m		0.80	
-					
_					
1					
-					
-					
-					
-					
1 1					
-				1	
-					

## ROTARY BOREHOLE LOG

Borehole No. CP2ATFB 2L (A) Sheet 1 of 2

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation DS+RC C5759

Section 2A Location: Scale mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 09/11/2017 Dates: ĔС End: 15/11/2017

(m)	Water		ın, Samples &		Core Run &	TCR SCR	Install	Description	Depth	Level	Leger
` ′	Levels	No/Type	Depth (m)	Result	Sample	RQD	 	TOPSOIL: Grass over firm brown slightly sandy silty	(m)	(mAD)	1, . x 1, 1,
7		В	0.20					CLAY with occasional roots and rootlets (<5mm).	0.20		× -
7		ES	0.20					Firm orangish brown mottled grey slightly sandy silty			× ×
		В	0.50				******	CLAY with occasional gypsum crystals (<1mm).			-x-
-											X
. 7									(1.50)		<del>×</del> >
' =		В	1.00						(1.50)		×
		ES	1.20 - 1.65	S 5				1.20-1.70m: Locally soft with frequent gypsum crystals			x>
+		SPT						(<1mm).			<del></del> ;
7											X.
1								Firm grey locally mottled orangish brown silty CLAY with	1.70		$\left  \begin{array}{c} \hat{\mathbf{x}} & \cdot \\ \end{array} \right $
2 -		D	1.90		l			occasional locally frequent gypsum crystals.			×
+		UT100	2.00 - 2.45								$\frac{1}{8}$
7											
		D	2.45 - 2.55					2.40-2.55m: Slightly sandy.			<u></u>
1		Ď	2.50								-x:-
4								2.65-2.75m. Slightly sandy.			<del>X</del>
;		D	2.90	S 6							×
1		SPT	3.00 - 3.45	30					(2.90)		×
Ⅎ											x
-											- ×-
7											
1		_									
ŀ -		D UT100	3.90 4.00 - 4.45								×
-		01100	4.00 - 4.43								<del>×</del> ;
7											<del>×</del> _
1		D	4.45 - 4.55				<del></del>		4.60		جَنِيًا ا
								Stiff becoming very stiff indistinctly fissured dark brown silty CLAY with occasional locally frequent shells and			^_ <u>x</u>
5 -		H	4.80 4.85	H 91 H 91	<			shell fragments (<5mm).			<del>*</del>
' 7			4.90	H 71			1				
7		н	4.93	S 37							× ->
		SPT	5.00 - 5.45		\ `		_	5.39-5.80m: Thinly laminated friable.	(1.70)		×
Ⅎ		D	5.50								$\times$
-				/	\ \	\ \	$\rightarrow$				- ×-
; -		D	5.90	C*60	$\rightarrow$	7221	<del></del>				- X
1		C SPT C	6.00 - 7.10 6.00 - 6.45	C 60	! \	66% 0%					
Ⅎ		3510	0.00 - 6.45			9%		Very stiff locally thinly laminated dark brownish grey silty	6.30		<del>`</del> = ;
-					6			CLAY locally tending to extremely weak mudstone.			× ====================================
7				\ \	Y !/			Frequent shells and shell fragments (<20mm).			×-
					//						
' -		D	7.00		<u> </u>						<u>^_</u>
+		С	7.10 - 8.60	C 39	i	73%					<del>*_</del> *
7		SPTC	7.10 - 7.55		1	0% 0%					X
1					¢				(2.70)		<u> </u>
1		_			i				(2.70)		<del>*</del> _*
, ∃		D	7.80		:						<u>x</u>
3 —	-	. '		-					-		
<b>EQUIF</b>	PMENT:	Hand dia	ging tools. Cor	nacchio	Geo 205	Multi-	drill track i	mounted rig.			
<b>ЛЕТН</b>	IOD: Har	nd dua in	enection nit. 0 (	∩∩_1 2∩n	n Dynan	nic can	anlina ucin	g 128mm and 113mm sample barrels: 1.20-6.00m. Waterflus	rotary co	rina usin	a T6-1

EQUIPMENT: Hand digging tools. Comacchio Geo 205 Multi-drill track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm and 113mm sample barrels: 1.20-6.00m. Waterflush rotary coring using T6-116 coring barrel: 6.00-14.60m.

CASING: PW 140mm diameter to 4.50m.

GROUNDWATER: None encountered prior to using water flush to advance casing to 4.60m.

BACKFILL: Borehole was backfilled with bentonite pellets: 14.60-0.00m.

			ing water flush to adva e pellets: 14.60-0.00m				
Groundwater:	Strike Depth	Casing Depth	Depth After Observation (m)	Hole Progress:	Hole Depth (m)	Casing Depth	Water Depth (m)
	,	· ,	, ,	09/11/2017 17:00 10/11/2017 08:00 10/11/2017 17:00 11/11/2017 08:00	1.20 1.20 6.00 6.00	, ,	· ,

Proje	ct Nar	ne: Ea Inv	st West Ra estigation	ail Pha	se 2 (	Froun	d Proje	ct No: <b>C5759</b>	Co-ords:	E N		Ho D	le Type S+RC
Loca	tion:	Se	ction 2A						Level:	mAOD			Scale : 50.00
Clien	it:	Ea	st West Ra	ail Allia	nce				Dates:	Start: 09/11/20 End: 15/11/20		Log	gged By EC
(m)	Water Levels	Core Ru No/Type	un, Samples &		Core Run & Sample	TCR SCR ROD	Install		Description		Depth (m)	Level (mAD)	Legend
-		00	8.50 8.60 - 10.10	C*71	- - - -	95% 0%		Very stiff locally thinly CLAY locally tending to Frequent shells and sherom previous sheet)	o extremely w	eak mudstone.			× × × × × × × × × × × × × × × × × × ×
9 -		SPT C	8.60 - 8.95			0%		Very stiff thinly laminat tending to extremely w	ted dark grey s	silty CLAY locally	9.00		* * * * * * * * * * * * * * * * * * * *
-		D	9.35		- C			shells (<20mm).	reak muustone	withoccasional			* - X - X - X - X - X - X - X - X - X -
10 —		D C SPT C	10.00 10.10 - 11.60 10.10 - 10.48	C*65	-	91% 0% 0%							× × × × × × × × × × × × × × × × × × ×
11 —		D	10.80		- C					· ·			× × × × × × × × × × × × × × × × × × ×
12 —		D C SPT C	11.50 11.60 - 13.10 11.60 - 12.05	C 45		100% 0% 0%					(5.60)		* * * * * * * * * * * * * * * * * * *
13 —		D D C SPT C D	12.85 13.00 13.10 - 14.60 13.10 - 13.49 13.30	C*63		99% 0% 0%							X X X X X X X X X X X X X X X X X X X
14 —													X X X X X X X X X X X X X X X X X X X
15 —		D SPT C	14.50 14.60 - 15.03	C*54				Borehole completed at	t 14.60m		14.60		* * * * * * * * * * * * * * * * * * * *
16 —													
- - -													- - - -
17 -													- - - -
Groun	dwater:	Strike	Denth Coo	ing Dept	h D	epth Aft	er	Hole Progress:	Hole Depth	Casing Depth W	ater Depth		<u>E</u>

## WINDOWLESS SAMPLE LOG

Borehole No. WS2ACLOB_1D

Sheet 1 of 1

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation WS C5759

Section 2A Location: Scale mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 25/10/2017 Dates: MB End: 25/10/2017

								End: 25/10/20	17		טועו
(m)	Water	_ ·	oles & In Situ To		Sample	Install	Des	scription	Depth (m)	Level (mAD)	Legend
<u> </u>	Levels	No/Type	Depth (m)	Result		   	MADE GROUND: Soft to firm	dark brown slightly sandy slightly	(m)	(MAD)	
1 —		D ES B D ES H B	0.15 0.40 0.50 0.55 - 0.60 0.55 0.70	H >130 H 101 H 92			gravelly CLAY with frequent ro sub-rounded fine to coarse of MADE GROUND: Firm to stiff slightly gravelly CLAY with occ	oots (<2mm). Gravel is angular to limestone, flint and brick. friable dark brown slightly sandy casional roots (<2mm). Gravel is coarse of flint, limestone, brick.	0.20 0.45 0.60 (0.90)		
		D ES H H B	0.90 1.00 - 1.20 1.00 1.60				Stiff light brownish grey mottle occasional roots (<2mm).  Stiff laminated and fissured brorangish brown CLAY with occ	d light orangish brown CLAY with own mottled yellowish brown and casional partings of brown and	1.50		
2 -		D ES D UT100	2.00 - 2.45				yellow silt.	ey CLAY with occasional partings	(0.95)		2 2 
3 -		D	2.60				of grey silt and fine sand.	ey CLAT with occasional partings	(1.15)		
		D	3.70					ey CLAY with frequent partings of n) and occasional shells (<10mm).	3.60		
4	Dry	D	4.15 - 4.30				Weak grey fossiliferous fine gr Borehole completed at 4.30m	rained SANDSTONE.	4.25		4
5 — 6 — 7 — 7 — 7 — 7 — 7 — 7 — 7 — 7 — 7											-5 -5 
8 -	]			<u> </u>	<u> </u>						I L ₈

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm and 86mm sample barrels: 1.20-4.30m. CASING: 113mm to 2.00m.

GROUNDWATER: None encountered.

BACKFILL: Borehole backfilled with bentonite pellets: 0.50-4.30m and arisings: 0.00-0.50m.

REMARKS: Dynamic Probe undertaken adjacent to borehole prior to sampling - see separate sheet. Window sampling refused at 4.30m.

SCG

TION 2A.GPJ o								
Groundwater: Date  Date	Dry Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Hole Progress:	Hole Depth (m) 4.30	Casing Depth (m) 2.00	Water Depth (m)	

#### CC GROUND INVESTIGATIONS LTD Probe No DYNAMIC PROBE LOG HDP2ACLOB 1D Sheet 1 of 1 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 25/10/2017 C5759 Level: mAD Section 2A Specification: DPH Scale Location: 1:50 Hammer Mass: 50Kg Drop Height: 500mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 44mm Ť06 Diagram (N100 Values) 20 25 30 Depth Readings Torque 5 10 40 45 50 Remarks (m) (blows/100mm) (Nm) 1 Hand dug inspection pit: 0.00-1.20m. 0 2 0 3 27 29 27 50/50mm. Dynamic probe completed at 4.35m 5 6 7 0.GDT EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig. METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing Heavy (DPH): 1.20-4.35m. REMARKS: Probing undertaken adjacent to window sample - see separate sheet.

#### BOREHOLE LOG

Borehole No. CP2ACLOB 1D Sheet 1 of 4

Hole Type

DS+RC

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Investigation C5759

Section 2A Location: Scale mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 01/11/2017 Dates: TB/EC End: 08/11/2017

(m)	Water		les & In Situ To		Sample	Install	Description	Depth	Level (mAD)	Leger
	Levels	No/Type	Depth (m)	Result		*********	TOPSOIL: Soft dark brown slightly sandy SILT with frequent	(m)	(MAD)	1312:5
	7	В	0.20				roots and rootlets (<5mm).	0.15		× :
	1	ES	0.20				Firm brownish grey mottled orangish brown slightly sandy silty	(0.50)		× ×
	1	В	0.50				CLAY with occasional roots and rootlets (<4mm).	j` '		X -
	1	ES					Firm becoming stiff thinly laminated brownish grey mottled	0.65		
_	Ⅎ						orangish brown CLAY with frequent lenses of light orangish brown clayey silt (<15mm)			
	_	B ES	1.00		l					
	1	UT100	1.20 - 1.65							<u> </u>
	7							(1.65)		
	7	D	1.65 - 1.75							
	7	SPT	1.75 - 2.20	S 9						
. –	7									
	1	D	2.20	11.00			5. 1	2.30		
	1	H UT100	2.30 2.30 - 2.75	H 63			Firm becoming stiff grey CLAY with rare angular medium sized gypsum crystals (<30mm).			
	1	01100	2.30 - 2.73				gypoum oryotate ( looking).			<u> </u>
	1	D	2.75 - 2.85	S 16	''			(4.00)		
3 –	1	SPT	2.85 - 3.30	0 10				(1.30)		
	Ⅎ	D	3.10							
	-	D H	3.30 - 3.75 3.30	H 75			3.30m; Firm to stiff.			
	7	"	3.30				Stiff becoming very stiff thinly laminated grey silty CLAY with	3.60		= :
	7	D	3.75 - 3.85				frequent comminuted bivalve shells (<15mm).			<u> </u>
. –	1	SPT	3.85 - 4.30	S 38 H 77			3.75-4.15m. Occasional thin beds of silt and fine sand (<3mm).	(0.70)		
	1	D H	3.90 4.00	П / /						
	1	D	4.10				4.20m: Well preserved belemnite fossil (22mm).  Very dense grey clayey SAND with frequent comminuted bivalve	4.30		· ·
	₫	С	4.30 - 5.30				shells (2mm-20mm).			I
	1									<del>- ' _ ' -</del>
, <u> </u>	Ⅎ	В	4.90		K , <					-: -: -
	Ⅎ				/	<del></del>				
	Ⅎ	С	5.30 - 6.80	S*136				(1.90)		
	Ⅎ	SPT	5.30 - 5.54		1					<u> </u>
	7				! \					· .—. ·
	7			1						I
; —	7	н	6.10		C\		·	0.00		-: <u></u> :-
	7	''	0.10			<del>                                     </del>	Stiff becoming very stiff thinly laminated dark grey silty CLAY	6.20		× ×
	1	D	6.50		//		with occasional comminuted bivalve shells (3mm-25mm) and occasional silt lenses (<2mm).			*
	1		0.50	\ \	$Y \mid /$		occasional sittlenses ( \Zmm).			X
	1	С	6.80 - 8.30	S 27						×
_	1	SPT	6.80 - 7.25		/ i					×
	Ⅎ	D	7.20		1			(2.15)		X
	Ⅎ				¢			(,		- ×
	Ⅎ	_			) ))))					<del>*</del> = =
	1	CS	7.69 - 7.90							<u>×</u> _
3 —								1		- ×-

GPJ

EQUIPMENT: Hand digging tools. Comacchio MC305 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm and 113mm sample barrels: 1.20-4.30m. Waterflush rotary coring using T6-116 coring barrel: 4.30-28.70m.

CASING: SW to 4.30m.

GROUNDWATER: None encountered prior to using water flush to advance casing.

BACKFILL: Borehole was backfilled with bentonite pellets: 28.70-1.20m and arisings: 1.20-0.00m.

Groundwater:				Hole Progress:				
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
				01/11/2017 17:00	4.30			
				01/11/2017 17.00	₹.50			

#### CC GROUND INVESTIGATIONS LTD Borehole No. **BOREHOLE LOG** CP2ACLOB 1D Sheet 2 of 4 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation DS+RC C5759 Section 2A Location: Scale Level: mAOD 1:50.00 Client: East West Rail Alliance Logged By Start: 01/11/2017 Dates: TB/EC End: 08/11/2017 Samples & In Situ Testing Water Depth Level Install Description (m) Sample Legend Levels (m) No/Type Depth (m) 8.30 - 9.80 S*115 8.35 C SPT Medium strong thinly bedded light grey fossiliferous 8.30 - 8.48 LIMESTONE. Discontinuities are closely spaced stepped rough with fine sand infill (<6mm). CS 9.28 - 9.59 9.60m: Light grey frequent comminuted bivalve shells (5mm-23mm) 9.80 - 11.30 C*286 SPT C 9.80 - 9.98 10 (3.45)10.02 - 10.26 CS 0 11 11.30 - 11.80 11.30 - 11.65 C*150 SPT C C 11 80 Very stiff thinly laminated grey silty CLAY locally tending to С 11.80 - 13.10 extremely weak mudstone with medium spaced beds (<300mm) strong light grey LIMESTONE. 12 D 12.30 CS 12.41 - 12.60 13 D 13.00 C** C SPT C 13.10 - 14.60 13.10 - 13.14 (3.20)D 13.80 14 CS 14.45 - 14.60 14.60 - 16.10 C*750 С SPT C 14.60 - 14.66 15 15.00 Very strong very light grey shelly LIMESTONE. Discontinuities are horizontal medium locally closely spaced undulating rough locally stained orangish brown. CS 15.41 - 15.67 (1.35)D 15 90 16 16.10 - 17.60 C** SPT C 16.10 - 16.14 16.35 Very stiff dark grey mottled dark green slightly sandy silty CLAY. D 16.60 (0.65)0 D 16.90 17.00 17 17.00-17.05m: Extremely closely spaced. DONE Very strong locally strong light grey locally grey shelly CS 17.21 - 17.45 LIMESTONE. Discontinuities are sub-horizontal closely spaced locally medium spaced undulating rough. 17.40-17.55m: Very stiff light grey mottled grey slightly sandy Groundwater: **Hole Progress:** Strike Depth Casing Depth (m) Hole Depth (m) Casing Depth (m) Depth After Observation (m) Water Depth Ō Date Date (m) 4.30 3.08 11.30 02/11/2017 17:00 06/11/2017 08:00 11.30 4.30 1.70 06/11/2017 17:00 17.60 4.30 2.40 07/11/2017 08:00 17.60 4.30 2.02

#### CC GROUND INVESTIGATIONS LTD Borehole No. **BOREHOLE LOG** CP2ACLOB 1D Sheet 3 of 4 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation DS+RC C5759 Section 2A Location: Scale Level: mAOD 1:50.00 Client: East West Rail Alliance Logged By Start: 01/11/2017 Dates: TB/EC End: 08/11/2017 Samples & In Situ Testing Water Depth Level Install Description (m) Sample Legend Levels (m) Depth (m) 17.60 - 19.10 17.60 - 17.69 No/Type Result silty clay. SPT C Very strong locally strong light grey locally grey shelly 18 LIMESTONE. Discontinuities are sub-horizontal closely spaced locally medium spaced undulating rough. (continued from previous sheet) 17.90-18.25m: 1no discontinuity sub-vertical stepped rough. D 18.70 CS 18.88 - 19.10 18.90-18.95m: Grey. 19 19.10 - 20.60 SPT C 19.10 - 19.14 19.20-19.40m: Extremely weak grey D 19.40 19.70-19.75m: Stiff light grey sandy clay. D 19.80 19.85-20.15m: Non intact, recovered as slightly clayey sandy 20 angular fine to coarse gravel fragments. CS 20.37 - 20.60 20.40 20.60 - 22.10 D C*500 C SPT C 20.60 - 20.65 21 D 21.60 CS 21.68 - 21.95 22 С 22.10 - 23.60 22.25-22.30m: Extremely closely spaced discontinuities. D 22.70 22.70-22.75m. Extremely closely spaced discontinuities. B (11.70)22.85-23.45m: 1no sub-vertical incipent discontinuity. 23 -23 23.25-23.30m: Extremely closely spaced. 23.30 CS 23.36 - 23.60 C SPT C 23.60 - 25.10 C*750 23.60 - 23.63 24 24.40-24.45m: Grey. CS 24.81 - 25.04 25 25.05-25.40m: Very weak dark grey mottled grey. С 25 10 - 26 60 25.40-25.50m: Firm to stiff slightly gravelly sandy clay. 26 -26 26.00-26.10m: Dark grey. DONE.GPJ CS 26.38 - 26.60 26.60 - 28.00 C*600 SPT C 26.60 - 26.63 27 ${\Bbb C}$ -27 Groundwater: **Hole Progress:** Strike Depth Casing Depth (m) Hole Depth Casing Depth (m) Water Depth Depth After Date Date Observation (m) (m) (m) 4.30 07/11/2017 17:00 26.60 2.68 08/11/2017 08:00 26.60 4.30 2.90

 $\overline{\Omega}$ 

	me: Ea					ecground.co.uk Project No:  C5759	Co-ords:	E N			ole Typ
ation:		ction 2A				C3/33	Level:	mAOD		;	Scale : 50.0
nt:	Eas	st West Ra	ail Alliand	се			Dates:	Start: 01/11/2	017	Log	gged I
Water	Samp	les & In Situ T	esting					End: 08/11/2	017 Depth	Level	ΓΒ/EC
	No/Type	Depth (m)	Result	ample	Install	Very strong locally strong LIMESTONE. Discontinu	Description	grey shelly	(m)	(mAD)	Legend
=		27.67 - 27.90		¢		locally medium spaced u previous sheet)	ndulating rough. (c	continued from			
=	С	28.00 - 28.70	-								
=	CS	28.43 - 28.59	-	Ġ -		Borehole completed at 2	70	$\triangle$	28.70		
indwater:	Strike (n	Depth Cas	ing Depth	De Obse	epth After ervation (r	Hole Progress:	Hole Depth (m)	Casing Depth V	Vater Depth		

#### CC GROUND INVESTIGATIONS LTD

#### BOREHOLE LOG

Borehole No. CP2AJLFB 2U Sheet 1 of 2

Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation DS+RC C5759

Section 2A Location: Scale mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 16/11/2017 Dates: EC/JE End: 21/11/2017

								End: 21/11/20	117		
(m)	Water	Samp No/Type	les & In Situ Te		Sample	Inst	all	Description	Depth (m)	Level (mAD)	Legend
	LCVCIS	No/Type	Depth (m)	Result			$\Box$	TOPSOIL: Soft dark brown slightly sandy clayey SILT with	(111)	(117 (D)	. Z _I J ^X . Z _I J ^X .
}		В	0.20					frequent roots and rootlets (<30mm).	(0.40)		1/ 3// 3
4	1	ES	0.50				Ħ	Firm light brown slightly sandy silty CLAY.	0.40		<u></u>
‡	<u>¥</u>	B ES	0.50				Н				<del>*</del> **
. 1									(0.80)		$\begin{bmatrix} x & x \\ x & x \end{bmatrix}$
1 -		В	1.00					$\wedge$	4.00		<u>×</u>
3		SPT C	1.20 - 1.65	S 3				Firm brown mottled grey silty CLAY with occasional	1.20		<u>×</u> ×_[
=							Н	decomposed roots and rootlets (<5mm).			<del>*</del> _*_*
‡											<del>*</del> ***
2 –		D	1.90						(4.00)		
7		UT100	2.00 - 2.45					2.20-3.00m: Grey.	(1.80)		× × ×
3		D	2.45 - 2.55			$\Box$	H	L.E. G.SSIII. Grey.			<u></u>
=			2.40 - 2.00								<del>-</del> X
_ ‡											
3 —		С	3.00 - 4.00	C*429			ద	Medium strong grey shelly LIMESTONE. Discontinuities are	3.00		3
3		SPT C	3.00 - 3.45		1		Н	horizontal medium spaced locally closely spaced undulating rough.			
3					C						
4					i						
4 -		С	4.00 - 5.00	C*500							4
7		SPT C	4.00 - 4.18	C 300	1	$H_{-}$	H				
]					- C	A			(3.00)		
4							$\square$		(3.00)		
_ ‡		CS	4.72 - 5.00								
5 —		C SPT C	5.00 - 6.00	C*750		$\mathbb{N}$	H				5
3		SPIC	5.00 - 5.04				A				
3					Q			5.40-5.50m: 1no. open fracture (100mm) infilled with firm grey clay.			
‡		cs	5.74 - 5.89			$oxed{\Box}$	$\forall$	`			
6		С	6.00 - 7.50	C*23	<del></del>	$\forall$	$\mapsto$	5.80-6.00m: Black. Stiff to very stiff indistinctly laminated grey silty CLAY with	6.00		<del>× × 6</del>
3		SPT C	6.00 - 6.45	0 20	)	$\rightarrow$		occasional fine to medium sand sized comminuted shell			- X X
3								fragments (2-20mm) and calcareous nodules.			<u>× - x</u>
4					/ _ /	$\Box$	$\Box$		(1.25)		[ <del>**</del> ]
_ ‡		D	6.90			$\vdash$	$\vdash$				<del>*</del> **+
7 —		ט	0.90				Н				<u>x_x+7</u>
3							Ħ	Medium strong locally strong grey mottled dark grey shelly	7.25		
3		С	7.50 - 8.50				$\Box$	LIMESTONE. Discontinuities are closely spaced stepped rough with fine sand infill (30mm).	(0.50)		
4		CS D	7.50 - 7.70 7.50		C	$\vdash$	$\vdash$	(continued on next sheet)	7.75		× ×
8		D	7.00		<u> </u>		П	(25			<del></del>

EQUIPMENT: Hand digging tools. Fraste multi-purpose ML track mounted rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm sample barrel: 1.20-3.00m. Waterflush rotary coring using T6-116 coring barrel: 3.00-14.00m.
CASING: SW to 3.00m.
GROUNDWATER: Encountered at 0.60m, no rise recorded. Artesian water encountered 12.50-14.00m. Rose to 2.85m above headworks.
BACKFILL: Borehole backfilled with bentonite pellets: 14.00-0.50m and arisings 0.50-0.00m. Hand shear vane testing not possible due to strength of clay.

Groundwater:				Hole Progress:			
	Strike Depth	Casing Depth	Depth After	Data	Hole Depth	Casing Depth	Water Depth
Date	(m)	(m)	Observation (m)	Date	(m) [']	(m)	(m) ·
Date 16/11/17				16/11/2017 17:00	(m) ['] 1.20		(m) · 0.60
	(m)				` '		` '

#### CC GROUND INVESTIGATIONS LTD Borehole No. BOREHOLE LOG CP2AJLFB 2U Sheet 2 of 2 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation DS+RC C5759 Section 2A Location: Scale Level: mAOD 1:50.00 Client: East West Rail Alliance Logged By Start: 16/11/2017 Dates: EC/JE End: 21/11/2017 Samples & In Situ Testing Depth Water Level Install Description Legend (m) Sample Levels (m) No/Type Depth (m) Result Very stiff thinly laminated grey silty CLAY with occasional fine gravel sized comminuted shell fragments (2-6mm). (continued (0.75) $\mathbb{C}$ from previous sheet) 8.30-8.40m: Medium strong light grey limestone. 8.50 С 8.50 - 9.50 Very stiff grey calcareous silty CLAY. (0.90)0 D 9.00 CS 9.35 - 9.50 9.40 Medium strong light grey oolitic LIMESTONE with frequent coarse sand sized comminuted shell fragments (<2mm). 9.50 - 11.00 Discontinuities are closely spaced undulating rough locally stained orangish brown. 10 10.00-10.30m: Occasional fine to medium gravel sized shell fragments. 11.00 - 12.50 С 11.00-11.60m: Weak grey. CS 11.30 - 11.55 (4.10)12 12.00m. Locally non intact, recovered as angular to sub-angular fine to medium gravel. С 12.50 - 14.00 13 13.50 Firm (drilling disturbed) grey silty CLAY with frequent fine gravel sized comminuted shell fragments (<6mm). (0.50)14.00 Borehole completed at 14.00m 15 16 17 DONE Groundwater: **Hole Progress:** Casing Depth (m) Strike Depth Casing Depth (m) Hole Depth (m) Water Depth Depth After Observation (m) Ō Date 20/11/2017 17:00 3.00 2.85 14.00

#### WINDOWLESS SAMPLE LOG



Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Hole Type Co-ords: E N Investigation WS C5759

Section 2A Location: Scale mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 03/11/2017 Dates: MB End: 03/11/2017

							End: 03/11/20	/ 1 /		IVID
(m)	Water		les & In Situ To		Sample	Install	Description	Depth (m)	Level (mAD)	Legend
	Leveis	No/Type	Depth (m)	Result		VI KI	TOPCOIL : Cliff frieble deel, brown aliability and disability and aliability	(111)	(IIIAD)	. 7/1 /V 7/1 /V.
=		D ES	0.20				TOPSOIL: Stiff friable dark brown slightly sandy slightly gravelly CLAY with frequent roots (<3mm). Gravel is angular to sub-rounded fine to coarse of siliceous material.	c 0.30		1, 1, 1
-		B D ES	0.50 - 0.60 0.50				Stiff brown mottled grey slightly sandy slightly gravelly CLAY with occasional roots (<3mm). Gravel is sub-angular to sub-rounded fine to coarse of siliceous material.	(0.60)		
1 -		B D ES	1.00 - 1.10 1.00				Stiff to very stiff fissured light brown mottled light grey CLAY with occasional roots and with frequent shells and occasional fine gravel sized pockets of white calcareous silt.	(0.70)		
=		D	1.40				0.00	1.60		
_		_	4.00				Stiff fissured light brown mottled light grey CLAY.			‡
, 🚽		D	1.80		l l			(0.60)		[ <u>_</u>
2 -		UT100	2.00 - 2.45				Stiff fissured dark grevish brown CLAY with occasional partings	2.20		
=		D	2.55				(<10mm) of white silt.	2.55		
+							Firm to stiff fissured, locally laminated, dark greyish brown CLAY with rare sand sized gypsum crystals and fragments of lignite			
3		D	2.80				(<20mm).			
1							3.30-4,90m; Locally firm.			
=		D	3.50				3.30-4,90Hi, Locally IIIII.			
4								(2.35)		
4		ES UT100	3.90 4.00 - 4.45							
-		D	4.55					4.00		
5							Stiff to very stiff fissured dark brownish grey CLAY with occasional fine to medium gravel sized shell fragments (<20mm).	4.90		- <u>-</u>
-		D	5.50					(1.55)		
6		UT100	6.00 - 6.45							
							6.45m: Dry. Borehole completed at 6.45m	6.45		
7										-7
=										
				1		I		1		1

CCGI GINT STD AGS 4 0.GDT 12/12/17

C5759_GI SECTION 2A DONE DONE.GPJ

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 98mm and 84mm sample barrels: 1.20-6.00m.
CASING: 128mm to 4.00m.
GROUNDWATER: None encountered.
INSTALLATION: 50mm ID HDPE slotted pipe with washed gravel response zone: 1.45-6.45m. 50mm ID HDPE plain pipe with bentonite pellet seal: 1.45-0.20m.
Raised borehole helmet set in concrete: 0.00-0.20m. Gas valve fitted.
REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet. Hand shear vane testing not possible due to strength of clay.

Groundwater:  Date  Strike Depth Casing Depth Depth After Observation (m)	Hole Progress:DateHole Depth (m)Casing Depth (m)Water Depth (m)03/11/2017 00:006.454.00	
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#### CC GROUND INVESTIGATIONS LTD Probe No NAMIC PROBE LOG HDP2A109 U Sheet 1 of 2 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 03/11/2017 C5759 Level: mAD Section 2A Specification: DPSH-B Scale Location: 1:50 Hammer Mass: 63Kg Drop Height: 750mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 51mm Ť07 Diagram (N100 Values) 20 25 30 Depth Readings Torque 5 10 40 45 50 Remarks (m) (blows/100mm) (Nm) Hand dug inspection pit 0.00-1.20m. 0 2 0 3 0 20 5

20

20

20

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

6

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METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-8.00m.

REMARKS: Probing undertaken prior to windowless sampling - see separate sheet.

#### CC GROUND INVESTIGATIONS LTD Probe No DYNAMIC PROBE LOG SHDP2A109 U Sheet 2 of 2 Telephone: 01452 739165 , Fax: 01452 739220 , Email: info@ccground.co.uk Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E N Date Investigation 03/11/2017 C5759 Level: mAD Section 2A Specification: DPSH-B Scale Location: 1:50 Hammer Mass: 63Kg Drop Height: 750mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 51mm T07 Diagram (N100 Values) 20 25 30 Depth Readings Torque 10 40 5 45 50 Remarks (m) (blows/100mm) (Nm) Dynamic probe completed at 8.00m 9 10 11 12 13 14 15 EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig. METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-8.00m. REMARKS: Probing undertaken prior to windowless sampling - see separate sheet.

## TRIAL PIT LOG

Pit No TP2ABR 2D Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 Ground Project No:

Investigation C5759

Level: 69.98mAOD

Date 06/12/2017

Location: Section 2A

Client:

Dimensions:

Scale 2.00m

Depth East West Rail Alliance

1:25

0.50m 2.00m

Co-ords: E 460367 N 223091

Logged By MB

Water	Samp	les & In Situ T	esting	Decadella	Depth	Level	1.0000
n) Levels	No/Type	Depth (m)	Result	Description	(m)	(mAD)	Legend
-	D ES	0.20		TOPSOIL: Soft friable dark brown very sandy CLAY with frequent roots. Sand is fine.  Stiff friable brown mottled dark orangish brown sandy CLAY with frequent roots. Sand is fine.	(0.30)	69.68	1/ 2/1/ 1/ 2/1/
	B D ES	0.50 - 0.60 0.50	97	Stiff locally stiff fissured light grey mottled light brown and light orangish brown slightly sandy CLAY with occasional roots. Sand is fine.	0.60	69.38	
	H	0.80	104	slightly sandy CLAY with occasional roots. Sand is line.			
	B D ES H	1.00 - 1.10 1.00	124		(1.00)		
-	D	1.50	_	Stiff fissured dark brown mottled light yellowish brown CLAY with occasional partings and very thin lenses (<30mm) of yellow and dark orangish brown silt.	1.60	68.38	
-	В	1.80 - 2.00			(0.40)		
				2.00m: Dry Trial pit completed at 2.00m	2.00	67.98	

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pits excavated using 0.60m bucket.

GROUNDWATER: Not encountered.

BACKFILL: Trial pit was backfilled with compacted arisings upon completion.

CC TP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT 15/12/17

## TRIAL PIT LOG

Pit No
P2ACLOB_1L
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 Ground Investigation Project No: Co-ords: E 460150 N 223083 Date 06/12/2017

Location: Section 2A Dimensions: 2.00m Scale 1:25

Client: East West Rail Alliance 2.00m Client: East West Rail Alliance Logged By

m) Water		les & In Situ T	esting	Description	Depth	Level	Legend
Levels	No/Type	Depth (m)	Result	·	(m)	(mAD)	Legend
-	D ES	0.20		MADE GROUND: Soft dark brown slightly sandy slightly gravelly CLAY with frequent roots. Sand is fine. Gravel is sub-angular to rounded fine to coarse of flint.  MADE GROUND: Soft friable dark brown slightly gravelly sandy CLAY with a low cobble content and occasional roots. Gravel is angular to rounded fine to coarse of flint, quartzitic, tarmacadam, sandstone and brick. Cobbles are of bick, tarmacadam.	0.15	69.26	
- - -	B ES H	0.50 - 0.60 0.50 0.60	115	Stiff locally stiff fissured light brown mottled light orangish and light greyish brown slightly sandy CLAY with occasional roots. Sand is fine.	0.60	68.81	
	B D ES	0.75 1.00 - 1.20 1.00 1.10 - 1.20	114		(0.70)		
-	H B D	1.40		Stiff light grey mottled light brown and light orangish brown slightly sandy locally sandy silty CLAY. Sand is fine.	1.30 (0.20) 1.50	68.11 67.91	× × × × × × × × × × × × × × × × × × ×
	D	1.60		Soft to firm dark orangish brown mottled brown and light grey very sandy CLAY. Sand is fine.  Light grey mottled light brown and light orangish brown clayey silty fine SAND.	(0.20)	67.71	
-	B B	1.80 - 2.00 1.81 - 2.00		Light grey motted light blown and light drangist blown dayey slity line SAND.	(0.30)		×
				2.00m: Dry Trial pit completed at 2.00m	2.00	67.41	

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pits excavated using 0.60m bucket.

GROUNDWATER: None encountered.

BACKFILL: Trial pit was backfilled with compacted arisings upon completion.

CC TP LOG C5759 GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT 15/12/17

Location:

## TRIAL PIT LOG

Section 2A

Pit No P2ACLOB_3[ Sheet 1 of 1

Date

05/12/2017

Scale

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E 460142 N 222724

Investigation C5759 Level: 68.81mAOD

1:25 Depth Client: East West Rail Alliance

0.50m 2.00m Logged By MB

2.00m

Dimensions:

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(m)	Water	Samp	les & In Situ T		Description		Depth	Level (mAD)	Legend
` ′	Leveis	No/Type	Depth (m)	Result	MADE GROUND: Soft dark brown slightly sand	v slightly grovelly CLAV with	(m)	(MAD)	***
-		D	0.10		frequent roots . Sand is fine. Gravel is sub-angu flint.	lar to rounded fine to coarse of	(0.20)	68.61	
-		D ES	0.25		EMBANKMENT FILL: Firm light brown mottled I CLAY with occasional roots.	ight orangish brown and light grey	(0.25)		_
-		D ES H	0.50 0.60 - 0.80	72	Firm to stiff friable brown mottled orangish brow CLAY with occasional roots. Sand is fine.	n and light grey slightly sandy	(0.45)	68.36	
1		B H	0.80	79				67.00	
					Stiff fissured light brown mottled light orangish a occasional rootlets.	and light greyish brown CLAY with	0.85	67.96	
-		B ES B H	1.00 - 1.10 1.00 1.01 - 1.10 1.20	93			(0.95)		
-		D	1.50	112		/	(* * * * )		
-		H							
-		B B	1.80 - 2.00 1.81 - 2.00		Firm to stiff fissured greyish brown mottled light slightly sandy CLAY with occasional partings ar yellow and dark orangish brown silt. Sand is fine	d very thin lenses (<30mm) of	1.80 (0.20)	67.01	
-					2.00m: Dry Trial pit completed at 2.00m	7	2.00	66.81	
-									-
_									
-									

EQUIPMENT: JCB 3CX mechanical excavator. METHOD: Trial pits excavated using 0.60m bucket.

GROUNDWATER: None encountered.

BACKFILL: Trial pit was backfilled with compacted arisings upon completion.

C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT 15/12/17 CC TP LOG

## TRIAL PIT LOG

Pit No
P2ACLOB_4E
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 Ground Investigation Project No: Co-ords: E 460140 N 222921 Date 05/12/2017

Location: Section 2A Dimensions: 2.00m Scale 1:25

Client: East West Rail Alliance 2.00m Client: East West Rail Alliance Logged By

						$\overline{-}$		טועו
(m)	Water	Sampl	les & In Situ T		Description	Depth (m)	Level (mAD)	Legend
	Leveis	No/Type	Depth (m)	Result	MADE GROUND: Soft friable dark brown slightly gravelly sandy CLAY with	(111)	(IIIAD)	\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[\times_{I}\]\[
-	-	D	0.10		occasional roots. Sand is fine. Gravel is sub-angular to rounded fine to coarse of flint.  EMBANKMENT FILL: Firm friable brown slightly sandy slightly gravelly CLAY wit	0.20	69.60	1/ 1/ 1
-		D ES	0.30		occasional roots. Sand is fine. Gravel is sub-angular to rounded fine to coarse predominantly of flint.  Stiff fissured light brown mottled light orangish and light greyish brown CLAY with	0.40	69.40	
- - -	-	D ES H	0.50	111	occasional rootlets.	(1.00)		
1 -	-	B ES H B	1.00 - 1.10 1.00 1.01 - 1.10	80 86				
-		D	1.50	00	Sstiff fissured greyish brown mottled light yellowish and orangish brown slightly sandy CLAY with occasional partings and very thin lenses (<30mm) of yellow and the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the contro	1.40	68.40	
- - -		D	4.00, 2.00		dark orangish brown silt. Sand is fine.	(0.60)		
2 -		B B	1.90 - 2.00 1.91 - 2.00		2.00m: Dry Trial pit completed at 2.00m	2.00	67.80	
- - - -			/					- - - - -
3 — - - - -								
- - - - 4 —								-

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pits excavated using 0.60m bucket.

GROUNDWATER: None encountered.

BACKFILL: Trial pit was backfilled with compacted arisings upon completion.

CC TP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.G

Location:

## TRIAL PIT LOG

Section 2A

Pit No P2ACLOB 4L Sheet 1 of 1

2.00m

Date

06/12/2017

Scale

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 Ground Project No: Co-ords: E 460106 N 222952 Investigation

C5759 Level: 69.46mAOD

1:25 Depth 1.60m Client: East West Rail Alliance Logged By

Dimensions:

0.50m MB

m)	Water	Samp	les & In Situ T	esting	Description	Depth	Level	Legend
111)	Levels	No/Type	Depth (m)	Result	·	(m)	(mAD)	Legend
-		D ES	0.10		TOPSOIL: Soft friable dark brown slightly gravelly sandy CLAY with occasional roots. Sand is fine. Gravel is sub-angular to rounded of quartzitic and flint.	(0.30)		\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(1
					Stiff friable light brown mottled light orangish brown and light grey sandy to very sandy CLAY with occasional roots. Sand is fine.	0.30	69.16	
-		D ES H	0.50	112		(0.60)		
-		Н	0.80	122	Stiff fissured light brown mottled light orangish brown and light grey slightly sandy	0.90	68.56	
-		B H B	1.00 - 1.10 1.00 1.01 - 1.10	96	CLAY with occasional rootlets. Sand is fine.	(0.50)		
-		В	1.50 - 1.60	-	Stiff fissured light grey mottled light brown and light orangish brown sandy locally very sandy CLAY with occasional rootlets. Sand is fine.	1.40 (0.20)	68.06	
-		D B	1.50 1.51 - 1.60		1.60m: Dry Trial pit completed at 1.60m	1.60	67.86	-
-								-
-				<				
-								
-								
-								
1								

EQUIPMENT: JCB 3CX mechanical excavator. METHOD: Trial pits excavated using 0.60m bucket.

GROUNDWATER: None encountered.

BACKFILL: Trial pit was backfilled with compacted arisings upon completion.

CC TP LOG

# YNAMIC PROBE LOG

Telephone: 01452 739 165, Fax: 01452 739 220, Email: info@CCGround.co.uk

Co-ords: E N

Sheet 1 of 1

Probe No

SHDP2APDN_2U

Project Name: East West Rail Phase 2 Ground Project No:

Investigation C5759 Level: mAD

Date 06/12/2017

Section 2A Location:

Specification: DPSH-B Hammer Mass: 63Kg

Scale 1:50

Client: East West Rail Alliance Drop Height: 750mm Cone Base Diameter: 51mm

Rig No.

							Cone		ameter. J IIIIII	T04
Readings (blows/100mm)	5	10	Diag 15 2	ram (N100 0 25	0 Values) 30	35	40 45	50	Torque (Nm)	Remarks
0									1	
0 0										
0 0								$\wedge$	0 ]	
0 1 1										
2 2 1								>		
1 1 3							$\checkmark//$		41 _	
2 2 3	国									
5 4 4						,		>	54	
4 5 5										
7 7										
7 7									54	
8 7 6										
6 7									54	
7 7 8										
8 8			/							
8 7									54 _	
9 8 10		크								
8 10 11 12										
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			(JOWS) 100HIII)  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Readings (blows/100mm) 5 10 15 20 25 30 35 40 45 40 45 40 45 40 45 5 5 8 7 7 7 7 6 8 7 6 7 8 8 7 8 8 7 8 8 7 8 9 9 8 10 8 10 11 11	Readings (blows/100mm) 5 10 15 Diagram (N100 Values) 35 40 45 50	

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-8.00m.

REMARKS: Probing undertaken adjacent to window sampling - see separate sheet.

CC DP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT 15/12/17

CC Ground Investigations Ltd Probe No MAMIC PROBE LOG IDP2A101 ¢ Sheet 1 of 1 Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk Project Name: East West Rail Phase 2 Grip 4 Project No: Co-ords: E 467284 N 225359 Date **Ground Investigation** 08/01/2018 C5759 Level: 89.15mAD Section 2A Specification: DPH Scale Location: 1:50 Hammer Mass: 50Kg Drop Height: 500mm Client: East West Rail Alliance Rig No. Cone Base Diameter: 44mm T07 Diagram (N100 Values) 20 25 30 Depth Readings Torque 10 40 5 45 50 Remarks (m) (blows/100mm) (Nm) 0.00-1.20m: Hand dug inspection 0 2 Dynamic probe completed at 2.56m 3 5 6 7 0.GDT EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig. METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-2.56m. REMARKS: On completion hole backfilled with arisings. GI SECTION 2A.GPJ

# NAMIC PROBE LOG

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 466902 N 225255

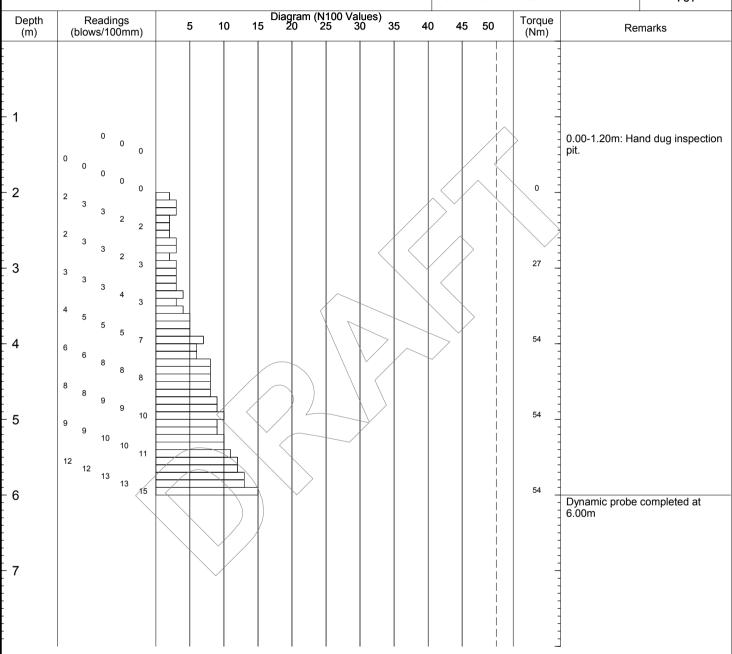
Probe No

IDP2A102_¢ Sheet 1 of 1

Project Name: East West Rail Phase 2 Grip 4 Project No: Date **Ground Investigation** 08/01/2018 C5759 Level: 89.60mAD

Section 2A Specification: DPH Scale Location: 1:50 Hammer Mass: 50Kg

Drop Height: 500mm Client: East West Rail Alliance Rig No. Cone Base Diameter: 44mm T07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-6.00m.

REMARKS: On completion hole backfilled with arisings.

0.GDT

#### DYNAMIC PROBE LOG

N ISO 22476-2

Client:

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 464891 N 224533

Sheet 1 of 1

B Date

Project Name: East West Rail Phase 2 Grip 4 Ground Investigation

East West Rail Alliance

C5759

Project No:

Level: 86.77mAD

Date 08/01/2018

Probe No

IDP2A105 ¢

Location: Section 2A

Specification: DPH

Scale 1 : 50

Hammer Mass: 50Kg Drop Height: 500mm

Rig No.

Ciletit.	Last Wes		Cone Base Diameter: 44mm				T07						
Depth (m)	Readings (blows/100mm)	5	10 15	Diagram 20	(N100 \ 25	/alues) 30	35	40	45	50	Torque (Nm)	Re	marks
1											14 _	0.00-1.20m: Ha pit.	nd dug inspection
3	3 2 2 3 3 3 3 5 6 6 7 7 7 0 6										54		
4	9 11 11 11 12 12 12 11 10 11 12						> \		>		54		
5 6	12 14 15 15 14 15 15 14 13 13 15				>						54 _		
7												Dynamic probe 6.00m	completed at

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-6.00m.

REMARKS: On completion hole backfilled with arisings.

CC DP LOG C5759 GI SECTION 2A.GPJ CCGI GINT STD AGS 4 0.GDT 23/1/18

#### DYNAMIC PROBE LOG

**Ground Investigation** 

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Probe No

HDP2A107 ¢ Sheet 1 of 1

Co-ords: E 464643 N 224436 Project Name: East West Rail Phase 2 Grip 4 Project No: Date 08/01/2018 C5759 Level: 86.18mAD

Specification: DPH Section 2A Scale Location: 1:50 Hammer Mass: 50Kg

Drop Height: 500mm Rig No. Client: East West Rail Alliance Cone Base Diameter: 44mm Ĭn7

									Cone	Base Dia	ameter: 44	mm	T07
Depth (m)	Readings (blows/100mm)	5	10 15	Diagram 20	(N100 ' 25	Values) 30	35	40	45	50	Torque (Nm)	Re	marks
- 1	2 2 .										- -	0.00-1.20m: Ha	nd dug inspection
- 2	5 5 5 7 4 3 6 5 5										0 _	, μι	
- 3	7 7 6 5 4 4 4										0		
- 4	5 4 4 4 4 4 4 4 3 3 4 3						>		>	)   	0		
5	3 3 4 5 6 6 5 5 5										0 _		
6	6 5										0 _	Dynamic probe 6.00m	completed at
7											-		

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-6.00m.

REMARKS: On completion hole backfilled with arisings.

CC DP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT 23/1/18

#### DYNAMIC PROBE LOG

N ISO 22476-2

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 464211 N 224312

Sheet 1 of 1

Date

Probe No

1DP2A110

Project Name: East West Rail Phase 2 Grip 4 Ground Investigation

estigation C5759

Project No:

Level: 83.95mAD

09/01/2018

Location: Section 2A

Specification: DPH

Scale 1 : 50

Client: East West Rail Alliance

Hammer Mass: 50Kg
Drop Height: 500mm

Rig No.

								00110	, Dasc Di	ameter: 44	111111	T07
Depth (m)	Readings (blows/100mm)	5	10	Diagram 15 20	(N100 \ 25	/alues) 30	35 4	0 45	5 50	Torque (Nm)	Rei	marks
I	0 5 0 0									-	0.00-1.20m: Ha pit.	nd dug inspectio
2										0 -		
3	1 2 2 2 3 3 3 4 3									27 _		
ŀ	4 3 4 4 5 5 5 5 5 5 5									54 _		
i	5 4 5 6 5 6 7 7 6 8									54 _		
	8 8 9				>					54 ₋	Dynamic probe 6.00m	completed at
										-		

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-6.00m.

REMARKS: On completion hole backfilled with arisings.

CC DP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT 23/1/18

# DYNAMIC PROBE LOG

EN ISO 22476-2

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Probe No

HDP2A113_C Sheet 1 of 1

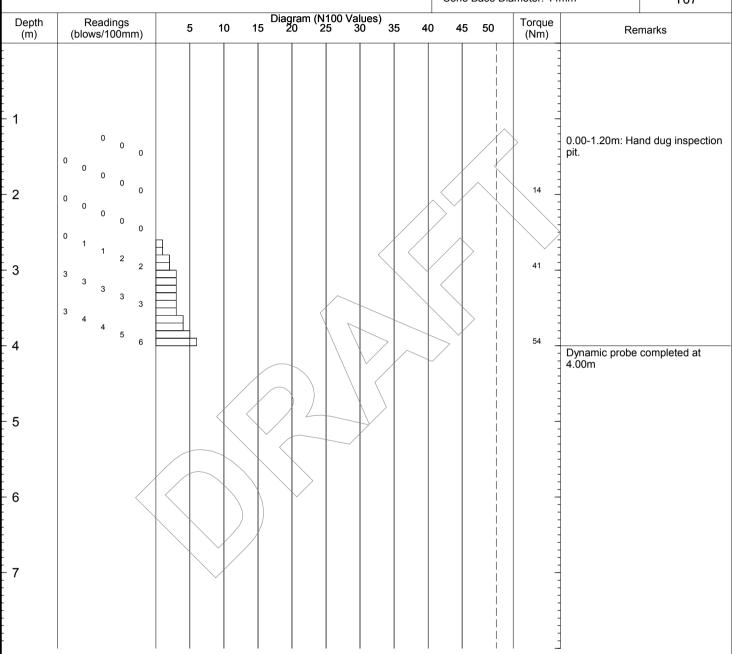
Project Name: East West Rail Phase 2 Grip 4 Ground Investigation

Project No: Co-ords: E 463128 N 223994 Level: 77.60mAD

Co-ords: E 463128 N 223994 Date 09/01/2018

Location: Section 2A Specification: DPH Scale Hammer Mass: 50Kg 1:50

Client: East West Rail Alliance Drop Height: 500mm Rig No.
Cone Base Diameter: 44mm T07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-4.00m.

REMARKS: On completion hole backfilled with arisings.

G C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT

# DYNAMIC PROBE LOG

Project Name: East West Rail Phase 2 Grip 4

**Ground Investigation** 

EN ISO 22476-2

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

0 | 5 400000 N 000004

Co-ords: E 462623 N 223821 Date Level: 74.40mAD 10/01/2018

Probe No

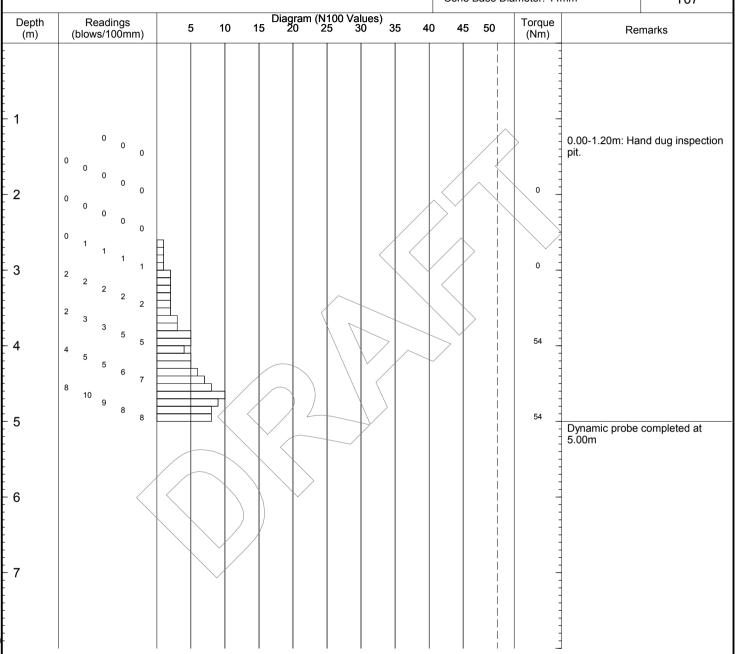
IDP2A116_C Sheet 1 of 1

Location: Section 2A Specification: DPH Scale
Hammer Mass: 50Kg 1:50

Project No:

Client: East West Rail Alliance Drop Height: 500mm Rig No.
Cone Base Diameter: 44mm T07

C5759



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-5.00m.

REMARKS: On completion hole backfilled with arisings.

C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4

0.GDT

#### NAMIC PROBE LOG

East West Rail Alliance

Client:

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Sheet 1 of 1 Co-ords: E 461707 N 223496 Date

Probe No

IDP2A119 C

Project Name: East West Rail Phase 2 Grip 4 **Ground Investigation** 

C5759

Project No:

69.29mAD Level:

10/01/2018

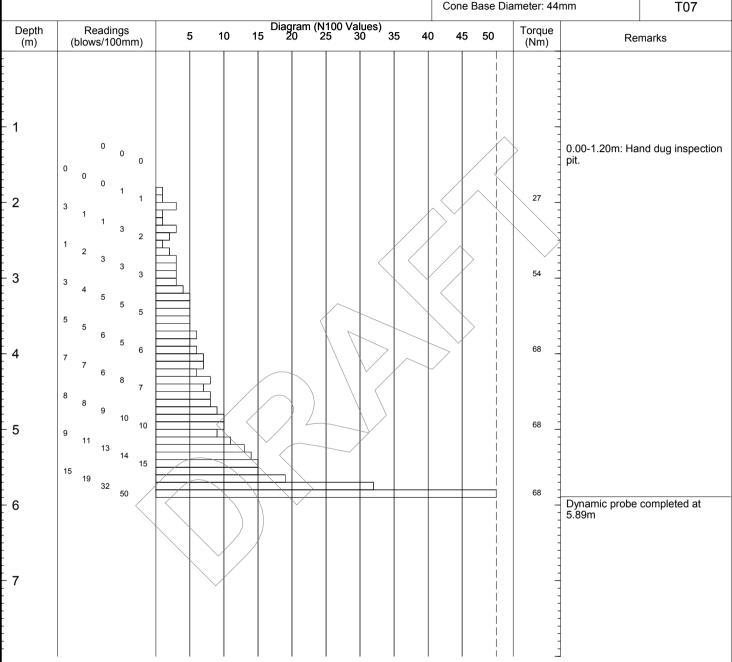
Section 2A Location:

Specification: DPH

Scale 1:50 Hammer Mass: 50Kg

Drop Height: 500mm

Rig No. Cone Base Diameter: 44mm



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-5.89m.

REMARKS: On completion hole backfilled with arisings.

0.GDT

#### YNAMIC PROBE LOG

Client:

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Sheet 1 of 1 Co-ords: E 461577 N 223450 Date

Probe No

1DP2A122

Project Name: East West Rail Phase 2 Grip 4

East West Rail Alliance

**Ground Investigation** C5759

Project No:

Level: 69.05mAD 10/01/2018

Section 2A Location:

Specification: DPH

Scale 1:50

Hammer Mass: 50Kg Drop Height: 500mm

Rig No.

					Cone Base Di	ameter: 44	·mm	Ť07
Depth (m)	Readings (blows/100mm)	5 10 1	Diagram (N100 Va 5 20 25 3	alues) 30 35 40	45 50	Torque (Nm)	Ren	narks
2						0	0.00-1.20m: Har pit.	nd dug inspectio
						-		
	5 5 4 5 5 4					54		
	5 6 6 7 10 8 14 12					54		
	18 20 30 50					54	Dynamic probe of 5.89m	completed at

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-5.89m.

REMARKS: On completion hole backfilled with arisings.

CC DP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT 23/1/18

#### NAMIC PROBE LOG

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 461475 N 223413 Date

Probe No

IDP2A125 ¢

Sheet 1 of 1

Project Name: East West Rail Phase 2 Grip 4

**Ground Investigation** C5759

Project No:

Level: 69.11mAD 10/01/2018

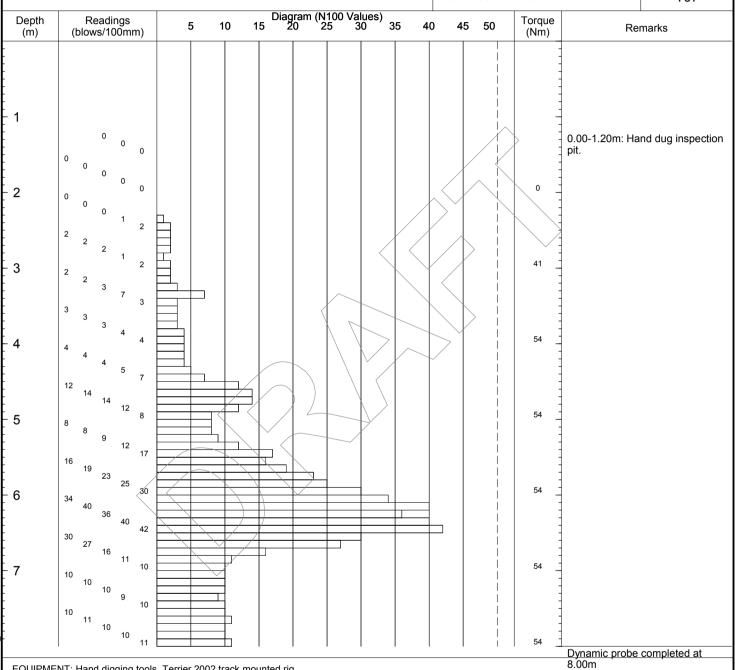
Section 2A Location:

Specification: DPH Hammer Mass: 50Kg Scale 1:50

Client: East West Rail Alliance

Drop Height: 500mm Cone Base Diameter: 44mm

Rig No. T07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing heavy (DPH): 1.20-8.00m.

REMARKS: On completion hole backfilled with arisings.

0.GDT

## TRIAL PIT LOG

Pit No
P2AMGOB_1
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Ground Investigation Project No: C5759 Co-ords: E 463651 N 224209 Level: 87.16mAOD Date 20/12/2017

Location: Section 2A GI

Dimensions: 2.00m
Scale 1:25

Client: East West Rail Alliance 2.00m Client: East West Rail Alliance Logged By

	1	T _				$\overline{}$	$\perp$	IVID
(m)	Water Levels	Samp No/Type	les & In Situ T Depth (m)	Result	Description	Depth (m)	Level (mAD)	Legend
- - -		D ES	0.20	Result	TOPSOIL: Soft dark brown slightly sandy slightly gravelly CLAY with frequent rootlets (<1mm). Gravel is sub-angular to rounded fine to coarse of flint and quartzitic.  Firm fissured light brown mottled light orangish brown and light grey CLAY with occasional roots (<2mm).	(0.25)	86.91	\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}{2}\)\(\frac{1}\)\(\frac{1}\)\(\frac{1}\)\(\frac{1}\)\(\frac{1}\)\(\frac{1}\)\(\frac{1}\)\(\frac{1}\)\(\
- - - -	-	B D ES H	0.50 - 0.70 0.50 0.70	87		(1.25)		
1 -		ES	1.00					1
-	-	Н	1.20	91				
- - -		B H	1.50 - 1.60 1.50	87	Firm fissured greyish brown mottled brown and dark orangish brown CLAY with occasional partings of yellow silt.	1.50	85.66	
2 —	-	D H	1.90	87	2.00m: Dry. Trial pit completed at 2.00m	(0.50)	85.16	
3 -								

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

GROUNDWATER: None encountered.

 ${\bf STABILITY: Trial\ pit\ generally\ stable\ and\ vertical.}$ 

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

CC TP LOG C5759 GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GI

## TRIAL PIT LOG

Pit No
P2AMGOB_2L
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Ground Investigation

Project No: Co-ords: E 463645 N 224003 Level: 78.02mAOD

Co-ords: E 463645 N 224003 Level: 78.02mAOD

Location: Section 2A GI

Dimensions: 2.00m
Scale 1:25

Client: East West Rail Alliance 2.00m Client: East West Rail Alliance Logged By

(m) \	Water	Sampl	es & In Situ T		Description	Depth	Level	Legend
\'''' L	Levels	No/Type	Depth (m)	Result	·	(m)	(mAD)	-
-		D ES	0.20	_	TOPSOIL: Soft dark brown slightly sandy slightly gravelly CLAY with frequent rootlets (<1mm). Gravel is sub-angular to rounded fine to coarse of flint and quartzitic.  Firm fissured light brown mottled light orangish brown and light grey CLAY with occasional roots (<2mm).	(0.25)	77.77	1/ 1/1/ 1/2 1/ 1/1/ 1/2 1/ 1/1/ 1/2
		D ES H	0.50	82				
1 -		B ES H	1.00 - 1.20 1.00	89		(1.45)		
-		D H	1.50	87	Firm fissured greyish brown mottled brown and dark orangish brown CLAY with	— 1.70	76.32	
2 –		B H	1.90 - 2.00 1.90	87	occasional partings of yellow silt.  2.00m: Dry.  Trial pit completed at 2.00m	(0.30)	76.02	
3 -								- - - - - - - - - - - - - - - - - - -

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

STABILITY: Trial pit generally stable and vertical.

GROUNDWATER: None encountered.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

CC TP LOG C5759 GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.G

## TRIAL PIT LOG

Pit No
P2ACLOB_1
Sheet 1 of 1

Date

09/04/2018

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Ground Investigation Project No: C5759 Co-ords: E 460140 N 222845 Level: 70.03mAOD

Location: Section 2A GI Dimensions: 2.00m Scale 1:25

Client: East West Rail Alliance Depth 2.00m P Logged By MB

(m) Water	Samp	les & In Situ T	esting	Description	Depth	Level	Legend
Levels	No/Type	Depth (m)	Result	·	(m)	(mAD)	Legenu
- - -	D ES	0.20		MADE GROUND: Soft dark brown slightly sandy slightly gravelly CLAY with frequent roots and rootlets (<6mm). Gravel is angular to rounded fine to coarse limestone, chalk, tarmacadam and siliceous material.	(0.40)		
-	B D ES	0.50 - 0.60 0.50	40 34 39	MADE GROUND: Soft light brown mottled orangish brown and grey slightly sandy slightly gravelly CLAY with low cobble content and occasional roots and rootlets (<3mm). Gravel is angular to rounded fine to coarse chalk, limestone and siliceous material.	(0.30)	69.63 69.33	
	H D H	0.80	52 50	Soft to firm grey mottled brown slightly sandy CLAY with occasional rootlets (<1mm). [ALLUVIUM].  Firm light orangish brown mottled light grey slightly sandy locally sandy CLAY.	(0.20)	69.13	
1 -	B ES H	1.00 - 1.10 1.00 1.10	47 60 58 56	[OXFORD CLAY].			
	D H	1.50	60 62 64		(0.90)		
	B H	1.80 - 2.00 1.80	56 62	Firm friable fissured grey mottled brown and orangish brown CLAY with frequent lithorelicts (<10mm). [OXFORD CLAY].	1.80	68.23	
3 —				Trial pit completed at 2.00m	2.00	68.03	

EQUIPMENT: 5 Tonne Tracked Excavator.

METHOD: Trial pits excavated using 0.60m bucket.

GROUNDWATER: Seepage encountered at 1.80m. No rise recorded.

STABILITY: Trial pit generally stable.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

PID: PID readings were undertaken on all environmental samples. Results: 0.20m - 0.0ppm; 0.50m - 0.0ppm; 1.00m - 0.0ppm.

TP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GI

## WINDOWLESS SAMPLE LOG



Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E 461707 N 223476 **Ground Investigation** WS C5759

Section 2A GI Scale Location: Level: 66.08mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 23/04/2018 Dates: MB/EC End: 24/04/2018

								End: 24/04/20	18	''	/ID/LC
(m)	Water Levels		les & In Situ To	esting Result	Sample	Install	Des	scription	Depth (m)	Level (mAD)	Legend
	<u>1</u>	D ES H B	0.20 0.40 0.50 - 0.60	52 48			roots (<15mm). TOPSOIL: Soft dark brown slig roots (<15mm).	ghtly sandy CLAY with frewuent ghtly sandy CLAY with frequent ngish brown and light grey slightly	0.25	65.83	<u></u>
1 -		D ES H B	0.50 0.70 1.00 - 1.10 1.00	49 61 74 72			sandy CLAY with occasional r Soft to firm brown mottled oral sandy CLAY with occasional r	oots (<2mm). [ALLŬVĬŪM] ngish brown and light grey slightly oots (<2mm).	0.80 (0.40) 1.20	65.28 64.88	1
		D ES H H	1.39 1.60	62 68 64 32			∏ [ALLUVIUM]	ootlets (<1mm). Sand is fine. lar fine to coarse of sandstone.	(0.40)	64.48	× × × × × × × × × × × × × × × × × × ×
2 -		D D UT100	1.90 2.00 - 2.45				Soft orangish brown mottled li	ootlets (<1mm). Sand is fine. (ar fine to coarse of sandstone. (ght grey sandy silty CLAY.)	(0.85)		2
		D D B	2.45 - 2.55 2.55 - 2.60 2.60 - 3.00				Soft orangish brown mottled light of Orangish brown mottled light of Orangish brown mottled light of Dark grey silty SAND.	grey çlayey SAND.	2.45	63.63	×××
3 -		В	3.00 - 3.50				Dark grey silty SAND.		(1.05)	62.58	× × -3
4 -							Borehole completed at 3.50m		0.00	02.00	-4 4
5 -											- - - 5
6 -											- - - - 6
7 -											- - - - -7
8											- - - - - - - - - - - - - - - - - - -
<u> </u>											

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 128mm, 101mm and 86mm sample barrels: 1.20-3.50m.
CASING: Not used.
GROUNDWATER: Seepage at 0.60m. Rose to 0.56m.
BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 1.00-3.00m and arisings: 0.00-1.00m.
REMARKS: Dynamic probe undertaken adjacent to window sample - see separate sheet. Borehole collapsed:3.00-3.50m. Client agreed terminating at 3.50m.
PID: PID readings were undertaken on all environmental samples. Results: 0.20m - 0.00ppm, 0.50m - 0.00ppm, 1.00m - 0.00ppm.

Groundwater:				Hole Progress:				
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
23/04/18	0.56			23/04/2018 17:00 24/04/2018 08:00	1.20 1.20		0.50 0.72	
				24/04/2018 17:00	3.50		0.56	

# MAMIC PROBE LOG

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 461707 N 223476 Date

Probe No

Sheet 1 of 1

23/04/2018

HDP2A118 U

Project Name: East West Rail Phase 2 GRIP4 Project No:

**Ground Investigation** C5759

66.08mAD Level: Specification: DPSH-B

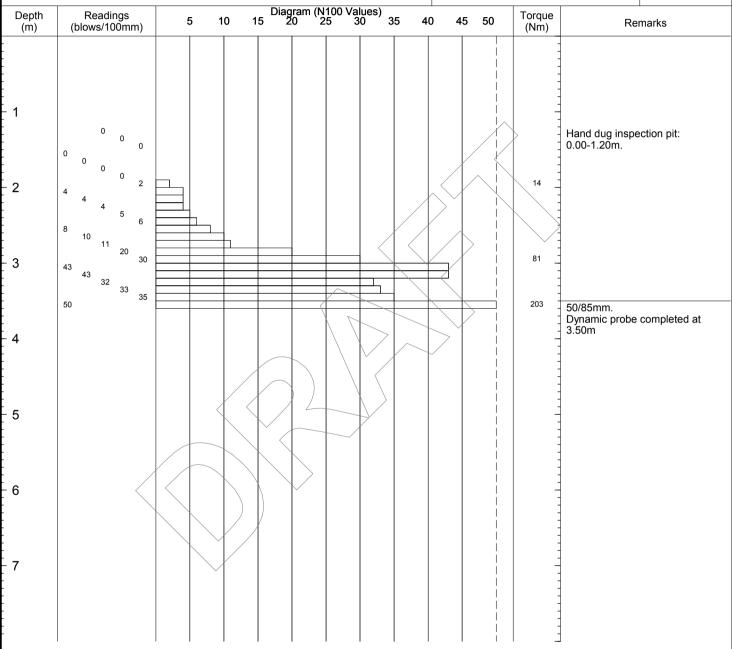
Scale 1:50

Section 2A GI Location:

Hammer Mass: 64Kg Drop Height: 750mm

Rig No.

East West Rail Alliance Client: Cone Base Diameter: 51mm



EQUIPMENT: Terrier 2002 track mounted window sampling rig. METHOD: Dynamic probing superheavy (DPSH-B): 1.00-3.50m.

REMARKS: Probing undertaken adjacent to windowless sample - see separate sheet.

## WINDOWLESS SAMPLE LOG



End: 26/04/2018

WS2A120 D

Sheet 1 of 1

Hole Type

WS

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: **Ground Investigation** 

Co-ords: E 461673 N 223507 C5759

Location: Section 2A GI Scale Level: 66.05mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 26/04/2018 Dates:

(m)	Water	Samp	les & In Situ Te	esting	Sample	Install	Description	Depth	Level	Legend	
(111)	Levels	No/Type	Depth (m)	Result	Sample	IIIDIAII	· · · · · · · · · · · · · · · · · · ·	(m)	(mAD)	Legend	
- - -		ES	0.20				TOPSOIL: Soft dark brown slightly sandy CLAY with frequent roots (<20mm).  Firm brown mottled grey slightly sandy CLAY with occasional	0.25	65.80		
=	1	H B D	0.40 0.50 - 0.60 0.50	56 64			rootlets (<2mm).  Firm tending to stiff light brown mottled light orangish brown and	0.60	65.45		
1 -	<u>_</u>	ES H B	0.70 0.80 - 0.90 0.80	80			light grey slightly sand CLAY. Light orangish brown mottled light grey clayey silty SAND.	0.90	65.15	<u>-</u>	-1
=		D ES H	1.00 1.30	00				(1.10)			
		D D	1.80								
2 -		D D	2.00 2.10				Brown mottled dark orangish brown very silty fine SAND with occasional shell fragments	2.00	64.05 63.85	× 1 × 1 = 1	-2
-		B D	2.30 - 2.80 2.30				Dark grey very silty SAND with rare shell fragments.	(0.60)		× · · · ·	
-	-						Borehole completed at 2.80m	2.80	63.25		2
3 —											-3
										-	
4 -											4
- - -										-	
5 —										-	-5
-											
6 -											6
- - -											
7 -											-7
										<u> </u>	
-										[ -	
8 —										<u> </u>	-8

WS LOG

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm sample barrels: 1.20-2.80m.

CASING: 128mm to 2.00m.

GROUNDWATER: Seepage encountered at 0.80m. Borehole damp at 2.80m.

BACKFILL: Bolehole backfilled with bentonite pellets: 1.20-2.80m. Inspection pit backfilled with arisings: 0.00-1.20m and surface reinstated.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate sheet SHDP2A126_D. Drillers notes refusal at 2.80m, borehole terminated.

PID: PID testing undertaken: 0.20m - 0.00ppm; 0.50m - 0.00ppm; 1.00m - 0.00ppm.

5							
Groundwater:				Hole Progress:			
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
26/04/18	0.90	2.00		26/04/2018 17:00	2.80	2.00	
2							

# DYNAMIC PROBE LOG

Project Name: East West Rail Phase 2 GRIP4 Project No:

**Ground Investigation** 

East West Rail Alliance

Section 2A GI

EN ISO 22476-2

Location:

Client:

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 461673 N 223507 Date Level: 66.05mAD 26/04/2018

Specification: DPSH-B Scale
Hammer Mass: 64Kg 1:50

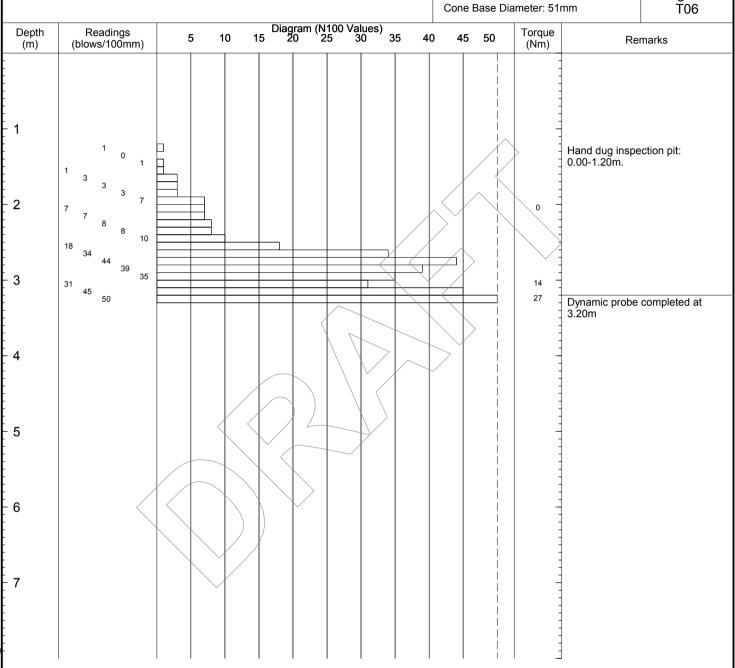
Hammer Mass: 64Kg Drop Height: 750mm

Rig No.

Probe No

Sheet 1 of 1

HDP2A120 D



C5759

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-3.20m.

REMARKS: Probing undertaken adjacent to windowless sample - see separate sheet.

DP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT

## WINDOWLESS SAMPLE LOG



Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E 461581 N 223433 **Ground Investigation** WS C5759

Location: Section 2A GI Scale Level: 65.71mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 23/04/2018 Dates: MB/EC End: 24/04/2018

Certification  Levels No/Type Depth (m) Result  Description  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Comparison  Compa												
TOPSOIL: Soft dark brown lightly sandy CLAY with frequent roots (>15mm).  TOPSOIL: Soft dark brown slightly sandy CLAY with frequent roots (>15mm).  TOPSOIL: Soft dark brown slightly sandy CLAY with frequent roots (>15mm).		Level (mAD)		scription	D	Install	Sample				Water Levels	(m)
D 0.40 62 0.50 - 0.60 70 70 70 70 D 0.70 70 D 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70 T 0.70	6		(m)  0.25 0.45 (0.40) 0.85  1.20 1.30 (0.70) 2.00	control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the contro	TOPSOIL: Soft dark brown li roots (>15mm). TOPSOIL: Soft dark brown s roots (>15mm). Soft to firm dark brown slight roots (<10mm). [ALLUVIUM] Soft to firm dark brown slight roots (<10mm). [ALLUVIUM] Firm brown mottled orangish CLAY with occasional roots [ALLUVIUM] Firm brown mottled orangish CLAY with occasional roots (>2mm) begravelly with depth. Gravel is coarse of sandstone. Firm light grey mottled light occasional roots (<2mm) begravelly with depth. Gravel is coarse of sandstone. Very soft orangish brown movery soft orangish	Install	Sample	60 62 70 72 70 75	Depth (m)  0.20 0.30 0.40 0.50 - 0.60 0.50 0.70 1.00 - 1.10 1.00 1.40 1.50 - 2.00	No/Type  D ES D H B D ES H B D ES H B D ES H B B B	Water Levels	1 - 3

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 128mm, 101mm and 86mm sample barrels: 1.20-3.50m.
CASING: 113mm diameter to 2.00m.
GROUNDWATER: Drillers log states seepage at 0.50m. Rose to 0.39m.
BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 1.00-3.50m and arisings: 0.00-1.00m.
REMARKS: Dynamic probe undertaken adjacent to window sample - see separate sheet. Borehole collapsed:3.00-3.50m. Client agreed terminating at 3.50m. PID readings were undertaken on all environmental samples. Results: 0.20m - 0.00ppm, 0.50m - 0.00ppm, 1.00m - 0.00ppm.

Groundwater:				Hole Progress:			
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
24/04/18	0.50			23/04/2018 17:00 24/04/2018 08:00	1.20 1.20		
				24/04/2018 17:00	3.50	2.00	0.39

# DYNAMIC PROBE LOG

Project Name: East West Rail Phase 2 GRIP4 | Project No:

EN ISO 22476-2

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 461581 N 223433 Date Level: 65.71mAD 24/04/2018

Probe No

Sheet 1 of 1

HDP2A121 U

Ground Investigation

C5759

Level: 65.71mAD

Location: Section 2A GI

Specification: DPSH-B

Specification: DPSH-BScaleHammer Mass: 64Kg1:50

Client: East West Rail Alliance Drop Height: 750mm

op Height: 750mm Rig No.

Hand dug inspection pit 0.00-1.20m.						Cone Base Diam	eter: 51mm	
1 4 10 16 16 16 18 27 25 23 27 30 42 45 50 95 95 95 95 95 95 95 95 95 95 95 95 95	Depth (m)	Readings (blows/100mm)	5 10	Diagram (N10 15 20 25	00 Values) 30 35 40	45 50	Torque (Nm)	Remarks
9 11 18 27 25 23 27 30 95 95 95 Dynamic probe completed at 3.20m	1	0 1 1 4 10 16					=	inspection pit m.
		9 11 18 27 25 23 27 30 42 45					7	orobe completed at
	•							

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-3.20m.

REMARKS: Probing undertaken adjacent to windowless sample - see separate sheet.

P LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GD



Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E 461502 N 223447 **Ground Investigation** WS C5759

Section 2A GI Location: Scale Level: 65.68mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 26/04/2018 Dates:

End: 26/04/2018

								End: 26/04/20	18		
(m)	Water	Samp	les & In Situ T		Sample	Install	Des	scription	Depth	Level	Legend
. ,	Levels	No/Type	Depth (m)	Result	·			•	(m)	(mAD)	
		D	0.25					ghtly sandy CLAY with frequent	0.20	65.48	
	‡	ES	0.30 - 0.50				MADE GROUND: Light brown high cobble content. Gravel is	very sandy silty GRAVEL with a angular to rounded fine to coarse	0.50	65.18	
,	վ,	B B	0.55 - 0.65 0.55				of concrete, brick, limestone, s	sandstone and siliceous material.	0.70	64.98	
	<b>\</b>	D	0.55				0.20m-0.50m: Cobbles are an	gular of concrete.	(0.40)		
1 -	7	ES B	1.00 - 1.10				rootlets (<1mm).	y slightly slity OLAT with rare	1.10	64.58	
	7	D	1.00					ish brown and grey slightly sandy			
	7	ES D	1.50				CLAY. 0.70m-1.10m: Sand tends from	n slightly sandy to sandy	(0.70)		
	7		1.00				Firm light orangish brown mott	tled light grey fine sandy CLAY.	1 00	60.00	
2 -	3	D	1.90				Light orangish brown mottled I	ight grey silty fine SAND.	1.80	63.88	×
	3								(0.50)		x x ^ [ 2
	_						Dark grey silty fine SAND with	frequent clay lenses.	2.30	63.38	1 × 1 × 1
	_	D B	2.40 2.50 - 3.00					^			: · : · × · :
	₫		2.00 0.00								× ×
3 -	╛								(1.20)		× -3
	‡										×
	‡										* · · ·
	‡	D	3.60					silt CLAY with frequent lenses of	3.50 3.65	62.18 62.03	<u></u>
	1	D	3.80				grey silty fine sand,	ed dark grey CLAY. Fissures are	3.03	02.03	
4 -	‡	UT100	4.00 - 4.35				closely spaced.	ed dark grey CLAY. Fissures are			4
	7	01100	4.00 - 4.00								
	7										
	7	D	4.50								
	3					/ 🗏 🕽					<del></del>
5 -	3	D	5.00						(2.60)		( <del></del>
	_										
	_	_				$\setminus \exists \setminus$					T
	Ⅎ	D	5.50			\\ \					Z-1
	Ⅎ		7/00	ľ		$  \exists  $					
6 -	=	D UT70	5.90 6.00 - 6.25				<b>V</b>				6
	‡				)		3.65m-6.25m: Medium strengt		6.25	59.43	
	‡						sandstone fragments recovered Borehole completed at 6.25m	ed.			
	7				/ /		25.5.1010 00111910104 41 0.20111				
_ :	7										
7 -	7				ľ l						<del>-7</del>
	7										F
	7										F
	3										
	3										_8
8 -		· '		-							8

GP J

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 101mm, 86mm sample barrels: 1.20-6.25m.

CASING: 128mm to 3.00m.

GROUNDWATER: Dampness encountered at 0.90m to the base of the borehole.

INSTALLATION: 50mm ID HDPE slotted pipe with washed gravel response zone: 6.25-1.25m. 50mm ID HDPE plain pipe with bentonite pellet seal: 1.25-0.20m.

Raised borehole helmet set in concrete: 0.00-0.20m. Gas valve fitted.

REMARKS: Dynamic Probe undertaken prior to sampling - see separate SHDP123_D. PID testing undertaken: 0.25m - 0.00ppm, 0.55m - 0.00ppm; 1.00m - 0.00ppm.

Driller notes 6.00m-6.25m UT70 bouncing UT70 damaged. Borehole samples unsuitable for field hand vein testing.

Groundwater:				Hole Progress:			
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
26/04/18	0.90	3.00		26/04/2018 00:00	6.25	3.00	

# NAMIC PROBE LOG

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 461502 N 223447

Probe No

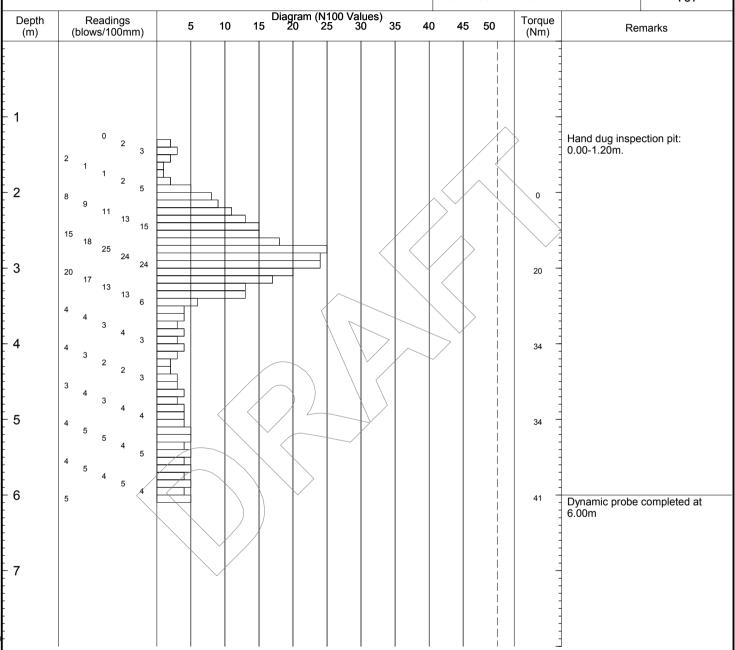
Sheet 1 of 1

HDP2A123 D

Project Name: East West Rail Phase 2 GRIP4 Project No: Date **Ground Investigation** 26/04/2018 C5759 65.68mAD Level:

Specification: DPSH-B Section 2A GI Scale Location: 1:50 Hammer Mass: 64Kg Drop Height: 750mm

East West Rail Alliance Client: Rig No. Cone Base Diameter: 51mm T07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.00m.

REMARKS: Probing undertaken adjacent to windowless sample - see separate sheet.

0.GDT



WS2A126 D

Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E 461253 N 223351 **Ground Investigation** WS C5759

Location: Section 2A GI Scale Level: 67.25mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 26/04/2018 Dates: End: 26/04/2018

							L11u. 20/04/20	10		
(m)	Water	Samp No/Type	les & In Situ T		Sample	Install	Description	Depth (m)	Level (mAD)	Legend
-	LOVEIS	No/Type D ES	0.20 0.30 - 0.45	Result			TOPSOIL: Soft dark brown slightly sandy CLAY with frequent roots (<20mm).  MADE GROUND: Brown sandy clayey GRAVEL with a high	0.25	67.00	
- - -		B D ES	0.50 - 0.60 0.50	76			cobble content and rare roots (<25mm). Gravel is angular to sub-angular fine to coarse of brick, concrete, limestone, sandstone.	0.45	66.80	
1 -	-	H H H	0.80 0.90 1.00 - 1.10	77 74			0.25m-0.45m: Cobbles are sub-angular to sub-rounded of brick, concrete and limestone.  Firm light brown mottled light orangish brown and light grey	(1.05)		1 1
-		B D ES	1.00				CLAY with rare rootlets (<2mm).  Firm tending to stiff laminated brown mottled orangish vellow	1.50	65.75	
2 -		D UT100	2.00 - 2.45				CLAY with occasional lenses of fine silty sand.	(0.80)		
-		D	2.50				Firm tending to stiff dark grey slightly sandy CLAY with occasional lenses of sifty fine sand (<5mm).	2.30 (0.50)	64.95	-
3 -		D D	2.90 3.00				Dark grey silty fine SAND.	2.80 (0.40)	64.45	× × × = 3
-	1						Stiff dark grey sandy silty CLAY with frequent pockets of dark grey silty fine sand and occasional fossil shells.	3.20 (0.40)	64.05	× × × × × × × × × × × × × × × × × × ×
4 —	<u>¥</u>	D	3.50				Borehole completed at 3.60m	3.60	63.65	
										-
-										-
5 -										5 _ _
										-
6 -										6
-										
7 -										-7 -7
- - -										
8 —	1									_8

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm sample barrels: 1.20-3.60m.

CASING: 128mm to 2.00m.

GROUNDWATER: Encountered in pit at 0.80m after 20 minutes monitoring, water strike at 3.60m on completion of borehole.

BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 1.20-3.60m and arisings: 0.00-1.20m.

REMARKS: Dynamic Probe undertaken adjacent to sampling - see separate sheet SHDP2A126_D. Drillers note borehole refused at 3.60m.

PID: PID testing undertaken: 0.20m - 0.00ppm, 0.50m - 0.00ppm; 1.00m - 0.00ppm.

PID testing undertaken: 0.20m - 0.00ppm, 0.50r	стооррин, тоон. стооррин			
	Depth After bservation (m)  Hole Progre	ess:  Hole Depth (m)	Casing Depth (m)	Water Depth (m)
04/18 3.60 2.00	26/04/2018	17:00 3.60	2.00	3.60

# **NAMIC PROBE LOG**

Project Name: East West Rail Phase 2 GRIP4 Project No:

**Ground Investigation** 

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 461253 N 223351 Date 26/04/2018 67.25mAD Level:

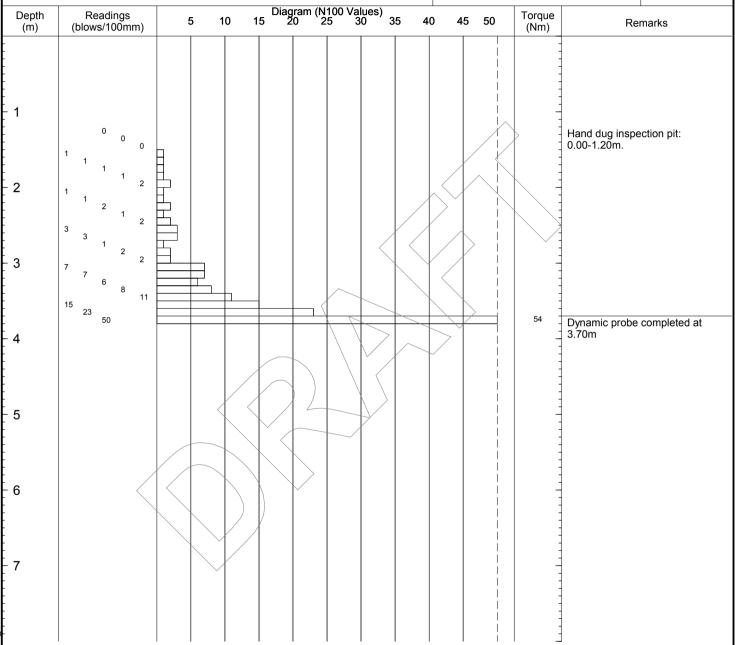
Probe No

Sheet 1 of 1

HDP2A126 D

C5759 Specification: DPSH-B Section 2A GI Scale Location: 1:50 Hammer Mass: 64Kg

Drop Height: 750mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 51mm Ť06



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-3.70m.

REMARKS: Probing undertaken adjacent to windowless sample - see separate sheet.

0.GDT

Borehole No. NS2ALOB 1₩ Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E 461928 N 223533 **Ground Investigation** WS C5759

Section 2A GI Location: Scale Level: 67.41mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 23/04/2018 Dates: EC End: 23/04/2018

								End: 23/04/20	18		LO
(m)	Water Levels		les & In Situ To	Result	Sample	Install	De:	scription	Depth (m)	Level (mAD)	Legend
	1	B ES B	0.20 0.50	. 1000.1			sandy silty CLAY sith occasion angular to sub-angular fine of	firm brown sightly gravelly slightly nal rootlets (<3mm). Gravel is siliceous material. ottled light grey slightly sandy silty	0.26	67.15	X X X X X X X X X X X X X X X X X X X
-		B ES D H H H	1.00 1.15 1.42 1.56 1.66	68 42 55			Soft to firm light orangish brov slightly sandy silty CLAY. Grav fine to medium of siliceous ma Firm grey mottled orangish bro	on mottled grey slightly gravelly yel is sub-angular to sub-rounded aterial.	1.10 1.20	66.31 66.21	× × × × × × × × × × × × × × × × × × ×
2 -		H D H UT100 D	1.76 1.90 2.00 - 2.45 2.45 - 2.55 2.55 - 2.60	52 58			Firm grey slightly clayey SILT		(1.40)	64.81	× × 2 × × × 2
3 -		D	2.90				sand and occasional shell and	d shell fragments (<4mm) .	(0.70)	64.11	X
4 -	2	ВВВ	3.50 - 4.00 4.00 - 4.50				shell fragments (<4mm). 3.60-3.80m; Clayey.		(1.10)		X
5 -							Borehole completed at 4.40m		- 4.40	63.01	-5 5 
7											- -7 - - - - - - - - - - - - - - - - -

CC WS LOG C5759_GI SECTION 2A.GPJ

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 128mm, 101mm and 86mm sample barrels: 1.20-4.40m.
CASING: 128mm diameter to 2.00m.
GROUNDWATER: Encountered at 0.71m and at 3.91m, rose to 3.30m after 20 minutes.
BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 1.00-4.40m and arisings: 0.00-1.00m.
REMARKS: Dynamic probe undertaken adjacent to window sample - see separate sheet. PID readings were undertaken on all environmental samples. Results: 0.20m - 0.10ppm and 1.00m - 0.00ppm.

Groundwater:				Hole Progress:			
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
23/04/18 23/04/18	0.71 3.91			23/04/2018 17:00	4.40	2.00	3.91

# NAMIC PROBE LOG

East West Rail Alliance

Client:

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 461928 N 223533 Project Name: East West Rail Phase 2 GRIP4 Project No: Date **Ground Investigation** 23/04/2018 C5759 67.41mAD Level:

Section 2A GI Location:

Specification: DPSH-B Hammer Mass: 64Kg

Drop Height: 750mm

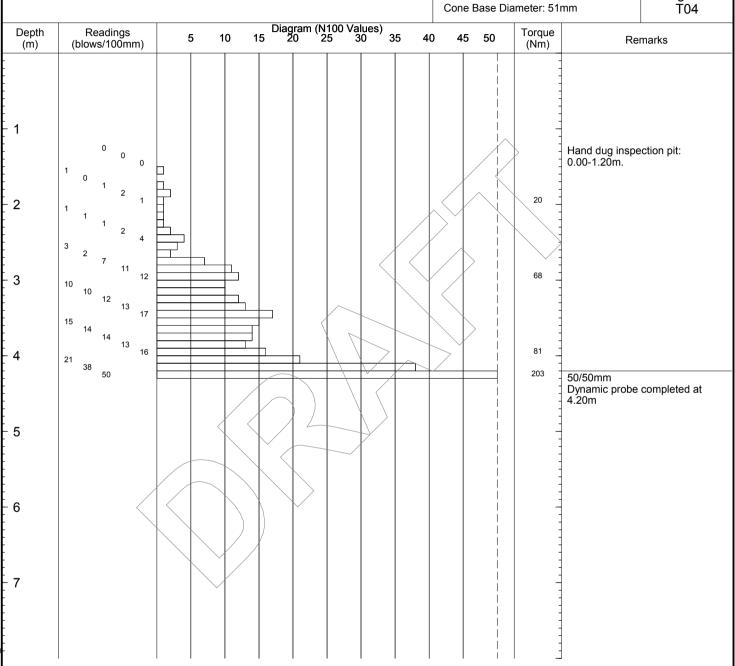
1:50 Rig No. T04

Scale

Probe No

Sheet 1 of 1

IDP2ALOB IU



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-4.20m.

REMARKS: Probing undertaken adjacent to windowless samp - see separate sheet.

0.GDT

# TRIAL PIT LOG

Pit No P2ALOB 10 Sheet 1 of 1

Date

04/06/2018

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Co-ords: E 461998 N 223632 **Ground Investigation** 

C5759 Level: 67.35mAOD

Location: Section 2A GI Dimensions: Scale 2.00m 1:25 Depth

0.70m 2.00m Client: East West Rail Alliance Logged By MB

n)	Water	Sampi	les & In Situ To		Description	Depth	Level	Legend
	Levels	No/Type	Depth (m)	Result	TOPSOIL: Soft friable dark brown slightly sandy CLAY with frequent roots	(m)	(mAD)	.74 1 ^N . 1/4 1 ^N .
-					(<3mm). Sand is fine.	(0.20)		1, 31, 3
-					Soft to firm becoming firm friable light brown mottled light orangish brown slightly	0.20	67.15	
-		ES	0.30		sandy slightly gravelly CLAY with occasional roots (<2mm). Sand is fine. Gravel is			
-		Н	0.40	50	sub-angular to rounded fine to coarse of siliceous material.			+
-		В	0.50 - 0.60	45 48		(0.60)		
-		D ES	0.50	40				
-		H	0.70	67				
-				65 62	Firm light bluish grey mottled light orangish brown CLAY with occasional rootlets	0.80	66.55	
-				"-	(<1mm).			
		B ES	1.00 - 1.10 1.00	71 72		(0.50)		
		H	1.00	79				
_						1.30	66.05	
_					Firm light bluish grey mottled light brown and light orangish brown sandy CLAY. Sand is fine.	1.00	00.00	
_		D	1.50			(0.40)		
-			1.50			,		
-					Firm light bluish grey mottled light brown and light orangish brown very sandy	1.70	65.65	
-					CLAY with frequent lenses of bluish grey silty fine sand. Sand is fine.	(0.20)		
-		В	1.90 - 2.00			(0.30)		
_		_			Trial pit completed at 2.00m	2.00	65.35	
-								
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	1	1				1		

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

GROUNDWATER: Seepage at 1.90m.

STABILITY: Stable throughout.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: PID testing undertaken on all environmental samples. Results: 0.30m - 0.10ppm, 0.50m - 0.10ppm; 1.00m - 0.00ppm.

Location:

#### TRIAL PIT LOG

Pit No P2ALOB 2D Sheet 1 of 1

2.00m

Date

04/06/2018

Scale

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Co-ords: E 462088 N 223755 **Ground Investigation** 

C5759 Level: 67.60mAOD Section 2A GI

1:25 Depth 70m 2.00m Client: East West Rail Alliance Logged By MB

Dimensions:

Samples & In Situ Testing Water Depth Level (m) Description Legend (m) No/Type Depth (m) TOPSOIL: Soft friable dark brown slightly sandy CLAY with frequent roots 71 1^N - 71 1^N (<4mm). Sand is fine. (0.25)1/ 1/1/ 1 <u>. 1 / . . 1 / .</u> 0.25 67.35 Soft to firm orangish brown mottled light grey and brown slightly sandy slightly D 0.30 gravelly CLAY with occasional roots (<2mm). Sand is fine. Gravel is angular to ES ō sub-rounded fine to coarse of siliceous material. [ALLUVIUM] В 0.50 - 0.60 42 (0.65)ES 0.50 38 Н 50 Н 0.80 41 39 66.70 0.90 Soft to firm light orangish brown mottled light brown slightly gravelly sandy CLAY. 46 Sand is fine. Gravel is sub-angular to sub-rounded, fine to coarse of siliceous В 1.00 - 1.10 material. [ALLUVIUM] 1.00 ES (0.70)1.30 Н 37 39 D 1.50 1.60 66.00 Firm light bluish grey mottled light brown and light orangish brown sandy sandy CLAY. Sand is fine. [KELLAWAY FORMATION] 1 70 D (0.40)Н 1.80 59 В 1.90 - 2.002.00 65 60 Trial pit completed at 2.00m 3 -3

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

GROUNDWATER: Seepage 0.90m, settled at 1.90m 20mins following completion of pit.

STABILITY: Stable throughout.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: PID testing undertaken on all environmental samples. Results: 0.30m - 0.00ppm, 0.50m - 0.10ppm; 1.00m - 0.00ppm.

GINT

4

# TRIAL PIT LOG

Pit No

P2ALTN_2U

Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Ground Investigation Project No: C5759 Co-ords: E 461894 N 223513 Level: 66.75mAOD 04/06/2018

Location: Section 2A GI

Dimensions: 2.00m
Scale 1:25

Client: East West Rail Alliance Depth 3.00m S Logged By MB

) Wat	er Samı	oles & In Situ T	esting	Description	Depth	Level	Legend
' Leve	No/Type	Depth (m)	Result	TOPSOIL: Soft friable dark brown slightly sandy CLAY with frequent roots	(m)	(mAD)	- 7/1 1/V . 7/1 1/V .
1				(<3mm). Sand is fine.	(0.25)		1/ 1/1/ 1
-	ES	0.30		Soft to firm light brown slightly sandy slightly gravelly CLAY with occasional roots (<2mm). Sand is fine. Gravel is sub-angular to rounded fine to coarse of siliceous	0.25	66.50	<u></u>
1	Н	0.40	41 39	material. [ALLUVIUM]	(0.35)		
-	D ES	0.50	44	Firm light orangish brown mottled light brown and light grey slightly sandy slgihtly	0.60	66.15	
1	Н	0.70	60 64	gravelly CLAY with occasional rootlets (<1mm). Sand is fine. Gravel is sub-angular to rounded fine to coarse of siliceous material. [ALLUVIUM]			
<u> </u>	D	0.80	62		(0.60)		
_	B ES	1.00 - 1.10 1.00	65 55 57				
+	Н		57	Light brown mottled orangish brown slightly gravelly very clayey SAND. Sand is	1.20	65.55	
1	В	1.30 - 1.50		fine and medium. Gravel is sub-angular to rounded of siliceous material.  [ALLUVIUM]	(0.40)		
+					1.60	65.15	
]				Firm light blusish grey mottled orangish brown sandy CLAY. [KELLAWAY FORMATION]	1.60	65.15	
1	Н	1.80	59 61				
_	В	1.90 - 2.00	57		(0.70)		
1	D	2.20			2.30	64.45	
-				Dark grey silty fine \$AND with occasional pockets of firm dark grey fine sandy CLAY with frequent shells. [KELLAWAY FORMATION]	2.30	04.43	
	D	2.50					
-					(0.70)		
]	В	2.90 - 3.00					
_				Trial pit completed at 3.00m	3.00	63.75	
-							
1							
+							

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

GROUNDWATER: Seepage 0.90m, heavy seepage 1.20-1.60m.

STABILITY: Unstable and collapsing 1.20-1.60m.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: PID testing undertaken on all environmental samples. Results: 0.30m - 0.10ppm, 0.50m - 0.10ppm; 1.00m - 0.00ppm.

TP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.



WS2A115 U

Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 | Project No: **Ground Investigation** 

Co-ords: E 462629 N 223805 C5759

Hole Type WS

Location: Section 2A GI

Level: 71.33mAOD

Scale 1:50.00

Client: East West Rail Alliance

Start: 24/05/2018 Dates: End: 24/05/2018 Logged By MB

								End: 24/05/2	018		טועו
(m)	Water	Samp	les & In Situ T	esting	Sample	Install	Des	scription	Depth	Level	Legend
()	Levels	No/Type	Depth (m)	Result		×××××××××××××××××××××××××××××××××××××××		own slightly gravelly slightly sandy	(m)	(mAD)	-7/1/V. 7/1/V.
1 -		B D ES H B D ES	0.30 - 0.40 0.30 0.40 0.50 - 0.60 0.50 0.70 1.00 - 1.20	62 66 64 67 69 71			CLAY with frequent rootlets (< sub-angular fine of flint. Firm brown mottled orangish b sandy CLAY with occasional r sub-rounded fine to medium o Firm brown mottled orangish b	3mm). Gravel is angular to brown slightly gravelly slightly goots (<2mm). Gravel is angular to	0.25 0.45 (1.40)	71.08 70.88	
2 -		H B D ES H H D	1.00 1.20 1.40 1.90 2.00 - 2.45	77 68 70 74 77 75			Firm becoming stiff laminated brown CLAY with occasional p	and fissured brown mottled dark partings (<3mm) of yellow silt and	— 1.85	69.48	
- - - -		D UT100 D	2.50				rare gypsum crystals (<15mm)		(1.05)		
3 -		D	3.00				Stiff laminated dark grey slight partings (<2mm) of grey fine s (<10mm).	ly sandy CLAY with occasional andy silt and rare gypsum crystals	2.90	68.43	
-		D	3.50						(1.10)		
4		D	3.90				4.00m: Dry.  Borehole completed at 4.00m	<u> </u>	4.00	67.33	
5 —											-
6 -											- - - - - - - -
7 -											- - - - - - - - - - - -
8 —											

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm, and 86mm sample barrels: 1.20-4.00m.
CASING: 113mm diameter to 2.00m.
GROUNDWATER: None encountered.
BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 1.00-4.00m and arisings: 0.00-1.00m.
REMARKS: Dynamic probe undertaken adjacent to window sample - see separate sheet. PID readings were undertaken on all environmental samples. Results: 0.30m - 0.00ppm, 0.50m - 0.00ppm and 1.00m - 0.00ppm.

Groundwater: **Hole Progress:** Strike Depth Casing Depth (m) Depth After Observation (m) Hole Depth (m) Date

Casing Depth (m) Water Depth 24/05/2018 17:00 4.00 2.00

GI SECTION 2A.GPJ

# DYNAMIC PROBE LOG

Project Name: East West Rail Phase 2 GRIP4

EN ISO 22476-2

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 462629 N 223805 Date

Probe No

Sheet 1 of 1

1:50

HDP2A115 U

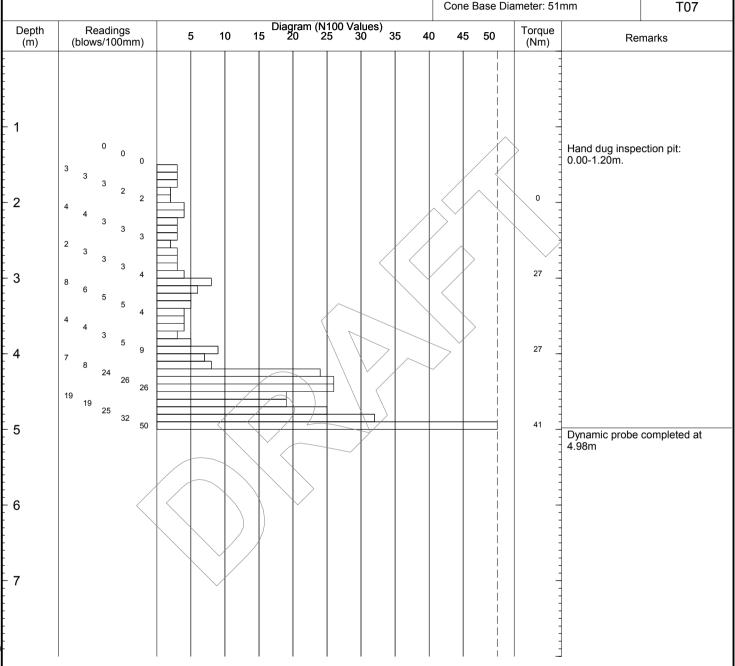
Ground Investigation
C5759
Level: 71.33mAD
24/05/20
Location: Section 2A GI
Specification: DPSH-B
Scale

Project No:

Client: East West Rail Alliance Hammer Mass: 64Kg

Drop Height: 750mm

Drop Height: 750mm Rig No.
Cone Base Diameter: 51mm T07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-4.98m.

REMARKS: Probing undertaken adjacent to windowless sample borehole WS2APDN_2U - see separate sheet. Dynamic probe refused at 4.98m.

LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT



Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 | Project No: Hole Type Co-ords: E 461453 N 223378 **Ground Investigation** WS C5759

Location: Section 2A GI Scale Level: 65.69mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 22/05/2018 Dates: TB End: 22/05/2018

								End: 22/05/20	18		10
(m)	Water	Samp No/Type	les & In Situ To		Sample	Install	Des	scription	Depth (m)	Level (mAD)	Legend
_	Leveis	No/Type	Depth (m)	Result				ghtly sandy CLAY with frequent		, ,	71 1 ^N - 77 1 ^N -
1 _		B D ES H B	0.30 - 0.40 0.30 0.40 0.60 - 0.70 0.60	90 94 92 74 69			sandy CLAY with low cobble or	d brown slightly gravelly slightly content and with occasional roots to sub-rounded fine to coarse of bles are sub-rounded of	0.25 0.50 (0.40) 0.90	65.44 65.19 64.79	
' - - -	<u></u>	D ES H B	0.70 1.00 - 1.20 1.00 1.30 1.50 - 1.80	70 67 64 62			sub-angular to sub-rounded fin nodules.	tled light grey slightly gravelly sional roots (<1mm). Gravel is ne of limestone and calcareous tled light bluish grey sandy CLAY	1.20	64.49	× · · · · · · · · · · · · · · · · · · ·
2 —		ES H D B UT100	2.00 - 2.45				locally tending to clayey sand.  Light orangish brown mottled I	ight bluish grey slightly gravelly blar fine to coarse of sandstone.	2.00	63.69	\( \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \
3 —		B D	2.50 - 3.00 2.50						(1.85)		× · · · -3
4		D D UT70	3.50 3.90 4.00 - 4.45		   <b> </b>		Stiff fissured dark grey CLAY pyrite.	with rare pockets (<25mm) of iron	3.85	61.84	× · · · · · · · · · · · · · · · · · · ·
5 —		D	4.50						(2.45)		
6 —		D	5.50								6
7 —		D	6.35				Very stiff dark grey slightly gra sans sized shell fragments. G medium of pyritised sandstone Borehole completed at 6.40m	velly slightly sandy CLAY with rare ravel is sub-rounded fine to e.	6.30 6.40	59.39 59.29	7
7 -											

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm, 76mm and 66mm sample barrels: 1.20-6.40m.

CASING: 113mm diameter to 4.00m.

GROUNDWATER: Encountered at 1.20m. No rise recorded.

INSTALLATION: Borehole was backfilled with bentonite pellets 4.00-6.40m. 50mm ID HDPE slotted pipe with washed gravel response zone: 1.00-4.00m. 50mm ID HDPE plain pipe with bentonite pellet seal: 0.20-1.00m. Raised borehole helmet set in concrete: 0.00-0.20m. Gas valve fitted.

REMARKS: Hole collapsed after run 3.00-4.00m at 4.00m back to 2.50m. Dynamic probe undertaken adjacent to window sample - see separate sheet. Drillers note borehole refused at 6.40m. PID readings were undertaken on all environmental samples. Results: 0.30m - 0.00ppm, 0.60m - 0.00ppm and 1.00m - 0.00ppm.

							oppm and 1.00m - 0.00ppm.
Groundwater: Date 23/05/18	Strike Depth (m) 1.20	Casing Depth (m)	Depth After Observation (m)	Hole Progress:	Hole Depth (m) 6.40	Casing Depth (m)	Water Depth (m)

# NAMIC PROBE LOG

Project Name: East West Rail Phase 2 GRIP4

**Ground Investigation** 

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 461453 N 223378 Date 23/05/2018 65.69mAD Level:

Probe No

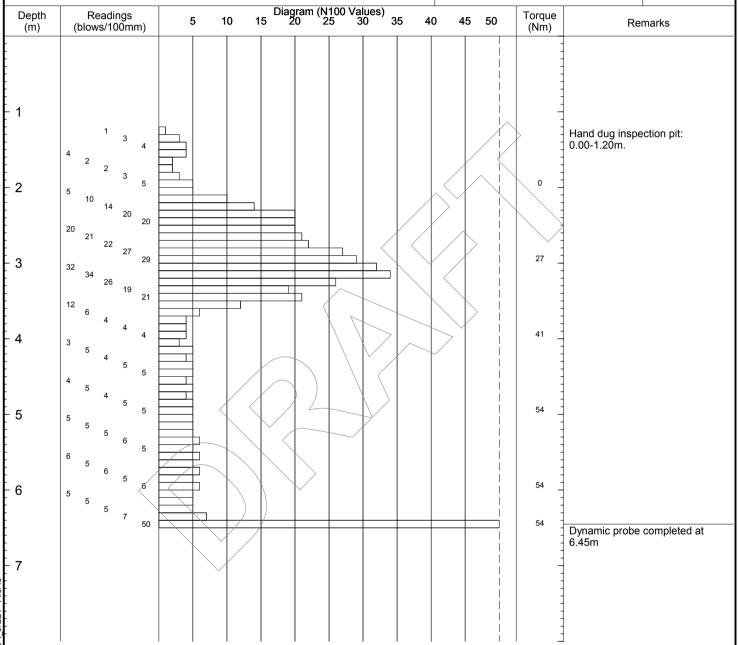
Sheet 1 of 1

HDP2A124 U

C5759 Specification: DPSH-B Section 2A GI Location:

Project No:

Scale 1:50 Hammer Mass: 64Kg Drop Height: 750mm East West Rail Alliance Client: Rig No. Cone Base Diameter: 51mm T07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.45m.

REMARKS: Probing undertaken adjacent to windowless sample - see separate sheet. Dynamic probe refused at 6.45m.

0.GDT

Borehole No. NS2ALOB 1D

Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 | Project No: Hole Type Co-ords: E 462036 N 223713 **Ground Investigation** WS C5759

Location: Section 2A GI Scale Level: 67.21mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 25/05/2018 Dates: MB

							End: 25/05/20	)18		MB
(m)	Water	Samp	les & In Situ T	esting	Sample	Install	Description	Depth	Level	Legend
(111)	Levels	No/Type	Depth (m)	Result	Campic		'	(m)	(mAD)	
1 -	1	B S H B D S H D D D B UT100	0.30 0.50 - 0.60 0.50 0.60 0.90 1.00 - 1.20 1.10 1.40 1.60 1.80 2.00 - 2.50 2.00 - 2.45	72 65 68 72 66 67 68 74 77 54 68 57			TOPSOIL: Soft dark brown slightly sandy CLAY with frequent roots (<2mm).  Soft to firm orangish brown mottled light greyish brown CLAY with occasional rootlets (<1mm).  Firm light grey mottled light orangish brown CLAY with occasional roots (<1mm).  Soft to firm brownish grey mottled dark grey CLAY with slight organic odour.  Firm light bluish grey mottled light orangish brown slightly gravelly slightly sandy CLAY. Gravel is sub-angular to sub-rounded fine of flint.  Orangish brown sandy very clayey sub-rounded to rounded fine to coarse GRAVEL of flint and quartzite.  Firm light bluish grey mottled brown very sandy CLAY locally tending to very silty sand.	0.20 0.40 (0.50) 0.90 (0.45) 1.35 1.70 (0.95)	67.01 66.81 66.31 65.86 65.71 65.51	
3 -		D B	2.80 3.00 - 3.50				Dark grey very silty SAND with rare shells.	(1.25)	64.56	× × -3 × × ×
4 -	<u>1</u>	D	4.00				Stiff dark grey sandy CLAY with rare pockets (<10mm) of iron pyrite.	3.90 (0.45) - 4.35	63.31 62.86	4
5 —		D	4.50				Stiff fissured dark grey CLAY.	7.00	32.00	5
6 —	-	D	5.80					(2.45)		6
		D	6.50			_				
7 —		D	6.85				Very stiff dark grey sandy CLAY with occasional shell fragments.  Borehole completed at 7.00m	6.80 7.00	60.41 60.21	7
8 -										<u> </u>

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm and 86mm sample barrels: 1.20-7.00m.

CASING: 113mm diameter to 3.00m.

GROUNDWATER: Encountered at 4.10m. Rose to 1.33m after 65 minutes under Client instruction.

INSTALLATION: Borehole was backfilled with bentonite pellets 4.30-7.00m. Gravel: 4.00-4.30m. 50mm ID HDPE slotted pipe with washed gravel response zone: 1.00-4.30m. 50mm ID HDPE plain pipe with bentonite pellet seal: 0.20-1.00m. Raised borehole helmet set in concrete: 0.00-0.20m. Gas valve fitted.

REMARKS: UT100 attempted at 2.00-2.45m, no recovery. Bulk sample taken. Dynamic probe undertaken adjacent to window sample - see separate sheet. PID readings were undertaken on all environmental samples. Results: 0.30m - 0.00ppm, 0.50m - 0.00ppm and 1.00m - 0.00ppm.

roundwater:				Hole Progress:				
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
24/05/18	4.10	3.00	1.33	24/05/2018 17:00	7.00	3.00	2.10	

# NAMIC PROBE LOG

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E 462036 N 223713

Date Project Name: East West Rail Phase 2 GRIP4 Project No: **Ground Investigation** 25/05/2018 C5759 67.21mAD Level:

Specification: DPSH-B Section 2A GI Scale Location: 1:50 Hammer Mass: 64Kg

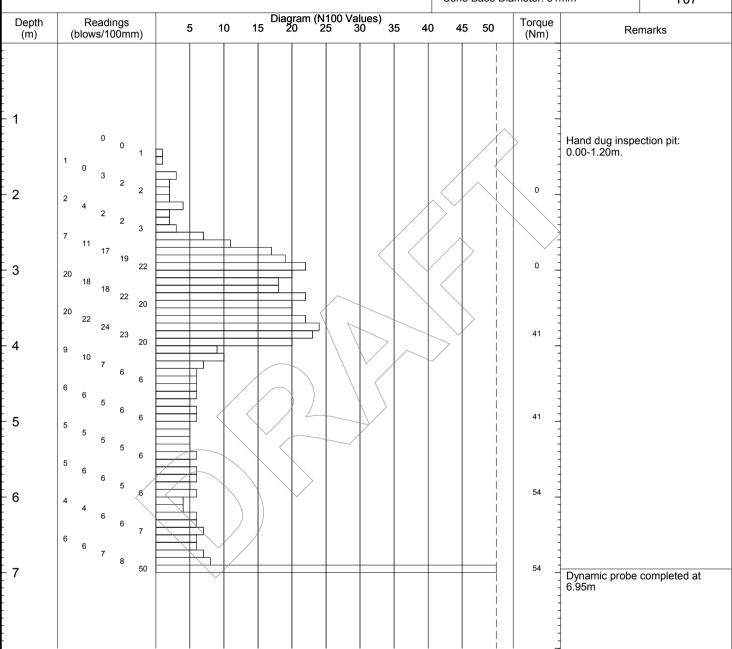
Drop Height: 750mm East West Rail Alliance Client: Cone Base Diameter: 51mm

Rig No. T07

Probe No

Sheet 1 of 1

IDP2ALOB ID



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.95m.

REMARKS: Probing undertaken adjacent to windowless sample borehole WS2APDN_2U - see separate sheet. Dynamic probe refused at 6.95m.

0.GDT

Borehole No. VS2AMFOB 1C

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Sheet 1 of 1

Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E 460700 N 223203 **Ground Investigation** WS C5759

Section 2A GI Scale Location: Level: 69.40mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 22/05/2018 Dates: End: 22/05/2018 MB

1								End: 22/05/20	18		IVID
(m) W	ater	Samp	les & In Situ To	esting	Camania	Install	De		Depth	Level	1
(m) Le	vels	No/Type	Depth (m)	Result	Sample	Install	De	scription	(m)	(mAD)	Legena
		Sample No/Type  D ES H B D ES H B D ES H D D ES UT100  D T100  D		100 102 104 66 68 72 74 72 76 76 72 75	Sample	Install	TOPSOIL: Soft to firm friable with occasional roots (<2mm) Firm to stiff brown mottled gre with occasional roots (<1mm) Firm light brownish grey mottle slightly sandy CLAY with occasional partially Firm light bluish grey mottled CLAY with occasional partially Firm becoming stiff laminated orangish brown CLAY with fre and orangish brown fine sand	eyish brown slightly sandy CLAY  ed brown and orangish brown asional partially decomposed roots  orangish brown slightly sandy y decomposed roots (<3mm).  and fissured brown mottled dark equent partings (<3mm) of yellow	Depth		Legend
4   1   1   1   1   1   1   1   1   1	77=	D UT70 D D D	3.50 4.00 - 4.45 4.50 5.00 5.20				Stiff to very stiff dark brownish occasional shells.  Dark grey very silty SAND  5.30m: Refusal. Borehole completed at 5.30m	ngrey slightly sandy CLAY with	- 3.45 (0.55) - 4.00 (1.30) - 5.30	65.95 65.40 64.10	× × 4 × × -5 × 7

C5759 GI SECTION 2A.GPJ

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm, 76mm and 66mm sample barrels: 1.20-5.30m.
CASING: 113mm diameter to 2.00m.
GROUNDWATER: Encountered at 5.00m. Rose to 4.60m after 20 minutes.
BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 1.00-5.30m and arisings: 0.00-1.00m.
REMARKS: Dynamic probe undertaken adjacent to window sample - see separate sheet. Drillers note borehole refused at 5.30m. PID readings were undertaken on al environmental samples. Results: 0.30m - 0.00ppm, 0.50m - 0.00ppm and 1.00m - 0.00ppm.

Groundwater:	Strike Depth	Casing Depth	Depth After	Hole Progress:  Date	Hole Depth	Casing Depth	Water Depth
Date	(m)	(m)	Observation (m)		(m)	(m)	(m)
22/05/18	5.00	2.00	4.60	22/05/2018 17:00	5.30	2.00	

# DYNAMIC PROBE LOG

N ISO 22476-2

0.GDT

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Sheet 1 of 1

Probe No

SHDP2AMFOB 1D

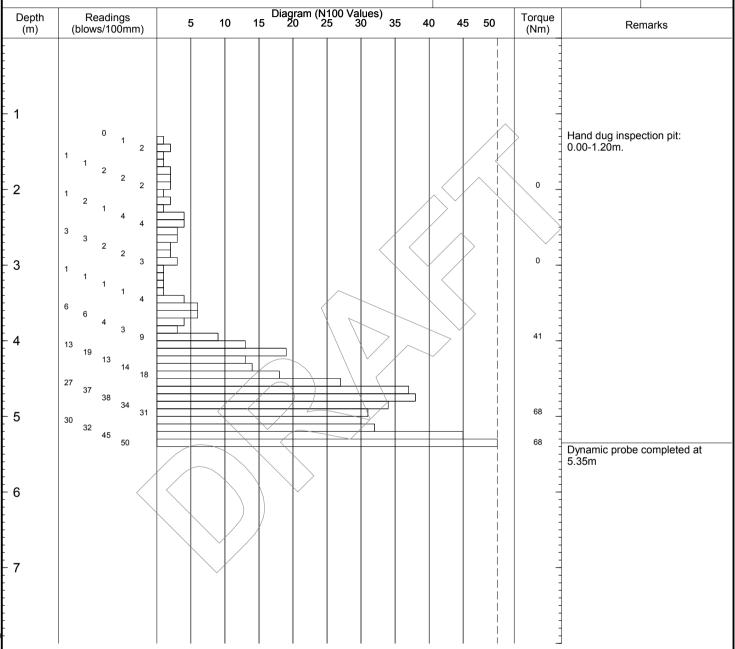
Project Name: East West Rail Phase 2 GRIP4 Ground Investigation Project No: C5759 Co-ords: E 460700 N 223203 Level: 69.40mAD Date 22/05/2018

Location: Section 2A GI Specification: DPSH-B Scale
Hammer Mass: 64Kg 1:50

 Client:
 East West Rail Alliance
 Hammer Mass: 64Kg
 1:50

 Drop Height: 750mm
 Rig No.

 Cone Base Diameter: 51mm
 T07



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-5.45m.

REMARKS: Probing undertaken adjacent to windowless samp - see separate sheet. Dynamic probe refused at 5.35m.

Borehole No. WS2AMFOB_1

Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: Info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E N **Ground Investigation** WS C5759

Section 2A GI Location: Scale Level: mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 30/05/2018 Dates: End: 30/05/2018 DH

1								End: 30/05/2	)18		חח
(m)	Water Levels		les & In Situ T		Sample	Install	De:	scription	Depth (m)	Level (mAD)	Legend
	Leveis	No/Type		Result				sandy CLAY with frequent roots	/ 0.10	(IIIAD)	
		B ES	0.20	63 68			and rootlets (<10mm).  MADE GROUND: Soft to firm	brown slightly sandy CLAY with	(0.40) - 0.50		
		B ES	0.50	70			frequent roots and rootlets (<8 Firm light orangish brown mot		0.50		
1 -	-	B ES	1.00					$\wedge$	(1.00)		1
							Firm thinly laminated dark bro silty CLAY with frequent decor	wn mottled light yellowish orange	1.50		
2 -		D	2.00				Sitty CLAT with frequent decoi	imposed rootiets (Commi).	(0.70)		* -× - × -× -2
		UT100	2.00 2.00 - 2.45				Firm thinly laminated bluish gr	rey slightly sandy silty CLAY.	2.20		X
3 -		D	3.00						(1.10)		× × × × × × × × × × × × × × × × × × ×
			0.00				Soft becoming firm bluish green frequent shell and fossill fraging	y slightly sandy silty CLAY with nents (<20mm).	3.30		× × × × × × × × × × × × × × × × × × ×
4 -	1 2	D	4.00						(1.00)		× × × 4
	]	UT70	4.00 - 4.45				Bluish grey slightly gravelly SA <20mm).Sand is fine to coarse	AND with frequent shell fragments	4.30		<del>-x</del> -x
	-						sub-rounded coarse of siliceo	e. Graver is sub-arigular to us material.	(0.70)		
5 -		D	5.00		(		Borehole completed at 5.00m		5.00		5
6 -											6 
8 -											8

C5759 GI SECTION 2A.GPJ

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm, 101mm and 66mm sample barrels: 1.20-5.00m.
CASING: 113mm diameter to 2.00m.
GROUNDWATER: Encountered at 4.00m. Rose to 3.91m after 20 minutes.
BACKFILL: On completion, borehole backfilled with bentonite pellets: 1.20-5.00m and arisings: 0.00-1.00m.
REMARKS: Dynamic probe undertaken adjacent to window sample - see separate sheet. PID readings were undertaken on all environmental samples. Results: 0.20m - 0.00ppm, 0.50m - 0.00ppm and 1.00m - 0.40ppm.

Groundwater:  Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Hole Progress:	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
30/05/18	4.00	2.00	3.91	30/05/2018 17:00	5.00	2.00	5.00	

# TRIAL PIT LOG

Pit No
P2ALOB_1U
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: Info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Ground Investigation Project No: C5759 Co-ords: E 461957 N 223555 Date 05/06/2018

Location: Section 2A GI

Dimensions: 2.00m
Scale 1:25

Client: East West Rail Alliance Depth 2.00m Point 2.00m Logged By MB

(m) W	/ater	Sampl	les & In Situ T	esting	Description	Depth	Level	Legend
Le	evels	No/Type	Depth (m)	Result	TOPSOIL: Soft friable dark brown slightly sandy CLAY with frequent roots	(m)	(mAD)	
-					(<3mm).	(0.25)		
		ES H D ES	0.30 0.40 0.50	58 54 52	Firm orangish-brown mottled light brown and light grey slightly sandy gravelly CLAY with occasional roots (<2mm). Gravel sub-angular fine to coarse of siliceous material and flint. [ALLUVIUM]	(0.35)	67.05 66.70	
-		Н	0.70	60 58 61	Firm light bluish grey mottled light brown and light orangish brown slightly gravelly CLAY with occasional rootlets (<1mm) and occasional randomly orientated undulating, polished surfaces noted (<500mm x 400mm exposed). Gravel is sub-rounded to rounded fine to coarse of siliceous material. [ALLUVIUM]		00.70	
		B D ES H	1.00 - 1.10 1.00	61 64 62		(0.70)		
-				-	Firm orangish brown mottled greyish brown slightly sandy CLAY with occasional thin pockets of orangish and yellowish-brown silty fine sand. Sand is fine. [KELLAWAY BEDS]	1.30	66.00	
		D H	1.50	58 56 59		(0.50)		
		B D	1.90 - 2.00 1.90	94 87	Stiff dark grey CLAY with rare up to fine gravel sized gypsum crystals.  [KELLAWAY BEDS]  Trial pit completed at 2.00m	(0.20) - 2.00	65.50 65.30	
		Н		90				

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

GROUNDWATER: Slight seepage 1.30m.

STABILITY: Stable throughout.

 ${\it BACKFILL: Trial\ pit\ backfilled\ with\ arisings\ and\ compacted\ with\ bucket\ 0.00-2.00m.}$ 

REMARKS: PID testing undertaken on all environmental samples. Results: 0.30m - 0.10ppm, 0.50m - 0.10ppm; 1.00m - 0.00ppm.

# TRIAL PIT LOG

Pit No
P2ALOB_2U
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: Info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Ground Investigation Project No: C5759 Co-ords: E 461903 N 223471 Level: 67.23mAOD Date 05/06/2018

Location: Section 2A GI

Dimensions: 2.00m
Scale 1:25

Client: East West Rail Alliance Depth 2.00m P Logged By MB

m) Wate	Samp	les & In Situ T		Description	Depth	Level	Legend
/ Level	No/Type	Depth (m)	Result	TOPSOIL: Grass over soft to firm brown sightly gravelly slightly sandy silty CLAY	(m)	(mAD)	20g0.id
-				sith occasional rootlets (<3mm). Gravel is angular to sub-angular fine of siliceous material.	(0.25)	00.00	1/ 1/ 1/
-	ES	0.30		Soft orangish brown locally mottled light grey slightly sandy silty CLAY.	(0.35)	66.98	× × × ×
-	D ES	0.50	54 51		0.60	66.63	× × -
-	H		56	Firm light bluish/grey mottled light brown and light orangish brown slightly gravelly CLAY with occasional rootlets (<1mm) and occasional randomly orientated undulating, polished surfaces noted (up to 500mm x 400mm exposed). Gravel is	0.00	00.00	
]	Н	0.80	60 59 57	sub-rounded to rounded fine to coarse of siliceous material. [ALLUVIUM]	(0.70)		
-	В	1.00	57		(0.70)		
1	D ES	1.10	60				<u> </u>
1	H		66		4.20	CE 02	
<u></u>	D	1.40	-	Firm orangish brown mottled greyish brown slightly sandy gravelly CLAY with occasional pockets of orangish brown silty fine sand (<50mm). Gravel	1.30	65.93	
1	н	1.50	74	sub-angular rounded fine to coarse siliceous material flint. [ALLUVIUM]	(0.40)		
1			76 80			05.50	
1				Firm fissured brownish grey slightly fine sandy CLAY with frequent thin lenses and	1.70	65.53	
]	D H	1.80		pockets of orangish yellowish brown or grey silty fine sand (<50mm). Fissures are sub-horizontal, random and very closely spaced. [KELLAWAYS]	(0.30)		
	B	1.90			2.00	65.23	
4				Trial pit completed at 2.00m	2.00	00.20	
+							
1							
]							
-							
4							
+							
+							
-							
1							
1			$  \ \  $				
]							
4							
4							
4							
4							

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

GROUNDWATER: Seepage below 1.40m.

STABILITY: Stable throughout.

 ${\it BACKFILL: Trial\ pit\ backfilled\ with\ arisings\ and\ compacted\ with\ bucket\ 0.00-2.00m.}$ 

REMARKS: PID testing undertaken on all environmental samples. Results: 0.30m - 0.00ppm, 0.50m - 0.00ppm; 1.00m - 0.00ppm.

Borehole No. CP2ALOB_1D

Sheet 1 of 3

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 | Project No: Hole Type Co-ords: E 4619977 N 223616 **Ground Investigation** DS+RC C5759

Section 2A GI Location: Scale Level: 67.18mAOD 1:50.00

Client: East West Rail Alliance Start: 08/06/2018 Logged By Dates: SM/MM/DH End: 22/06/2018

m)	Water	Core Ru	ın, Samples &	Testing	Core Run &	TCR SCR	Install	Description	Depth	Level	Lege
,	Levels	No/Type	Depth (m)	Result	Sample	RQD		•	(m)	(mAD)	
	1		0.00					TOPSOIL: Grass over soft brown mottled orangish brown and reddish brown slightly sandy silty CLAY with frequent	(0.50)		<u>z₁ 1</u>
	11	B ES	0.20					roots (<2mm).	(0.50)		$\frac{1}{\sqrt{-z_f}}$
	<del> </del>	В	0.50					$\sim$ 0.40-0.45m: 1no. broken land drain infilled with silty clay. $_{/}$	0.50	66.68	×1 /.
	1,1	ES						Soft yellowish brown mottled grey sandy silty CLAY.	(0.00)		× ×
	] ¥								(0.60)		× ×
-	1	В	1.00					Ooff and side have a settled assessed sitts OLAV	1.10	66.08	
	1	SPT	1.20 - 1.65	S 6				Soft orangish brown mottled grey sandy silty CLAY.			<u>^</u>
	1										
	1								(1.20)		<u>×</u>
	+	H D	1.70 1.80	15 15					(1.20)		×
_	7	H	1.90	20							× -
	7	H	2.00 - 2.45	S 27							X
	1	SPT						Soft thickly laminated grey slightly gravelly lightly sandy	2.30	64.88	×
	1							to sandy locally silty CLAY with rare shells (<10mm).			×
	1	н	2.70	15							<u>x_</u>
_	_	D	2.80	10							×
	7	H	2.90 3.00 - 4.00	10 S 120		75%		· /	(1.70)		× ×
	7	"C	3.00 - 3.27	0 120		% %			( ,		×
	7	SPT C									
	1		0.70	45	1		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				<u></u> x
	1	H D	3.70 3.80	15 15							<u>×</u>
-	1	н	3.90	10		70%		Soft thickly laminated grey slightly sandy locally silty	4.00	63.18	<u>*</u> =
	1	HC	4.00 - 5.00 4.00 - 4.40	C 60		%_		CLAY with rare shells (<10mm).			<del>×</del> _×
	-	SPT C	4.00 - 4.40		l c	%			(1.00)		X
	7								(1.00)		×
	7	D	4.80								× ×
_	7	H	4.90	15	K \	\	/	Stiff thickly laminated becoming very stiff grey slightly	5.00	62.18	<u>~</u> ×
	1	C	5.00 - 6.00	C 16		100%		sandy locally silty CLAY.			-X
	1	SPT C	5.00 - 5.45			%		, , , , , , , , , , , , , , , , , , ,			X
	1	н	5.50	75	I Q						
	∃	H	5.55	70		, \					×
	_	D H	5.60 5.65	80					(2.00)		×
_	-	cs	5.70	C 20	7	100%			(2.00)		<del>X</del> -
	7	C	6.00 - 7.00			% %					×
	1	SPT C	6.00 - 6.45 6.50	120							×
	1	H H	6.60	120	Y : A	/					x^
	1	H	6.70	120	$\mid / \mid \mid$						<u>×</u>
-	-	c	7.00 - 8.00	C 75	<u> </u>	100%		Very stiff thickly laminated grey slightly sandy locally silty	7.00	60.18	<del>x=</del>
	1	SPT C	7.00 - 7.35			55%		CLAY.			×
	+					55%					<u>×</u> x
	7				C						X
	1	cs	7.67 - 8.00						(1.40)		1 × ×
_											-×

GPJ

EQUIPMENT: Hand digging tools. Fraste multi-purpose ML track mounted rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm sample barrel: 1.20-3.00m. Waterflush rotary coring using T6-116 coring barrel: 3.00-22.00m.
CASING: 168mm diameter to 3.00m, 140mm diameter to 11.90m.
GROUNDWATER: Encountered at 1.20m rose to 0.85m after 1hour. Artesian water was encountered at 14.70m. Rose to 0.30m above ground level on 15/06/2018, 3.50m above ground level on 25/06/2018 and was at 5.00m above gorund level on 25/06/2018.
BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 14.00-0.50m and arisings 0.50-0.00m.
REMARKS: PID readings were undertaken on all environmental samples. Results: 0.20m - 0.00ppm; 0.50m - 0.00ppm.

Groundwater:				Hole Progress:			
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
13/06/18	0.50		0.85	13/06/2018 17:00	6.00	3.00	1.20
				14/06/2018 08:00	6.00	3.00	0.65

Date

Casing Depth (m)

Depth After Observation (m)

Hole Depth Casing Depth (m) Water Depth Date (m) (m) 3.00 14.00 0.00 14/06/2018 17:00 15/06/2018 08:00 14.00 3.00 0.00 15/06/2018 17:00 14.00 3.00 21/06/2018 08:00 14.70 3.00 21/06/2018 17:00 16.00 11.90 22/06/2018 08:00

Borehole No. P2AMFOB 2U Sheet 1 of 4

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 | Project No: Hole Type Co-ords: E 460644 N 223108 **Ground Investigation** DS+RC C5759

Section 2A GI Location: Scale Level: 69.43mAOD 1:50.00

Client: East West Rail Alliance Start: 26/06/2018 Logged By Dates: MB/DH End: 20/06/2018

								End: 29/06/20	18	1	/IB/DH
(m)	Water Levels		un, Samples &		Core Run &	TCR SCR	Install	Description	Depth (m)	Level (mAD)	Legend
2 -	Levels	No/Type  B D ES H B D ES H B D ES H C B D ES TO D D D D D D D D D D D D D D D D D D D	0.30 - 0.40 0.30 0.50 - 0.60 0.50 0.60 0.90 1.00 - 1.10 1.20 1.20 - 1.65 2.00 2.00 - 2.60	130 110 107 96 130 S 12	Sample	RQD		TOPSOIL: Firm friable dark brown slightly sandy CLAY with some roots (<3mm). Sand is fine.  Stiff friable brownish grey mottled orangish brown slight sandy slightly gravelly CLAY with occasional roots (<2mm). Gravel is sub-angular to rounded fine to medium of flint and siliceous material.  Stiff to very stiff fissured greyish brown mottled light orangish brown CLAY with occasional rootlets (<1mm). Fissures are random very closely spaced occasionally polished.  Firm to stiff thinly laminated dark orangish brown slightly sandy CLAY with frequent decomposed rootlets (<5mm) and occasional sand laminations (<8mm).	(1.20) (1.20) (1.20)	69.28 68.98 68.23	
4 —		SPT  D B SPT  C	3.81 4.00 4.00 - 4.44 4.50 - 5.50 5.00	S 52				4.00-7.00m. Very dense. 4.50-7.00m. Shell fragments absent.	(4.60)		4
6 -		C SPT B	5.50 - 7.00 5.50 - 5.71 6.00 7.00 7.00 - 8.50	S 130				5.90m: 1no. sub-rounded cobble of weakly cemented sandstone (<70mm).  Stiff thinly laminated dark grey slightly sandy silty CLAY.	7.00	62.43	
8 —		SPT C	7.00 - 8.50 7.00 - 7.45 7.65 - 7.82								* - × -   * - × -   * - × -   * - × -   * - × -

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 128mm and 113mm sample barrels: 1.20-4.50m. Waterflush rotary coring using T6-116 coring barrel: 4.50-30.50m.

CASING: 140mm to 4.50m.

GROUNDWATER: None encountered prior to using waterflush.

INSTALLATION: Bentonite pellets: 30.00-30.50m. 50mm ID HDPE slotted pipe with washed gravel response zone: 2.00-30.00m. 50mm ID HDPE plain pipe with bentonite pellet seal: 0.20-2.00m. Raised borehole helmet set in concrete: 0.00-0.20m. Gas valve fitted.

REMARKS: PID readings were undertaken on all environmental samples. Results: 0.30m - 0.00ppm; 0.50m - 0.00ppm and 1.00m - 0.00ppm. Due to hard ground conditions and under instruction from the Client Engineer onsite, SPTs from 23.50-30.50m were not undertaken.

SPT testing not carried out below 23.50m on engineers instruction. Standpipe installed on 29/06/2018.

01 1 101	oung not carried t	out below 20.00111	on engineers matrac	stion. Otanapipe motan	Ca 011 20/00/20 10.

roundwater:				Hole Progress:				
Date	Strike Depth	Casing Depth	Depth After	Date	Hole Depth	Casing Depth	Water Depth	
24.0	(m)	(m)	Observation (m)		(m)	(m)	(m)	
27/06/18	3.10			26/06/2018 17:00	4.00	3.00		
				27/06/2018 08:00	4.00	3.00	3.10	

Borehole No. CP2APFB_1L

Sheet 1 of 3

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E 464733 N 122442 **Ground Investigation** C5759 RC

Section 2A GI Scale Location: Level: 88.05mAOD 1:50.00

Client: East West Rail Alliance Start: 06/07/2018 Logged By Dates: DH/MB/TH End: 11/07/2018

(m)	Water	Core Kt	ın, Samples &	resung	Core Run &	TCR SCR	Install	Description	Depth	Level	Legen
()	Levels	No/Type	Depth (m)	Result	Sample		*********	TOPSOIL: Stiff light orangish brown mottled light grey	(m)	(mAD)	31
		B ES B	0.30 - 0.40 0.30 0.50 - 0.60					slightly sandy CLAY with frequent rootlets (<10mm).  Stiff light orangish brown slightly gravelly slightly sandy CLAY with occasional rootlets (<15mm). Gravel is sub-rounded fine to medium of siliceous material.	(0.50) (0.60	87.95 87.45	
1 –		ES B ES	0.50 1.00 - 1.10 1.00					Stiff locally firm thinly laminated friable dark orangish brown mottled light grey CLAY with frequent calcareous deposits (<8mm).	(1.10)		
	- - - - -	D SPT	1.20 - 1.30 1.20 - 1.65	S 12				Chiff thinks lowingted frights dock brown mostled light group	1.70	86.35	
2 –	- - - - -	D SPT D D	1.80 - 1.90 1.80 - 2.25 2.00 - 2.10 2.20 - 2.42	S 22				Stiff thinly laminated friable dark brown mottled light grey slightly sandy CLAY with frequent shell fragments (<16mm) and frequent calcite deposits (<7mm).	(4.00)		
	-								(1.30)		
3 –	- - - -	D SPT	3.00 - 3.10 3.00 - 3.45	S 18				Stiff friable dark bluish grey CLAY with frequent calcite deposits (<30mm) and rare lignite fragments (<80mm).	3.00	85.05	
	1	D	3.78 - 4.00						(1.00)		
4 –	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	UT100 D	4.00 - 4.45 4.45 - 4.55					Stiff very closely fissured dark brown CLAY with rare shell fragments.	4.00	84.05	
5 –		D D D SPT	4.45 - 4.55 4.55 - 4.60 4.80 5.00 - 5.45	S 28					(1.75)		
								Very stiff very closely fissured dark brownish grey CLAY	5.75	82.30	
6 –	-	D	5.90					with frequent shell fragments.			
7 -	<u>-</u>	C SPT	6.50 - 8.00 6.50 - 6.95	S 34		80% 0% 0%		6.50-12.50m: Very closely to closely fissured with occasional shell fragments.			
8 –	- - - - - - - -	CS	7.20 - 7.45								

EQUIPMENT: Hand digging tools. Fraste multi-purpose PLG track mounted rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm and 113mm sample barrels: 1.20-6.50m. Waterflush rotary coring using T6-116 coring barrel: 6.50-24.50m.
CASING: 140mm diameter to 4.00m.
GROUNDWATER: None encountered prior to using water flush to advance casing to 4.00m.
BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 0.80-24.90m and arisngs: 0.00-0.80m.
REMARKS: PID readings were undertaken on all environmental samples. Results: 0.30m - 0.00ppm; 0.50m - 0.00ppm; 1.00m - 0.00ppm.

REMARKS: PID	3				•••			
Groundwater:				Hole Progress:				
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
09/07/18	4.00	4.00		06/07/2018 17:00	4.00			
00/01/10				09/07/2018 08:00	4.00			

Borehole No. CP2APOOB 1D Sheet 1 of 3

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 | Project No: Hole Type Co-ords: E 463636 N 224167 **Ground Investigation** RC C5759

Section 2A GI Scale Location: Level: 85.73mAOD 1:50.00

Client: East West Rail Alliance Start: 03/07/2018 Logged By Dates: ĎН

								End: 05/07/20	18		DH
(m)	Water	Core Ru	ın, Samples &	Testing	Core Run &	TCR SCR	Install	Description	Depth	Level	Legend
(111)	Levels	No/Type	Depth (m)	Result	Sample	RQD		'	(m)	(mAD)	Logona
1 -		B ES H B ES:	0.30 - 0.40 0.30 0.50 - 0.60 0.50 0.60	60 62				MADE GROUND: Dark brown slightly gravelly slightly sandy silty CLAY. Gravel is sub-angular to sub-rounded fine to coarse of siliceous material.  Very stiff light brown mottled dark orangish brown gravelly slightly sandy CLAY with frequent rootlets (<20mm). Gravel is sub-angular to rounded medium to coarse of siliceous material.	0.10 0.40 (0.60)	85.63 85.33 84.73	
	- - - - - -	H B ES SPT ES	1.00 - 1.10 1.00 1.20 1.50	S 9				Firm light brown slightly gravelly CLAY. Gravel is angular to sub-rounded medium to coarse of siliceous material.  Firm becoming firm to stiff friable thinly laminated dark orangish brown slightly sandy CLAY with frequent iron stained sandstone laminae (<3mm) and frequent leaf		0 0	
2 -		D D H UT100 D	1.80 1.99 2.00 2.00 - 2.45 2.20	70				matter (<20mm).	(1.70)		2
3 -	- - - -	D D SPT	2.65 3.00 3.20	S 16				Stiff becoming to very stiff friable thinly laminated dark bluish grey slightly sandy silty CLAY with occasional shell fragments (<5mm) and rare fossils (<10mm).	2.70	83.03	× × 3 × × 3 × × 3
	- - - - -	H D	3.40 3.71	100							× × × × × × × × × × × × × × × × × × ×
4 -	-	D UT100	4.00 4.20 - 4.65 4.65						(2.50)		× + 4 × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × + 1 × × × × + 1 × × × × + 1 × × × × + 1 × × × × + 1 × × × × + 1 × × × × × + 1 × × × × × + 1 × × × × × × + 1 × × × × × × × + 1 × × × × × × × × × × × × × × × × × × ×
5 -		H D D SPT	4.70 4.80 5.00 5.20 5.50	S 30				Very stiff thinly laminae dark bluish grey slightly sandy CLAY with rare shell fragments (<8mm).	- 5.20	80.53	× × 5 × × 5
6 -	- - - -	D C	6.00 6.30 - 7.60	5.32					(1.20)		6
7 -	- - - - - - - - - - - - - - - - - - -	H SPT D	6.30 - 7.60 6.60 6.70 7.00	532	0	99% 0% 0%		Very stiff friable thinly laminae dark bluish grey slightly sandy silty CLAY with rare shell fragments (<8mm) and rare gypsum crystals (<1mm). 6.40-7.6m. With rare gypsum crystals (<1mm).	(1.20)	79.33	× × × × × × × × × × × × × × × × × × ×
8 -		CS C	7.44 - 7.60 7.60 - 9.10	S 27		100% 0% 0%		Very stiff thinly laminae dark bluish grey slightly sandy CLAY with rare shell fragments (<3mm).	7.60	78.13	X

GINT STD AGS 4_0.GDT 16/7/18

GPJ

ROTARY LOG C5759_GI SECTION 2A

EQUIPMENT: Hand digging tools. Comacchio MC305 Multi-drill track mounted rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm and 113mm sample barrels: 1.20-6.30m. Water flush rotary coring using T6-116 coring barrel: 6.30m-19.60m.
CASING: 140mm diameter to 5.50m.
GROUNDWATER: Water level dry prior to water flush.
BACKFILL: Bentonite pellet seal: 19.60-20.03m. 50mm ID HDPE slotted pipe with washed gravel response zone: 1.40-19.60m. 50mm ID HDPE plain pipe with bentonite pellet seal: 0.20-1.40m. Raised borehole helmet set in concrete: 0.00-0.20m. Gas valve fitted.
REMARKS: PID readings were undertaken on all environmental samples. Results: 0.30m - 0.00ppm; 0.50m - 0.00ppm; 1.00m - 0.00ppm; 1.50m - 0.00ppm Hand vane readings of >150kpa recorded at 4.70m, 6.60m, 8.00m, 13.10m, 14.80m and 19.00m.

<u>-</u>								
ည္က	Groundwater:				Hole Progress:			
C5/2	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
Ö Ö	04/07/18	15.10	5.50		03/07/2018 17:00	3.20		
֡֝֝֡֝ <del>֡</del>					04/07/2018 08:00	3.20		
<u>₹</u>								
ץ מ								

Location:

# TRIAL PIT LOG

Pit No P2AMFOB 2[ Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Co-ords: E 460728 N 223256 **Ground Investigation** C5759 Level: 69.64mAOD

Section 2A GI Dimensions: 2.00m

Depth 0.60m 2.00m Client: East West Rail Alliance Logged By

1:25 MD

Date

16/07/2018

Scale

(m)	Water	Sampl	les & In Situ T	esting	Description			Level	Legend
(111)	Levels	No/Type	Depth (m)	Result	·		Depth (m)	(mAD)	Legend
- -		ES	0.30	140	Very stiff dark brown slightly sandy CLAY with fr fine. [TOPSOIL]  Very stiff fissured slight brown mottled orangish		(0.30)	69.34	
-		H D ES	0.50 0.60	140	occasional rootlets (<1mm). Fissures are subve (<10mm). [OXFORD CLAY]	rtical closely spaced open			
- -		H	0.00	140			(0.90)		
-	<u></u>	B ES H	1.00 - 1.10 1.00	105 106 105	Firm light grey mottled orangish brown sandy Cl	AY, Sand is fine, IKELLAWAY	1.20	68.44	
-		D H	1.30	61 60	BEDSj		(0.25) 1.45	68.19	
-		D H	1.50 1.60	56 55	Firm fissured brown mottled dark orangish brown Fissures are sub-horizontal and randomly orient closely spaced. [KELLAWAY BEDS]	ated extremely closely to very	(0.55)		
- -		B H	1.90 - 2.00 1.90	56 54 55	2.00m: Dry. Trial pit completed at 2.00m		2.00	67.64	
- - -									
- -									
-									
-									

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.60m bucket.

GROUNDWATER: Seepage: 1.20-1.45m.

STABILITY: Trial pit remained stable and vertical.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: PID testing undertaken on all environmental samples. Results 0.30m - 0.00ppm, 0.50m - 0.00ppm, 1.00m - 0.00ppm.

# TRIAL PIT LOG

Pit No P2AMFOB 3[ Sheet 1 of 1

Date

16/07/2018

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Co-ords: E 460699 N 223190

**Ground Investigation** C5759 Level: 69.34mAOD

Location: Section 2A GI Dimensions: Scale 2.00m 1:25 Depth

0.60m 1.50m Client: East West Rail Alliance Logged By MB

(m)	Water	Samp	les & In Situ T	esting	Description	Depth	Level	Legend
····/	Levels	No/Type	Depth (m)	Result	·	(m)	(mAD)	
-	-				Very stiff dark brown slightly sandy CLAY with frequent roots (<3mm). Sand is fine. [TOPSOIL]	(0.30)		
-	-	ES	0.30	-	Very stiff fissured light brown mottled orangish brown and light grey CLAY with occasional rootlets (<1mm). Fissures are subvertical closely spaced open (<10mm). [OXFORD CLAY]	0.30	69.04	
-		D ES	0.50		(STORINI). [DAFORD CLAT]			
-	_	н	0.80	140		(0.90)		
1 —	-	B ES H	1.00 - 1.20 1.00 1.10	145				
-	<u></u>	Н	1.30	148 129 78	Stiff light grey mottled orangish brown sandy CLAY. Sand is fine. [KELLAWAY BEDS]	1.20	68.14 67.99	
-	1	B D H	1.40 - 1.40 1.40 1.50	88 85 48	Stiff becoming firm fissured brown mottled dark orangish brown and light yellowish brown CLAY. Fissures are randomly orientated extremely closely to very closely spaced. [KELLAWAY BEDS]	1.50	67.84	
-				49 53	Trial pit completed at 1.50m			
- 2 —								-2
-								-
-	-			<				-
-	-		/					-
- 3 —								-
- -	-							-
-	-							-
-	1							-
-								

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.60m bucket.

GROUNDWATER: Slight seepage at 1.30m.

STABILITY: Trial pit remained stable and vertical.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: Hand shear vane at 0.50m refused. PID testing undertaken on all environmental samples. Results 0.30m - 0.00ppm, 0.50m - 0.00ppm, 1.00m - 0.00ppm. Soakaway undertaken.

# TRIAL PIT LOG

Pit No
P2AMFOB_3L
Sheet 1 of 1

Date

16/07/2018

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Co-ords: E 4460599 N 223003

Ground Investigation C5759 Level: 68.47mAOD

Location: Section 2A GI

Dimensions: 2.00m
Scale 1:25

Client: East West Rail Alliance Depth 2.00m 8 Logged By MB

	Water	Samp	les & In Situ T	esting			Depth	Level	
(m)	Levels	No/Type	Depth (m)	Result	Description		(m)	(mAD)	Legend
- - -	-	ES H	0.30	140	Very stiff dark brown slightly sandy CLAY with fr fine. [TOPSOIL]  Very stiff fissured slight brown mottled orangish occasional rootlets (<1mm). Fissures are sub-very stiff fissures are sub-very stiff fissures.	brown and light grey	(0.30) CLAY with	68.17	
- - -		D ES H	0.50 0.60	140	(<10mm). [OXFORD CLAY]		(0.90)		
1 <del>-</del>	-	H B ES H	0.90 1.00 - 1.10 1.00	120 118 128 110 113	Stiff light grey mottled orangish brown slightly sa	andy CLAY Sand is f	1.20	67.27	
-		D H	1.40	62 66	[KELLAWAY BEDS]		(0.40)	66.87	
-	<b>1</b>	D H	1.70	92 95 90	Firm becoming stiff, fissured brown mottled dark yellowish brown CLAY, Fissures are sub-horizon extremely closely to very closely spaced. [KELL]	ntal and randomly orie	light	00.07	
2 -	-	B H	1.90 - 2.00 1.90	98 100 104	Trial pit completed at 2.00m	<del>\</del>	2.00	66.47	2
3 -									-3

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.60m bucket.

GROUNDWATER: Water seepae below 1.80m.

STABILITY: Trial pit remained stable and vertical.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: PID testing undertaken on all environmental samples. Results 0.30m - 0.00ppm, 0.50m - 0.00ppm, 1.00m - 0.00ppm.

TP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.G

# ROTARY BOREHOLE LOG

Borehole No. CP2AGFFB_1U Sheet 1 of 2

RC

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E 460978 N 223223 **Ground Investigation** C5759

Location: Section 2A GI Scale 68.09mAOD Level: 1:50.00

Client: East West Rail Alliance Logged By Start: 06/07/2018 Dates: DH/MB End: 00/07/2018

(m)	Water	Core Ru	ın, Samples &	Testing	Core Run &	TCR SCR	Install	Description	Depth	Level	Leger
()	Levels	No/Type	Depth (m)	Result	Sample	RQD		·	(m)	(mAD)	- N 1 ^N . V
	1							TOPSOIL: Soft dark brown slightly sandy clayey SILT with frequent roots and rootlets (<80mm).	0.10	67.99	_ <del>`</del> o`
	1	В	0.30					Very stiff dark brown gravelly slightly sandy CLAY with			
	-	D	0.30 - 0.40					occasional rootlets (<10mm). Gravel is sub-angular fine			-
	7	ES	0.30					to coarse of siliceous material.	(1.20)		- <u>°</u> -
	1	B D	0.50 0.50 - 0.60						,		
-	-	ES	0.50								
	7	В	1.00	S8							
	1	D	1.00 - 1.10	30				Soft to firm thinly laminated light brown mottled dark	1.30	66.79	<u> </u> _
	Ⅎ	ES SPT	1.00 1.20 - 1.65	120				orangish brown slightly sandy CLAY with frequent			
	-	H	1.55	120				rootlets (<30mm).			
	1	''	1.00						(1.10)		<u> </u>
-	Ⅎ	D	2.00 - 2.10	75							
	-	Н	2.05	/5							<u> </u>
	7	UT100	2.20 - 2.65						2.40	65.69	
	1							Firm thinly laminated dark bluish grey slightly sandy silty CLAY with rare pyrite crystals (<2mm).			<u>^x</u>
	-							CLAT with rare pyrite crystais (Szinin).			<del>*</del> -
	7								(1.00)		X>
-	┪	D	3.00 - 3.10					\ \ \ /	,		×
	-	SPT	3.20 - 3.65	S 32							<del>*</del> -*
	7	0	0.20 0.00	75				Very stiff thinly laminated dark grey sandy silty CLAY with	3.40	64.69	× :-
	1						ļ	occasional shell fragments (<4mm).			<u> </u>
	Ⅎ							ossasional onen nagmonio ( · mim).	(0.80)		<del>*</del>
	7	н	3.90	70					(0.60)		<u>X</u>
_	1	D	4.00 - 4.10	'0							<u>×</u>
	Ⅎ	SPT	4.20 - 4.50	S *158				Very dense dark grey slightly gravelly clayey fine SAND	4.20	63.89	. <del></del> -
	-							with frequent irregular very thin lenses of grey very silty			- <u>-</u> -
	7	D	4.50				<del></del>	fine sand. Gravel is angular to sub-angular fine to coarse	(0.70)		
	1							of sandstone.			
_	_	D	4.95		K 1		/_/_	Very dense dark grey very silty fine SAND.	4.90	63.19	·× · · ·
	-	SPT C	5.00 - 5.31	C *90				7			, , , ×
	7	0 0	0.00						(0.70)		×
	1		_		<u> </u>						· · · ·×
	-							Extremely weak dark grey fine gravelly SANDSTONE	5.60	62.49	×, , , , ,
	7			/ \	<b>\</b> \		$\langle \rangle$	with rare fossil shells. Locally weathered to silty fine			
_	1	D	5.95				<del></del>	sand.	(0.00)		
	Ⅎ	C	6.10 - 7.60	C *88		100%			(0.90)		
	-	SPT C	6.10 - 6.42	1	1 : ) [	0%					
	7					0%		Oiff forward dad become a control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of	6.50	61.59	l
	Ⅎ	D	6.60	\	$\vee$ ! $\wedge$			Stiff fissured dark brownish-grey CLAY with rare fossil shells. Fissures are sub-horizontal to randomly orientated			<u> </u>
	-							closely spaced.			
_	-	cs	7.00 - 7.30					, , , , , , , , , , , , , , , , , , , ,			
	1		1.00 - 1.30								<u> </u>
	Ⅎ										
	4						<u> </u>				
	7	С	7.60 - 9.10	C 21		100%					
	1	SPT C	7.60 - 8.05		¢	0% 0%			(2.70)		
3 –	_	1		I	I I	U 70	1				ı- —

EQUIPMENT: Hand digging tools. Comacchio MC305 track mounted rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm and 113mm sample barrels: 1.20-5.00m. Waterflush rotary coring using T6-116 coring barrel: 5.00-15.10m.
CASING: 140mm diameter to 5.00m.
GROUNDWATER: None encountered prior to adding water flush.
BACKFILL: Borehole backfilled with bentonite pellets: 0.00-15.10m on 10/07/2018.
REMARKS: PID readings were undertaken on all environmental samples. Results: 0.30m - 0.00ppm; 0.50m - 0.00ppm; 1.00m - 0.00ppm.

ROTARY LOG C5759_GI SECTION 2A.GPJ

Groundwater: Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Hole Progress: Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
				06/07/2018 17:00 09/07/2018 08:00	4.20 4.20	5.00	

# TRIAL PIT LOG

Pit No
P2ALOB_4D
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Ground Investigation Project No: C5759 Co-ords: E 462174 N 223882 Level: 68.52mAOD 17/07/2018

Location: Section 2A GI

Dimensions: 2.00m
Scale 1:25

Client: East West Rail Alliance Depth 2.00m 8 Logged By MB

	Water		les & In Situ T	esting			Depth	Level	
(m)	Levels	No/Type	Depth (m)	Result	Description		(m)	(mAD)	Legend
-	-				Very stiff dark brown slightly sandy slightly grav (<3mm). Gravel is sub-angular to sub-rounded and flint. [TOPSOIL]	fine to coarse of siliceous material	(0.25)	60.27	
-	-	ES	0.30	140	Very stiff orangish brown slightly sandy gravelly (<2mm). Gravel is sub-angular to rounded fine flint. [GLACIAL DEPOSITS]	CLAY with occasional rootlets to coarse of siliceous material and	0.25	68.27	
-		D ES H	0.50 0.60	140	Firm to stiff light brown mottled light orangish br	cours and light are CLAV with	0.70	67.82	
-		н	0.90	68	occasional rootlets (<1mm). [PROBABLE KELL	AWAY BEDS			
1 -		B ES	1.00 - 1.10 1.00	72 69			(0.90)		1 1
-		H	1.20	75 79 78	1.20m: Locally slightly sandy with lenses and pasand.	artings of orangish brown silty fine			
-		D H	1.50	72 75 76	1.60-1.80m: Becoming very sandy.		1.60	66.92	
-	<u></u>	D H B	1.70 1.90 - 2.00	54 52 51	Firm to stiff light bluish grey mottled orangish by [KELLAWAY BEDS]  Light bluish grey mottled orangish brown clayey [KELLAWAY BEDS]	<u> </u>	(0.20) - 1.80 (0.20)	66.72	
3 -					Trial pit completed at 2.00m		2.00	66.52	-3

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.60m bucket.

GROUNDWATER: Seepage from 1.80m.

STABILITY: Trial pit unstable.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: PID testing undertaken on all environmental samples. Results 0.30m - 0.00ppm, 0.50m - 0.00ppm, 1.00m - 0.00ppm.

# TRIAL PIT LOG

Pit No P2AMFOB 1 Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Co-ords: E 460600 N 223058 Date **Ground Investigation** 17/07/2018 C5759 Level: 69.05mAOD

Location: Section 2A GI Dimensions: Scale 2.00m 1:25 Depth

0.60m 2.00m Client: East West Rail Alliance Logged By MB

	Motor	Samn	les & In Situ T	estina			Donth	Loval	IVID
(m)	Water Levels	No/Type	Depth (m)	Result	Description		Depth (m)	Level (mAD)	Legend
-		ES	0.30		Very stiff dark brown slightly sandy CLAY with f fine. [TOPSOIL]  Very stiff fissured light brown mottled light grey with occasional roots (<40mm). Fissures are su	and light orangish brown CLAY	(0.30)	68.75	1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2
-	-	H D ES H	0.40 0.50 0.70	140	closely spaced. [OXFORD CLAY]	b-vertical and sub-nonzonial	(0.90)		
1 —		B ES	1.00 - 1.10 1.00	140	0.80m: With rare roots (<10mm).		(0.90)		
-	-	D H	1.30	140	Very stiff brownish grey motteld dark orangish, trare rootlets (<3mm) and occasional thin lenses brown silty fine sand. [KELLAWAY BEDS]  Stiff to very stiff fissured brown mottled dark ora	s and partings of dark orangish	1.20 (0.20) 1.40	67.85 67.65	
- - -		D	1.50		brown CLAY with rare roots (<3mm) and occasiorangish brown and yellowish brown silty fine sign and randomly orientated very closely to closely	onal thin lenses and partings of and. Fissures are sub-horizontal	(0.60)		
2 — -	-	В	1.90 - 2.00		2.00m: Dry. Trial pit completed at 2.00m		2.00	67.05	
3 —									- - - - - - - - -
- - - - -									-

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.60m bucket.

GROUNDWATER: No groundwater encountered.

STABILITY: Trial pit remained stable and vertical.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: Hand vane test 1.40-2.00m not undertaken, strata too fissured. PID testing undertaken on all environmental samples. Results 0.30m - 0.00ppm, 0.50m -0.00ppm, 1.00m - 0.00ppm.

Location:

# TRIAL PIT LOG

Section 2A GI

Pit No P2AMFOB 4L Sheet 1 of 1

2.00m

Scale

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Co-ords: E 460659 N 22304 Date **Ground Investigation** 17/07/2018 C5759 Level: 69.14mAOD

1:25 Depth

Dimensions:

0.60m 1.50m Client: East West Rail Alliance Logged By MB

m)	Water	Samp	les & In Situ T	esting	Description	Depth	Level	Legend
,	Levels	No/Type	Depth (m)	Result	·	(m)	(mAD)	Logona
-					Very stiff dark brown slightly sandy CLAY with frequent rootlets (<3mm). Sand is fine. [TOPSOIL]	(0.00)		
-						(0.30)		-=
-		ES	0.30	140	0.30-0.70m: With some closely and mediumly spaced subvertical open (<10mm)	0.30	68.84	<u> </u>
-					fissures.			
-		D	0.50		Very stiff fissured light brown mottled light grey and light orangish brown CLAY with occasional rootlets (<2mm). Fissures are sub-vertical and sub-horizontal			
-		ES H	0.60	140	closely spaced. [OXFORD CLAY]	(2.22)		
						(0.80)		
_		H	0.90	140				
_		B ES	1.00 - 1.10 1.00		Off light and a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state of a state	1.10	68.04	
-		D	1.20	90	Stiff light grey mottled orangish brown slightly sandy CLAY. Sand is fine. [KELLAWAY BEDS]	(0.20)		
-		H	1.20	92	Stiff fissured brown mottled dark orangish brown and light yellowish brown CLAY	1.30	67.84	
-		В	1.40	95 85	with occasional thin lenses and partings of orangish brown and yellowish brown	(0.20)		
-		D H		88	silty fine sand. Fissures are sub-horizontal and randomly orientated very closely to closely spaced. [KELLAWAY BEDS]	1.50	67.64	
-		''		85	1.50m: Dry. Trial pit completed at 1.50m	/		
-					That pit completed at 1.50M			
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				1				'

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.60m bucket.

GROUNDWATER: No groundwater encountered. STABILITY: Trial pit remained stable and vertical.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: PID testing undertaken on all environmental samples. Results 0.30m - 0.00ppm, 0.50m - 0.00ppm, 1.00m - 0.00ppm. Soakaway undertaken.

TP LOG

# TRIAL PIT LOG



Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No:

**Ground Investigation** C5759

Level: 69.65mAOD

0.60m

Co-ords: E 460392 N 223045 Date 18/07/2018

Location: Section 2A GI Dimensions:

Scale 2.00m 1:25

Client: East West Rail Alliance

Depth 2.00m

Logged By

Jilont.	Lu	st west re	an 7 mai	100	Ö			MB
(m) Water	Samp No/Type	les & In Situ T		Description		Depth (m)	Level (mAD)	Legend
-	No/Type	Depth (m)	Result	Very stiff dark brown slightly gravelly CLAY with subangular to rounded fine to coarse of siliceou	frequent roots (<20mm). Gravel is material and flint. [TOPSOIL]	. ,	(III/LD)	<u>1/ 2/ 1/</u> . <u>2/</u>
-	ES H	0.30	140	Very stiff desiccated brown mottled dark brown CLAY with rare roots (<100mm). Sand is fine. [l	and orangish brown slightly sand	0.30 S]	69.35	
-	D ES H	0.50	140		$\nearrow$	(0.40)	60.05	
	Н	0.80	140	Very stiff fissured light grey mottled light brown with occasional rootlets (upto 1mm). Fissures a orientated, closely spaced. [PROBABLE OXFO	re subvertical and randomly	0.70	68.95	
_	B ES	1.00 - 1.10 1.00				(0.80)		
-	H D	1.30 1.35	140	1.30-1.50m: Occasional partings of orangish br	own clayey fine sand.			
-	D	1.60		Stiff fissured brown mottled dark orangish brow with rare pockets of gypsum (<20mm) and occa and light yellowish brown silty fine sand. Fissur randomly orientated very closely to closely space	sional partings of orangish browi es are sub-horizontal and	ו	68.15	
	H D	1.80 1.90 - 2.00	90 86	2.00m: Dry	SU. [KELLAWAT BEDS]	(0.50)	67.65	
				Trial pit completed at 2.00m				

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.60m bucket.

GROUNDWATER: No groundwater encountered.

STABILITY: Trial pit remained stable and vertical.

BACKFILL: Trial pit backfilled with arisings and compacted with bucket.

REMARKS: PID testing undertaken on all environmental samples. Results 0.30m - 0.00ppm, 0.50m - 0.00ppm, 1.00m - 0.00ppm.

#### ROTARY BOREHOLE LOG

Borehole No. P2AMFOB 1D Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 | Project No: Hole Type Co-ords: E 460658 N 223134 **Ground Investigation** DS+RC C5759

Location: Section 2A GI Scale Level: 69.24mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 31/07/2018 Dates: MM End: 31/07/2018

								L11u. 31/01/20	10		
(m)	Water	Core Ru	ın, Samples &		Core Run &	TCR SCR	Install	Description	Depth	Level	Legend
-	Levels	No/Type	Depth (m)	Result	Sample	RQD		MADE GROUND: (grass on) firm dark brown slightly	(m) - 0.10	(mAD) 69.14	
1 -		ES ES H H	0.30 0.50 0.55 0.60	80 85 120				gravelly slightly sandy silty ĆLAY with frequent roots and rootlets (<10mm). Gravel is angular to sub-angular fine to coarse of siliceous material.  MADE GROUND: Firm brown to orangish brown slightly sandy gravelly silty CLAY with low cobble content. Gravel is angular to sub-angular fine to coarse of siliceous material and brick. Cobbles are sub-angular of siliceous	0.35 (0.40) 0.75	68.89 68.49	-1
2 —								material (<200mm).  MADE GROUND: Stiff brown to orangish brown slightly sandy gravelly silty CLAY with low cobble content. Gravel is angular to sub-angular fine to coarse of siliceous material and brick. Cobbles are sub-angular of siliceous material (<200mm).  0.75m: Dry.			2
-								Borehole completed at 0.75m			-
3											-3 - - - - - -
4 -											-4 - - - - - - -
5 -											5
6 -											- -6 -
7 -											- - -7 - -
8 —											-8

EQUIPMENT: Hand digging tools.
METHOD: Hand dug inspection pit: 0.00-0.75m.
CASING: None used.
GROUNDWATER: Not encountered.
BACKFILL: Upon completion, inspection pit backfilled with arisings: 0.00-0.75m.
REMARKS: Inspection pit terminated at 0.75m due to exposed bureid service at 0.65m. No geotechnical samples taken as instructed by Atkins engineer. PID readings were undertaken on all environmental samples. Results: 0.30m - 0.40ppm and 0.50m - 0.10ppm.

Groundwater: **Hole Progress:** Strike Depth Casing Depth (m) Depth After Observation (m) Hole Depth (m) Casing Depth (m) Water Depth Date 0.75 31/07/2018 17:00

SECTION 2A ROTARY

GINT

#### ROTARY BOREHOLE LOG

Borehole No. P2AMFOB 1D (A) Sheet 1 of 2

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E 460658 N 223133 **Ground Investigation** DS+RC C5759

Section 2A GI Location: Scale Level: 69.52mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 01/08/2018 Dates: ММ End: 03/08/2018

									End:	03/08/20	18		IVIIVI
(m)	Water	Core Ru	ın, Samples &	Testing	Core Run &	TCR SCR	Install	D	escription		Depth	Level	Legend
(111)	Levels	No/Type	Depth (m)	Result	Sample		IIIStali		'		(m)	(mAD)	Legena
]		В	0.20 - 0.40					MADE GROUND: Grass gravelly slightly sandy sil rootlets (<10mm). Grave	Ity CLAY with frequent	roots and	0.10	69.42	
	}	В	0.40 - 0.60					coarse of siliceous mater	rial.		(0.60)		
1 -		H H B D ES UT100	0.60 0.65 0.70 0.90 - 1.20 1.00 1.20 1.20 - 1.65	60 80 125				MADE GROUND: Firm b sandy gravelly silty CLA\ sub-angular fine to coars 0.35m: 1no. band of grav 0.48m: 1no. band of grav Stiff brown mottled grey s silty CLAY. Gravel is sub	Y. Gravel is angular to se of siliceous materia vel (<50mm). vel (<50mm), slightly gravelly slightly	I and brick.	0.70 (0.50) 1.20	68.82 68.32	× × 1 × × 1 × × × × × × × × × × × × × ×
2 -		D H H D H SPT	1.65 1.70 1.80 1.90 2.00 - 2.45	70 70 70 8 12				siliceous material.  Firm brown mottled grey silty CLAY with rare rootl sub-angular to sub-rouncy.  Firm becoming stiff grey silty CLAY with occasion (<3mm). Gravel is sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub-angular to sub	slightly gravelly slight lets (<2mm). Gravel is ded fine of siliceous m slightly sandy slightly al light brown clay len	ly sandy aterial. gravelly ses	2.00	67.52	x x - 2 x x - 2 x x - 2 x x - 2
3 -		UT100	3.00 - 3.45	130 110 100				siliceous material.			(1.60)		× × × × × × × × × × × × × × × × × × ×
4 -		D H H D C SPT	3.45 - 3.50 3.70 3.80 3.90 4.00 - 5.00 4.00 - 4.37	80 70 S*68		80% 0% 0%		Stiff grey slightly gravelly calcite lenses. Gravel is medium of siliceous mate 3,80-3,90m: tending to a coarse sand.  Very stiff grey slightly gracalcite lenses and rare p	angular to sub-angula erial and mudstone. gravelly very clayey fi avelly sandy silty CLA	r fine to ne to Y with rare	3.60 (0.40) 4.00	65.92 65.52	× × × × × × × × × × × × × × × × × × ×
5 —		CS D C SPT C	4.72 - 4.90 4.90 5.00 - 6.50 5.00 - 5.36 5.45	C*71		90% 0% 0%		brown slightly sandy clay sub-angular fine to coars mudstone. 4.00-4,37m: SPT disturb 5.00-5.36m: CPT disturb	se of siliceous materia	l and	(2.60)		X
7 —		D CS C SPT(C)	6.20 6.30 - 6.50 6.50 - 8.00 6.50 - 6.95	C 44		100% 0% 0%		Very stiff thinly to thickly rare calcite and gypsum		LAY with	6.60	62.92	× × × × × × × × × × × × × × × × × × ×
8 —		cs	7.55 - 7.80								(2.60)		× × × × × × × × × × × × × × × × × × ×

EQUIPMENT: Hand digging tools. Fraste Multi-drill PL(G) track mounted rig. METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm sample barrels: 1.20-4.00m. Waterflush rotary coring using T6-116 coring barrel:

GINT STD AGS 4_0.GDT 22/8/18

GPJ

SECTION 2A

Ō C5759

ROTARY LOG

Aloc-15.50m. CASING: 128mm diameter to 4.00m. GROUNDWATER: Not encountered prior to using water-flush to advance casing to 4.00m. BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 0.00-15.50m LOCATION: OX 17m+1675yd (76.45ch) DOWN CESS REMARKS: PID readings were undertaken on all environmental samples. Results: 1.20m - 0.20ppm. No environmental samples taken: 0.00-1.00m as instructed by Atkins engineer.

3	Groundwater:				Hole Progress:				
	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
3					01/08/2018 17:00	1.20			
1					02/08/2018 08:00	1.20			
Ę									
5									

Location:

# TRIAL PIT LOG

Pit No
P2ACLOB_3L
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No:

Ground Investigation C5759

Level: 69.54mAOD Dimensions: 2.0

.54mAOD 08/08/2018 2.00m Scale

Client: East West Rail Alliance

Section 2A GI

Depth & 2.00m & 2.00m

Co-ords: E 460161 N 223142

Logged By MB

1:25

Date

								MB
(m)	Water	Sampl	les & In Situ T		Description	Depth	Level (mAD)	Legend
	Leveis	No/Type	Depth (m)	Result	TOPSOIL: Dark brown clayey fine SAND with frequent roots (<3mm).	(m) (0.25)	(MAD)	7,15 7,15
- - -		ES	0.30		Brown slightly gravelly silty fine to medium SAND with occasional roots (<2mm). Gravel is angular to rounded fine to coarse of siliceous material. (ALLUVIUM)	0.25	69.29	\(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}{1}\) \(\frac{1}\) \(\frac{1}{1}\) \(\frac{1}\) \(\
- -		B ES	0.50 - 0.60 0.50		Dark brown mottled dark grey clayey fine SAND. (ALLUVIUM)	0.60	68.94	
- 1 —	-	В	1.00 - 1.10	74	Firm orangish brown mottled brown and brownish grey slightly sandy CLAY. Sand is fine. (ALLUVIUM)	0.90	68.64	
-	-	D ES H	1.00	76 71 78		(0.60)		
- -	-			72 69	Light bluish grey mottled orangish brown very clayey fine SAND. (KELLAWAY BEDS)	1.50	68.04	
-		D	1.60			(0.50)		
2 —		В	1.90 - 2.00		2.00m: Dry. Trial pit completed at 2.00m	2.00	67.54	
3 —								

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

GROUNDWATER: Not encountered.

STABILITY: Trial pit walls stable and vertical throughout.

BACKFILL: Upon completion, trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: PID readings were undertaken on all environmental samples. Results: 0.30m - 0.20ppm; 0.50m - 0.20ppm and 1.00m - 0.00ppm.

# TRIAL PIT LOG

Pit No
P2ALOB_4U
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Ground Investigation Project No: C5759 Co-ords: E 461832 N 223403 Level: 66.90mAOD Date 08/08/2018

Location: Section 2A GI Dimensions: 2.30m Scale 1:25

Client: East West Rail Alliance Depth 2.00m P Logged By MB

	Water	Samp	les & In Situ T	estina			Depth	Level	IVID
(m)	Levels	No/Type	Depth (m)	Result	Description		(m)	(mAD)	Legend
- - -		ES	0.30		TOPSOIL: Very stiff fissured dark brown slight g frequent roots (<3mm). Gravelly sub-angular to material.  Very stiff fissured brown mottled grey slightly grave occasional roots (<2mm). Gravel sub-angular to	avelly slightly sandy CLAY with	(0.25)	66.65	1/2 1/1/2 1/2 1/1/2 1/2 1/1/2 1/2 1/1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2
- - -		B D ES	0.50 - 0.60 0.50	-	very stiff randomly orientated closely fissured lig with occasional rootlets (<1mm) and polished fis	ght brown mottled light grey CLAY	0.35)	66.30	
1 <del>-</del>		B ES H	1.00 - 1.10 1.00 1.10	135 140	1.20-1.50m: Firm to stiff		(0.90)		1
- - -		H D	1.40 1.60	75 78 83	Firm randomly orientated extremely closely and brownish grey sightly sandy CLAY with occasion	nal very thin lenses (<5mm) of	1.50	65.40	
-		н	1.80	70 72	yellow and light brown silt and fine sand. Sand is	s fine. (KELLAWAY BEDS)	(0.50)		
2			/	74	2.00m: Dry. Trial pit completed at 2.00m		- 2.00	64.90	2
3									-3

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.60m bucket.

GROUNDWATER: Not encountered.

STABILITY: Trial pit walls stable and vertical throughout.

BACKFILL: Upon completion, trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: PID readings were undertaken on all environmental samples. Results: 0.30m - 0.00ppm; 0.50m - 0.00ppm and 1.00m - 0.00ppm.

TP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.0

# TRIAL PIT LOG

Pit No
P2ALOB_6U
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

East West Rail Alliance

Project Name: East West Rail Phase 2 GRIP4 Project No:

Ground Investigation C5759

Level: 66.03mAOD

Co-ords: E 461737 N 223345

Date 08/08/2018

Location: Section 2A GI

Client:

Dimensions:

2.00m Scale

Depth 2.00m 1 : 25

Logged By MB

(m)	Water	Samp	les & In Situ T	esting	Description		Depth	Level	Legand
(m)	1	No/Type	Depth (m)	Result	Description		(m)	(mAD)	Legend
- - -		ES	0.20		MADE GROUND. Firm friable fissured dark bro CLAY with frequent roots (<3mm). Gravel is any brick, concrete and siliceous material.  MADE GROUND: Reddish brown and grey ang brick, concrete and limestone with much fines. sandy gravelly clay with occasional roots (<3mr fine to coarse of concrete, brick, sandstone, lim	gular-rounded to fine to coarse of ular to sub-angular COBBLES of Fines are firm dark brown slightly n). Gravel is angular to rounded	0.05 (0.25) 0.30	65.98 65.73	
-		D ES H B	0.50 0.70 - 0.80	110 118 109	Stiff locally firm brown mottled orangish-brown a CLAY with occasional rootlets (<1mm). Gravel coarse of siliceous material.	and grev slightly sandy gravelly	(0.75)		
-		Н	0.80	78 79 80	Firm orangish-brown mottled light grey slightly	and CLAV	1.05	64.98	
-		ES H	1.20 1.30	62	Gravel sub-angular to rounded fine to coarse of	siliceous material.	(0.60)		
-		В	1.50 - 1.60	61				04.00	
-		D	1.70		Light bluish grey mottled orangish brown very c BEDS)	layey fine SAND. (KELLAWAY	(0.35)	64.38	
_		В	1.90 - 2.00	_	2.00m: Dry. Trial pit completed at 2.00m	>	2.00	64.03	
-			/						
-									
-									

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

GROUNDWATER: Not encountered.

STABILITY: Trial pit walls stable and vertical throughout.

BACKFILL: Upon completion, trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: PID readings were undertaken on all environmental samples. Results: 0.20m - 0.10ppm; 0.50m - 0.00ppm and 1.20m - 0.00ppm.

TP LOG C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.G

**Hole Progress:** 

30/07/2018 17:00

Hole Depth

(m)

0.45

Casing Depth (m)

Water Depth

Groundwater:

Date

Strike Depth

Casing Depth (m)

Depth After

Observation (m)

Groundwater:
Date
Strike Depth (m)
Casing Depth Depth After Observation (m)

Depth After Observation (m)

Hole Progress:
Date
Hole Depth Casing Depth (m)
Casing Depth (m)
(m)
(m)

30/07/2018 17:00
0.55

Groundwater:				Hole Progress:				
Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
				31/07/2018 17:00	0.45			

Groundwater:
Date Strike Depth Casing Depth Depth After
(m) (m) Observation (m)

Hole Progress:
Date Hole Depth Casing Depth Water Depth
(m) (m) (m)

31/07/2018 17:00 0.50

#### ROTARY BOREHOLE LOG

Borehole No. CP2AJLFB 1D (D) Sheet 1 of 2

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 Project No: Hole Type Co-ords: E N **Ground Investigation** DS+RC C5759

Section 2A GI Location: Scale Level: mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 06/12/2018 Dates: MM End: 07/12/2018

									End: 07/12/2	018		IVIIVI
(m)	Water	Core Ru	ın, Samples &		Core Run &	TCR SCR	Install		Description	Depth	Level	Legend
()	Levels	No/Type	Depth (m)	Result	Sample	RQD		DALLACT (Dellace de	·	(m)	(mAD)	
-		B ES B ES	0.30 0.50					to sub-angular fine to c material, brick and lime Cobbles are angular of	nt brown sandy slightly silty angular coarse GRAVEL of igneous estone with low cobble content.	0.20 (0.45) 0.65		
1 -		B D ES SPT	1.00 1.20 - 1.65	S 5				to sub-angular fine to c material, brick and lime Cobbles are angular of	coarse GRAVEL of igneous estone with low cobble content. f limestone (<150mm).	(0.90)		1
2 -		H ES D SPT	1.70 1.80 1.90 2.00 - 2.45	50 65 70 S 4				gravelly slightly CLAY. fine of limestone.(KELI	ed grey slightly sandy slightly Gravel is angular to sub-angular LAWAYS CLAY FORMATION) sy silty CLAY. (KELLAWAYS CLAY	(0.45)		× × × × × × × × × × × × × × × × × × ×
3 -		H D UT100	2.75 2.90 3.00 - 3.45	55 60						(1.35)		× × × × × × × × × × × × × × × × × × ×
		D H	3.45 - 3.55 3.70	75				Stiff grey thinly laminat CLAY FORMATION)	ed silty CLAY. (KELLAWAYS	3.35		× × × × × × × × × × × × × × × × × × ×
4 -		D C SPT CS	3.90 4.00 - 5.20 4.00 - 4.12 4.32 - 4.55	80 90 S*750		83% 79% 68%		are horizontal medium undulating and stepped FORMATION)	nelly LIMESTONE. Discontinuities spaced locally closely spaced d rough. (CORNBRASH	4.20		X
5 -		C SPT C	5.20 - 6.70 5.20 - 5.26	C*429		100% 90% 80%		sand 5.08-5.20: Discontinuit fractures infilled with g 5.20-6.00: Sub-vertical	ies are very closely spaced with rey clayey sand (<15mm). I discontinuity stepped rough.	(2.65)		5
6		CS C	6.70 - 7.20 6.70 - 6.76	C*375		100%		sub-angular fine to me 6.10: 1No. 45 degree of 6.30: 1No. fine gravel s 6.55: 1No. open fractul sand.	discontinuity stepped rough. sized void. re (50mm) infilled with grey clayey	6.85		
7		SPT C CS H D C	6.70 - 6.76 6.90 - 7.15 7.00 7.15 7.20 - 8.20	135 110 130		30% 0% 30% 15% 0%	-	occasional fine to med fragments (2-10mm). (	nctly laminated grey silty CLAY with ium sand sized comminuted shell FOREST MARBLE FORMATION) trong light grey limestone.	(2.10)		7 × × × × × × × × × × × × × × × × × × ×

GPJ

EQUIPMENT: Hand digging tools. Fraste multi-purpose ML track mounted rig.
METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 113mm sample barrel: 1.20-4.00m. Water-flush rotary coring using T6-116 coring barrel: 4.00-17.20m.
CASING: 140mm diameter to 4.00m.
GROUNDWATER: Not encountered prior to flush casing.
BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 0.00-17.20m.
REMARKS: PID readings undertaken on all environmental samples. Results: 0.30m - 0.10ppm, 0.50m - 0.50ppm, 1.00m - 0.20ppm and 1.80m - 0.00ppm. Reported SPT 'N' values in excess of 50 have been linearly extrapolated.

I SECTION 2A.0	REMARKS: PID SPT 'N' values i	readings under n excess of 50 h	taken on all envir nave been linearly	onmental samples. Res extrapolated.	ults: 0.30m - 0.10ppn	ո, 0.50m - 0.50p	om, 1.00m - 0.20p	pm and 1.80m - 0.00ppm. Reported
CC ROTARY LOG C5759_G	<b>Groundwater:</b>	Strike Depth	Casing Depth	Depth After	Hole Progress:	Hole Depth	Casing Depth	Water Depth
	Date	(m)	(m)	Observation (m)	Date	(m)	(m)	(m)

#### WINDOWLESS SAMPLE LOG

Borehole No. NS2ALTN 2U

Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: East West Rail Phase 2 GRIP4 | Project No: Hole Type Co-ords: E 461920 N 223570 **Ground Investigation** WS C5759

Location: Section 2A GI Scale Level: 69.56mAOD 1:50.00

Client: East West Rail Alliance Logged By Start: 03/12/2018 Dates: TΒ End: 03/12/2018

								End: 03/12/20	18		טו
(m)	Water Levels	Samp No/Type	les & In Situ To	esting Result	Sample	Install	Des	scription	Depth (m)	Level (mAD)	Legend
-		B ES B ES H	0.20 0.50	36			CLAY with frequent roots and sub-angular fine to medium of MADE GROUND: Yellowish bi SAND. Gravel is sub-angular t siliceous material.	ballast and siliceous material. rown slightly gravelly clayey	- 0.20 - 0.45	69.36 69.11	
1		B ES H D ES H B	1.00 1.50 1.65 - 2.70 1.90	34			slightly gravelly slightly sandy medium of siltstone.  MADE GROUND: Soft dark br	own mottled greyish brown slightly AY Gravel is sub-angular fine to	(1.20) - 1.65	67.91	2
-		D ES UT70 H B	2.50 2.70 - 3.30 2.90	31				ivelly slightly sandy clayey SILT	(1.05)	66.86	
3		ES B H	3.30 - 5.35 3.50	56			Soft thirty-laminated yellowish sandy silty CLAY.		(0.60)	66.26	^ _
4 -		D ES UT70	3.90 4.00 4.50	62					(2.05)		* * 4 * * * 1 * * 2
5	1 <u>¥</u>	D B	4.90 5.35 - 6.00				Grey silty clayey SAND		- 5.35 (0.65)	64.21	× × 5
7	<u></u>	D	5.90				5.85-5.95m: With rare intact sl Borehole completed at 6.00m	hell fossils (<18mm).	6.00	63.56	

EQUIPMENT: Hand digging tools. Terrier 2002 track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Continuous disturbed sampling using 113mm and 101mm sample barrels: 1.20-6.00m.

CASING: 128mm diameter to 2.00m.

GROUNDWATER: Seepage encountered at 0.30m. Borehole damp at 4.00m. Water strike at 5.90m rising to 5.11m following 20 minute monitoring period.

BACKFILL: Upon completion, borehole backfilled with bentonite pellets: 1.20-6.00m and arisings: 0.00-1.20m.

REMARKS: PID readings were undertaken on all environmental samples. Results: 0.20m - 0.20ppm, 0.50m - 0.10ppm, 1.00m - 0.20ppm; 1.50m - 0.10ppm, 1.90m - 0.10ppm, 2.90m - 0.10ppm and 3.90m - 0.10ppm. Dynamic Probe undertaken adjacent to sampling - see separate sheet. Borehole refused at 6.00m.

Groundwater: Date 03/12/18	Strike Depth (m) 5.90	Casing Depth (m)	Depth After Observation (m) 5.11	Hole Progress: Date 03/12/2018 17:00	Hole Depth (m) 6.00	Casing Depth (m) 2.00	Water Depth (m) 5.90	

# DYNAMIC PROBE LOG

EN ISO 22476-2

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

_____

Probe No

Sheet 1 of 1

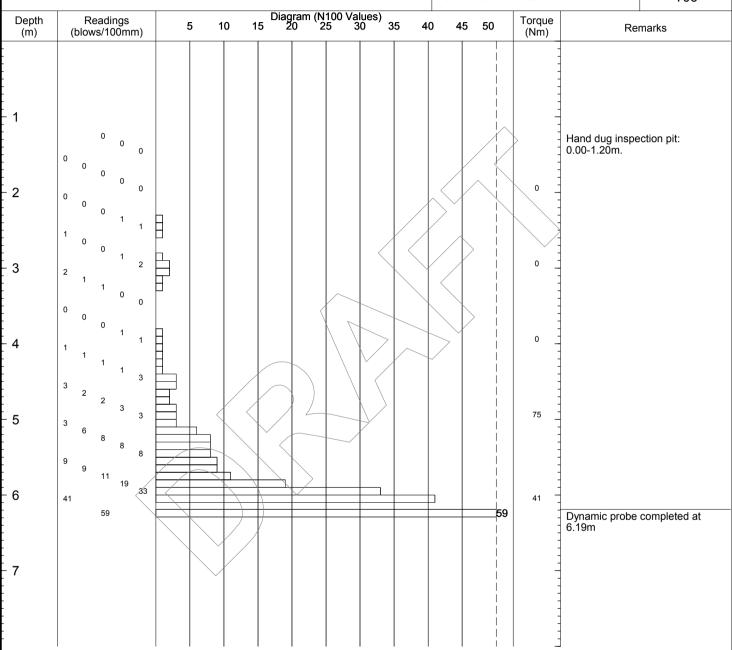
HDP2ALTN 2U

Project Name: East West Rail Phase 2 GRIP4 Ground Investigation Project No: Co-ords: E 461920 N 223570 Date 03/12/2018

Location: Section 2A GI Specification: DPSH-B Scale

 Client:
 East West Rail Alliance
 Hammer Mass: 64Kg
 1:50

 Drop Height: 750mm
 Rig No. Cone Base Diameter: 51mm
 T06



EQUIPMENT: Hand digging tools. Terrier 2002 track mounted window sampling rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic probing superheavy (DPSH-B): 1.20-6.19m.

REMARKS: Probing undertaken adjacent to windowless sampling - see separate sheet. Dynamic probe refused at 6.19m.

G C5759_GI SECTION 2A.GPJ CCGI GINT STD AGS 4_0.GDT

#### TRIAL PIT LOG

Pit No P2ALTN 2Ψ Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project No: Co-ords: E 461894 N 223513 Project Name: East West Rail Phase 2 GRIP4 Date **Ground Investigation** 04/06/2018 C5759 Level: 66.75mAOD

Location: Section 2A GI Dimensions: Scale 2.00m 1:25 Depth

0.70m 3.00m Client: East West Rail Alliance Logged By MB

1)   '	Water	Sampl	es & In Situ T		Description	Depth	Level	Legend
''   L	_evels	No/Type	Depth (m)	Result	'	(m)	(mAD)	Legend
}					TOPSOIL: Soft friable dark brown slightly sandy CLAY with frequent roots (<3mm). Sand is fine.	(0.25)		\(\frac{1}{2} \) \(\frac{7}{2} \) \(\fra
]		ES	0.20		Soft to firm light brown slightly gravelly slightly sandy CLAY with occasional roots	0.25	66.50	.11.
+		H ES	0.30 0.40	41	(<2mm). Sand is fine. Gravel is sub-angular to rounded fine to coarse of siliceous material. (ALLUVIUM)	(0.35)		
+		D	0.50	39 44		,		
1		ES		44	Firm light orangish brown mottled light brown and light grey slightly gravelly	0.60	66.15	
1.		Н	0.70	60 64	slightly sandy CLAY with occasional rootlets (<1mm). Sand is fine. Gravel is sub-angular to rounded fine to coarse of siliceous material. (AL/LUVIUM)			
1	<u></u>	D	0.80	62		(0.60)		
4		В	1.00 - 1.10	65		(		
+		ES H	1.00	55 57				-0
1		''		3'	Light brown mottled orangish brown slightly gravelly very clayey fine to medium	1.20	65.55	
]		В	1.30 - 1.50		SAND. Gravel is sub-angular to rounded of siliceous material. (ALLUVIUM)	(0.40)		. · · · · · · · ·
1						(0.70)		- <del>- · · ·</del>
+					Firm light bluish grey mottled orangish brown sandy CLAY. (OXFORD CLAY -	1.60	65.15	
+					PETERBOROUGH MEMBER)			
1		Н	1.80	59 61				
]		В	1.90 - 2.00	57		(0.70)		
4								
+		D	2.20					
1					Dark grey silty fine SAND with occasional pockets of firm dark grey fine sandy	2.30	64.45	
]		_	2.50	k	CLAY with frequent shells. (KELLAWAYS SAND FORMATION)			<u> </u>
+		D	2.50			(0.70)		
+						(0.70)		
1								
]		В	2.90 - 3.00	1 [		3.00	63.75	
1					Trial pit completed at 3.00m	3.00	03.73	
+								
+				$\setminus$				
4								
+								
+								
4								

EQUIPMENT: JCB 3CX mechanical excavator.

METHOD: Trial pit excavated using 0.45m bucket.

GROUNDWATER: Seepage encountered at 0.90m and 1.20-1.60m. No rise is recorded.

STABILITY: Trial pit walls unstable and collapsing from: 1.20-1.60m.

BACKFILL: Upon completion, trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Nomenclature provided by Client. PID readings were undertaken on all environmental samples. Results: 0.30m - 0.10ppm; 0.50m - 0.10ppm and 1.00m -

0.00ppm.



#### Appendix D – Soil Screening Results

eB Reference: 133735-EWR-REP-EEN-000137 Rev: B02 Page 93 of 99



Assessment Criteria :							Commercial - 1% S	SOM Sand		▼																										
☐ Use MRL Values?																																				
			ent		es				L	ocation.	WS2A02C	WS2A01D	WS2ALLCU	FCGF2A150	WS2A14C	WS2A19U	WS2A-3D	WS2A 15D	WS2a	WS2a12C	FCT2A2D	WS2A4U	WS2A16U	WS2A6C	WS2A7D	WS2A8C	WS2A9U	WS2A10C	WS2A11D	WS2A13C	WS2 A17U	-CMG2A1 U	WS2 AFCNG	W52A 18D WS	2A19U W	/S2A 20D
		ļ.	ssm		m du	e	e l		Sa	mple ID	В	Α	ES3	ES1	ES1	ES1	ES1		5C	ES1	ES1	ES1	ES1	ES2	ES1	ES1	ES1	ES1	ES2	ES1	ES1	ES1	ES2		ES1	
		etec	essi		f Sa	Valt	- Val			Depth	3.6m	1m	2.5m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	1m	0.3m	0.3m	0.3m	0.3m	1m	0.3m	0.3m	0.3m	1m			0.3m
		ص ص	, i	<u> </u>	er o	틀	num Ser o			Date	15-Jul-15	13-Jul-15	01-Jun-15	28-May-15	_	02-Jun-15	04-Aug-15	18-Jun-15	20-May-15	<del></del>		5 13-May-15	701	005	****	DI T	1400	DI T	000	DI T	005			24-Jun-15		Jun-15
		Ĭ	ene	Tie	Ę	Ë	axin axin xcee		Strata	7	SGF	MDG	MDG	BLT	BLT	MDG	MDG	SGF		TBL	SGF	MDG	TBL	SGF	ALV	BLT	MDG	BLT	GDC	BLT	SGF			MDG N	MDG N	MDG
Constituent ACM Type	Unit	N/A	No S	SV	0	2	<b>≥ Zш</b>	Locations of Exceedances		Zone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	_	-
Asbestos Identification	%	0.00			32	-	- 0				No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbesto Detected		No Asbestos	No Asbestos Detected	No Asbestos No Detected	o Asbestos Detected	No Asbestos Detected	No Asbestos No Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos I Detected	lo Asbestos I				Asbestos etected
Moisture	%						25 0 9.6 0				20 6.3	20 9.6	25 7.8	6.8	8.2 8.1	13	5.6 8	11	10 8.6	9.6 8.5		15	11	17	22	5.6	15	9	17	12	22	23 7.8				14 8.8
Boron (Hot Water Soluble)	mg/kg	g 0.4	No S	SV	32	<0.4	2.3 0				1.3	1.5	2	1.1	<0.4	1.9	1.2	1.7	<0.4	<0.4	0.5	0.85	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.8	0.69	0.82	1.1	2.3	1.8
Arsenic	mg/kg	g 1	63	5	32	4.9				-	<0.5 15	<0.5 41	<0.5 13	<0.5 13	<0.5 8.4	<0.5 33	<0.5 15	<0.5 31	<0.5 34	<0.5 39	<0.5 25	<0.5 32	11	11 25		38 23		30 32	12 23	6.1	<0.5 4.9	<0.5 14	<0.5 42	<0.5 27		<0.5 25
	mg/kg mg/kg		2080	00	32	<0.1 14	1.5 0 660 0				0.12 41	0.23 660	0.74 71	0.3 26	<0.1	0.18	0.12 190	0.29	0.25 16	0.27 14	0.18	1.5 44	0.19 29		0.1 49	0.17 35		0.39 39	0.66 57	0.23 20	0.22	<0.1 38	0.25 23			0.39
Copper	mg/kg	g 0.5	1060	00	32	1.6	120 0				16	23	56	12	1.6	59	63	26	12	16	47	39	30	25	17	18	30	81	31	15	36	22	110	120	59	49
Mercury Nickel	mg/kg mg/kg	g 0.5	177	0	32	7.7	0.47 0 74 0				<0.1 21	0.47 47	<0.1 74	0.25 23	<0.1 7.7	<0.1 30	0.13 25	<0.1 26	<0.1 20	<0.1 22	<0.1 24		18	<0.1 47	23	21	27	36	<0.1 51	21	0.12 21	<0.1 20	35	24	23	0.26 24
Lead Zinc	mg/kg mg/kg		23°	000	32 32	4.1 20	120 0 270 0			-	21 57	24 64	25 160	26 68	4.1 20	23 92	31 110	68 67	13 76	15 83	96	53 110		17 87				66 150	34 100		27 95	13 83				120 270
Chromium (Hexavalent)	mg/kg	g 0.5	49	1	5	<0.5	<0.5 0 21 0				1.7	<0.5 2.2	<0.5 3.8	1.7			<0.5 21							<0.5								< 0.5				
	mg/kg	g 10	No S	SV	32	<10	650 0				<10	<10	<10	<10	<0.4 <10	3.5 28	26	3.5 80	<0.4 <10	<0.4 <10	5.5 <10		<10		<10	25		37		<10	6.9 <10	0.86 24		24	200	5.7 650
Naphthalene Acenaphthylene	mg/kg mg/kg	g 0.1 g 0.1	No S	SV	32	<0.1	0.38 0 1.6 0		+ +	-	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	0.28	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1			<0.1 <0.1		<0.1 <0.1	<0.1 <0.1		<0.1 <0.1	<0.1 <0.1	0.21			1.6
Acenaphthene	mg/kg		836	00	32	<0.1					<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	1.1 0.31	<0.1 <0.1	<0.1	< 0.1	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1		<0.1	<0.1	<0.1	<0.1 <0.1	<0.1	<0.1	<0.1	0.24 1.2
Phenanthrene	mg/kg	g 0.1	No S	SV	32	<0.1	15 0				<0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.1	2.2	<0.1	<0.1	< 0.1	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	1.2	<0.1	< 0.1	<0.1	< 0.1	0.22	0.36	0.77	15
	mg/kg mg/kg	g 0.1 g 0.1				<0.1 <0.1	3.9 0 20 0			+	<0.1 0.17	<0.1 0.29	<0.1 <0.1	<0.1 0.2	<0.1 <0.1	<0.1 1.6	<0.1 0.46	0.55 5.1	<0.1 <0.1	<0.1 0.31	<0.1 <0.1			<0.1 <0.1	<0.1 <0.1				<0.1 0.26	<0.1 <0.1	<0.1 0.17	<0.1 <0.1	0.1 1.2			20
Pyrene	mg/kg	g 0.1	541	00	32	<0.1	17 0		+ -	$\dashv$	0.13	0.18	<0.1	0.21	<0.1	1.7	0.33	4.8	<0.1	0.21	<0.1	0.21	<0.1	<0.1	<0.1	1.1	<0.1	3.9	0.36	<0.1	0.17	<0.1	1.8	0.67	1.7	17
Benzo[a]anthracene	mg/kg	g 0.1	BaP Su	rogate	32	<0.1	9.8 0		$\sqcup$		<0.1	<0.1	<0.1	<0.1	<0.1	0.81	<0.1	2.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.58	<0.1	1	<0.1	<0.1	<0.1	<0.1	0.67	<0.1	1	9.8
Chrysene	mg/kg	g 0.1	BaP Su	rogate	32	<0.1	10 0				<0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	2.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.29	<0.1	0.76	<0.1	<0.1	<0.1	<0.1	0.79	<0.1	1.2	10
Benzo[b]fluoranthene	mg/kg	g 0.1	BaP Su	rogate	32	<0.1	11 0				<0.1	<0.1	<0.1	<0.1	<0.1	1.1	<0.1	3.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.1	<0.1	<0.1	<0.1	<0.1	1.6	<0.1	1.4	11
Benzo[k]fluoranthene	mg/kg	g 0.1	BaP Su	rogate	32	<0.1	4.2 0				<0.1	<0.1	<0.1	<0.1	<0.1	0.51	<0.1	1.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.51	<0.1	<0.1	<0.1	<0.1	0.62	<0.1	0.65	4.2
	1	g 0.1		-		<0.1					<0.1	< 0.1	<0.1	<0.1	<0.1	0.85	<0.1	2.3	<0.1		<0.1			<0.1			<0.1			<0.1	<0.1	<0.1				8.1
Indeno(1,2,3-c,d)Pyrene	mg/kg	g 0.1	BaP Su	rogate	32	<0.1	4.3 0				<0.1	< 0.1	<0.1	< 0.1	<0.1	0.57	<0.1	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.58	<0.1	<0.1	<0.1	< 0.1	0.66	<0.1	0.62	4.3
Dibenz(a,h)Anthracene	mg/kg	g 0.1	BaP Sui	rogate	32	<0.1	1.2 0				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.38	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21	<0.1	0.15	1.2
Benzo[g,h,i]perylene	mg/kg		BaP Sui	rogate	32	<0.1	3.6 0				<0.1	<0.1	<0.1	<0.1	<0.1	0.63	<0.1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.79	<0.1	<0.1	<0.1	<0.1	0.64	<0.1	0.73	3.6
	mg/kg			-			110 0	1		-	<2	<2	<2	<2	<2	9.1	<2	31	<2	<2	<2	<2		<2			<2			<2	<2	<2	9.9			110
	mg/kg %					<0.3	<0.5 0 <0.1 0				<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Moisture Content	%			SV		9.9																													$\Rightarrow$	
Total mass of sample received	kg	0.00	1 No S	SV	3	1.3	1.6 0																													
Asbestos in Soil	Туре	N/A	No S	sv	3	-	- 0																													
		its N/A				6.2	6.5 0																												=	=
Water Soluble Sulphate (2:1	mg/kg	0.001	No S 25 No S		3	0.0053	0.089 0														<del> </del>														-+	
Leachate Equivalent) Organic Matter	%				3	<0.1		1		-											1														-+	_
		g 1 g 0.05	No S	SV	3	<1																														
Acenaphthylene	mg/kg	g 0.1	No S	SV	3	<0.1	<0.1 0																												$\Rightarrow$	
Fluorene	mg/kg mg/kg	g 0.1	665	00	3	<0.1 <0.1	<0.1 0																												士	_
		g 0.1 g 0.1					<0.1 0 <0.1 0													<u> </u>	<del>                                     </del>	-	<del>                                     </del>												-	
Fluoranthene	mg/kg	g 0.1	722	00	3	<0.1	<0.1 0																													
Pyrene Benzo(a)anthracene	mg/kg mg/kg	g 0.1 g 0.1			3	<0.1	<0.1 0 <0.1 0		+ +				<del> </del>		<u> </u>						1	1	1					<b> </b>							+	
			-	-+					+ +				-		-					-	+	+	-					-							-+	
Chrysene	mg/kg		-	-+	3	<0.05	<0.05 0		$\vdash$						-					<u> </u>	1	-													$-\!\!\!\!+$	
Benzo(b)fluoranthene	mg/kg	g 0.1	BaP Su	rogate	3	<0.1	<0.1 0													ļ	1															
Benzo(k)fluoranthene	mg/kg	g 0.1	BaP Sui	rogate	3	<0.1	<0.1 0																													
Benzo(a)pyrene	mg/kg			3		<0.1	<0.1 0		$+ \top$	$-\mp$			<del></del>		+ -	<del>                                     </del>			<del> </del>		1	+	+ -			$\exists$									$ \vdash$	-
Indeno(1,2,3-cd)pyrene	mg/kg	g 0.1	BaP Su	rogate	3	<0.1	<0.1 0								ļ					ļ	1	1	<u> </u>												$-\!\!\!\!+$	
Dibenz(a,h)anthracene	mg/kg	g 0.1	BaP Su	rogate	3	<0.1	<0.1 0																													
Benzo(ghi)perylene	mg/kg	g 0.05	BaP Su	rogate	3	<0.05	<0.05 0		T		7														T	Ţ		I	Ţ		T		Ţ			
Speciated Total EPA-16 PAHs Arsenic (aqua regia					3	<1.6																-													=	
extractable)	mg/kg		63		3	9.6	12 0																<u> </u>												$\longrightarrow$	
Boron (water soluble) Cadmium (aqua regia		g 0.2			3	0.4			+ +	-			<u> </u>	<del>                                     </del>	<u> </u>					<u> </u>	+	+	<del>                                     </del>		1										+	$\dashv$
extractable) Chromium (aqua regia	mg/kg	_	_	-+	J	<0.2	<0.2 0		+ +	$\rightarrow$			-		-				-	-	+	1	<del>                                     </del>		1			-							$-\!\!+\!\!$	$\dashv$
extractable)	mg/kg	g 1	2080	00	3	26	32 0		$\perp \perp$											ļ	1														$\bot$	
Copper (aqua regia extractable)	mg/kg	g 1	1060		3	19	37 0						<u> </u>	<u> </u>	<u></u>	<u> </u>			<u></u>	<u> </u>			<u>L</u>		<u> </u>			I							[	
Lead (aqua regia extractable) Mercury (aqua regia					3	12	53 0			$\dashv$		-														=									$ \mp$	=
extractable)	mg/kg	g 0.3	360	0	3	<0.3	<0.3 0													ļ	1															
Nickel (aqua regia extractable)	mg/kg	g 1	177	0	3	21	92 0						<u> </u>	<u> </u>					<u> </u>	<u> </u>	<u></u>	<u> </u>	<u></u>													
Zinc (aqua regia extractable)	mg/kg	g 1	1100	000	3	71	200 0			-											_					=									$ \top$	=
Petroleum Hydrocarbons																				ļ	1	1													二丰	
TPH C10 - C40	mg/kg	g 10						<u> </u>	$\perp$																							i i				



Assessment Criteria :						Commerc	ial - 1% S	OM Sand									
Use MRL Values?									Ī								
			ant	s					CP2AMG-	CP2AUB3	OXDUB2A	OXDOB2A 29D	W52AOB2	OXDOB2A 31C	RC2ALOB-I	RC2ALOB-L	RC2AMF-L
		tion	Assessme	of Samples	<u>•</u>	er			ES1	ES1	ES2	ES1	ES2	ES	RC2ALOB-	RC2ALOB-l	RC2AMF-U
		Detection	isse	f Sa	Valu	Vali	fices		0.3m	0.3m	1m	0.3m	1m	0.3m	0.3m	1.00-1.00m	0.30-0.30m
		₽	ric A ia	o Jec	Ē	mnu	oer o edan		28-Sep-15 TPS	06-May-15	06-May-15	12-May-15	12-May-15		TPS	TPS	TPS
0	1114	Limit	Generic , Criteria	Number	Minimum Value	Maximum Value	Number of Exceedances	Leastlene of Foresteness	IPS	-	-				IPS	IPS	IPS
Constituent ACM Type	Unit	N/A	No SSV	0	-		<b>ZШ</b> 0	Locations of Exceedances	-	-	-	-	-	-			
Asbestos Identification	%	0.001	No SSV	32	-	-	0		No Asbestos Detected	Detected	No Asbestos Detected	Detected	No Asbestos Detected	No Asbestos Detected			
Moisture pH	%	0.02 N/A	No SSV No SSV	32 32	5.3 4.5	25 9.6	0		20 4.5	5.6 9.6	14 8.7	11 8.6	11 8.3	8.8 8.5			
Boron (Hot Water Soluble) Cyanide (Total)	mg/kg mg/kg	0.4	No SSV No SSV	32 32	<0.4 <0.5	2.3 38	0		1.1 <0.5	0.88 <0.5	1.8 <0.5	0.98 <0.5	0.76 <0.5	0.81 <0.5			
Arsenic Cadmium	mg/kg mg/kg	1 0.1	635 410	32 32	4.9 <0.1	48 1.5	0		11 0.14	29 0.42	13 0.27	48 <0.1	17 <0.1	25 0.22			
Chromium	mg/kg mg/kg	1 0.5	208000 106000	32 32	14	660 120	0		40 120	25 28	48	35 22	48	20			
Copper Mercury	mg/kg	0.1	3600	32	<0.1	0.47	0		< 0.1	< 0.1	<0.1	<0.1	< 0.1	< 0.1			
Nickel Lead	mg/kg mg/kg	0.5 0.5	1770 2310	32 32	7.7 4.1	74 120	0		28 33	27 42	45 18	47 22	25 16	26 33			
Zinc Chromium (Hexavalent)	mg/kg mg/kg	0.5 0.5	1100000 49.1	32 5	20 <0.5	270 <0.5	0		230	86	81	80	66	100			
Organic Matter Total TPH >C6-C40	% mg/kg	0.4 10	No SSV No SSV	32 32	<0.4 <10	21 650	0		1.6 <10	2.8 <10	3.3 <10	1.2 <10	1.1 <10	2.1 10			
Naphthalene	mg/kg	0.1	90.1	32	<0.1	0.38	0		< 0.1	< 0.1	<0.1	<0.1	< 0.1	< 0.1			
Acenaphthylene Acenaphthene	mg/kg mg/kg	0.1	No SSV 83600	32 32	<0.1	1.6	0		<0.1	<0.1	<0.1	<0.1	<0.1 <0.1	<0.1			
Fluorene Phenanthrene	mg/kg mg/kg	0.1 0.1	66500 No SSV	32 32	<0.1 <0.1	1.2 15	υ 0		<0.1 <0.1	<0.1 0.48	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 0.25			
Anthracene Fluoranthene	mg/kg mg/kg	0.1 0.1	535000 72200	32 32	<0.1 <0.1	3.9 20	0		<0.1 <0.1	0.21 0.73	<0.1 <0.1	<0.1 0.13	<0.1 <0.1	0.14 0.51			
Pyrene	mg/kg	0.1	54100	32	<0.1	17	0		<0.1	0.74	<0.1	0.29	<0.1	0.69			
Benzo[a]anthracene	mg/kg	0.1	BaP Surrogate	32	<0.1	9.8	U		<0.1	0.39	<0.1	<0.1	<0.1	0.41			<u> </u>
Chrysene	mg/kg	0.1	BaP Surrogate	32	<0.1	10	0		<0.1	0.35	<0.1	<0.1	<0.1	0.53			
Benzo[b]fluoranthene	mg/kg	0.1	BaP Surrogate	32	<0.1	11	0		<0.1	<0.1	<0.1	<0.1	<0.1	1.5			
Benzo[k]fluoranthene	mg/kg	0.1	BaP Surrogate	32	<0.1	4.2	0		<0.1	<0.1	<0.1	<0.1	<0.1	0.4			
Benzo[a]pyrene	mg/kg	0.1	76.3	32	<0.1	8.1	0		<0.1	<0.1	<0.1	<0.1	<0.1	0.91			
Indeno(1,2,3-c,d)Pyrene	mg/kg	0.1	BaP Surrogate	32	<0.1	4.3	0		<0.1	<0.1	<0.1	<0.1	<0.1	0.65			-
Dibenz(a,h)Anthracene	mg/kg	0.1	BaP Surrogate	32	<0.1	1.2	0		<0.1	<0.1	<0.1	<0.1	<0.1	0.23			
Benzo[g,h,i]perylene	mg/kg	0.1	BaP Surrogate	32	<0.1	3.6	0		<0.1	<0.1	<0.1	<0.1	<0.1	0.57			
Total Of 16 PAH's Phenol	mg/kg mg/kg	0.3	No SSV 685	32 32	<2 <0.3	110 <0.5	0		<2 <0.3	2.9 <0.3	<2 <0.3	<2 <0.3	<2 <0.3	6.8 <0.3			
Stone Content Moisture Content	%	0.1 N/A	No SSV No SSV	3	<0.1 9.9	<0.1 15	0								<0.1 15	<0.1 13	<0.1 9.9
Total mass of sample received	kg	0.001	No SSV	3	1.3	1.6	0								1.6	1.3	1.5
Asbestos in Soil	Туре	N/A	No SSV	3	-	-	0								Not- detected	Not- detected	Not- detected
pH Total Cyanide	pH Units mg/kg	N/A	No SSV No SSV	3	6.2	6.5 <1	0								6.5	6.2	6.4
Water Soluble Sulphate (2:1	g/l	0.00125	No SSV	3	0.0053	0.089	0								0.0053	0.089	0.0078
Leachate Equivalent) Organic Matter	%	0.1	No SSV	3	<0.1	1	0								1	<0.1	0.6
Total Phenols (monohydric) Naphthalene	mg/kg mg/kg	0.05	No SSV 90.1	3	<1 <0.05	<1 <0.05	0								<1 <0.05	<1 <0.05	<1 <0.05
Acenaphthylene Acenaphthene	mg/kg mg/kg	0.1	No SSV 83600	3	<0.1 <0.1	<0.1 <0.1	0		1						<0.1 <0.1	<0.1 <0.1	<0.1 <0.1
Fluorene Phenanthrene	mg/kg mg/kg	0.1	66500 No SSV	3	<0.1 <0.1	<0.1 <0.1	0								<0.1 <0.1	<0.1 <0.1	<0.1 <0.1
Anthracene Fluoranthene	mg/kg mg/kg	0.1	535000 72200	3	<0.1	<0.1	0								<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	54100	3	<0.1	<0.1	0								<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0								<0.1	<0.1	<0.1
Chrysene	mg/kg	0.05	BaP Surrogate	3	<0.05	<0.05	0								<0.05	<0.05	<0.05
Benzo(b)fluoranthene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0								<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0								<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	76.3	3	<0.1	<0.1	0								<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0								<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0								<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.05	BaP Surrogate	3	<0.05	<0.05	0								<0.05	<0.05	<0.05
Speciated Total EPA-16 PAHs Arsenic (aqua regia	mg/kg	1.6	No SSV	3	<1.6	<1.6	0		<u> </u>	<del>                                     </del>	<del>                                     </del>		<del>                                     </del>	<del>                                     </del>	<1.6	<1.6	<1.6
extractable) Boron (water soluble)	mg/kg mg/kg	0.2	635 No SSV	3	9.6	12	0		-	-	-	-	-	-	12 0.7	11	9.6 0.4
Cadmium (aqua regia	mg/kg	0.2	410	3	<0.2	<0.2	0								<0.2	<0.2	<0.2
extractable) Chromium (aqua regia	mg/kg	1	208000	3	26	32	0								28	26	32
extractable) Copper (aqua regia		1	106000	3	19	37	0								19	37	26
extractable) Lead (aqua regia extractable)	mg/kg mg/kg	1	2310	3	12	53	0					<u> </u>	<u> </u>	<u> </u>	17	12	53
Mercury (aqua regia extractable)	mg/kg	0.3	3600	3	<0.3	<0.3	0								<0.3	<0.3	<0.3
Nickel (aqua regia extractable)	mg/kg	1	1770	3	21	92	0								22	92	21
Zinc (aqua regia extractable)	mg/kg	1	1100000	3	71	200	0								71	200	72
Petroleum Hydrocarbons																	
TPH C10 - C40	mg/kg	10													<10	<10	<10



Assessment Criteria :					Public	c Open Sp	ace (Parks	) - 1% SOM Sand		-																										
Use MRL Values?											1																									
			ŧ	ω .				T		Location	WS2A02C	WS2A01D	WS2ALLCI	J FCGF2A150	WS2A14C	WS2A19U	WS2A-3D	WS2A 15D	WS2a	WS2a12C	FCT2A2E	WS2A4U	WS2A16U	WS2A6C	WS2A7D	WS2A8C	WS2A9U	WS2A10C	WS2A11D	WS2A13C	WS2	FCMG2A1	WS2 AFCNG W52	A 18D WS	2A19U WS2A	4
		<u> </u>	sme	) de						Sample ID	В	A	ES3	ES1	ES1	ES1	ES1		5C	ES1	ES1	ES1	ES1	ES2	ES1	ES1	ES1	ES1	ES2	ES1	ES1	ES1	ES2		ES1 20D	-
		tecti	ses	San	alne	/aln	es			Depth	3.6m	1m	2.5m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	0.3m	1m	0.3m	0.3m	0.3m	0.3m	1m	0.3m	0.3m	0.3m	1m 0	3m 0	0.3m 0.3m	
		f De	c As	rof	<u>E</u>	[	r of lanc			Date	15-Jul-15	13-Jul-15	01-Jun-15	28-May-15	03-Jun-15	02-Jun-15	04-Aug-15	18-Jun-15	20-May-15	18-May-15	11-May-1	13-May-15											24-	un-15	23-Jun-1	15
		i e	neric	mbe	اِيِّ ا	, ž	mbes		Strata		SGF	MDG	MDG	BLT	BLT	MDG	MDG	SGF		TBL	SGF	MDG	TBL	SGF	ALV	BLT	MDG	BLT	GDC	BLT	SGF		N	DG N	MDG MDG	
Constituent	Unit	트	9 5	ž	Ξ	Z Z	ZÜ	Locations of Exceedances		Zone																										
ACM Type Asbestos Identification	%	0.001	No SSV No SSV	32	+ :	-	0			-	No Asbestos	No Asbestos			No Asbestos		No Asbestos	No Asbestos	No Asbestos	No Asbestos	s No Asbesto		No Asbestos	No Asbestos	- No Asbestos		- No Asbestos			No Asbestos		- No Asbestos	- No Asbestos No A	bestos No A		
Moisture			No SSV			1	0	+	-	+	Detected 20	Detected 20	Detected 25	Detected 6.8	Detected 8.2	Detected 13	Detected 5.6	Detected 11	Detected 10	Detected 9.6			Detected 11	Detected 17	Detected 22	Detected 5.6	Detected 15	Detected 9	Detected 17	Detected 12	Detected 22	Detected 23			7.3 Detected	
pH Boron (Hot Water Soluble)			No SSV No SSV			9.6 2.3					6.3 1.3	9.6 1.5	7.8	7.7 1.1	8.1 <0.4	9 1.9	8 1.2	8 1.7	8.6 <0.4	8.5 <0.4	8.5 0.5		8.1 <0.5	8.1 <0.5	7.1 <0.5	9.4 <0.5		9.4	8.1 <0.5		7.4 1.8	7.8 0.69			9 8.8 2.3 1.8	_
Cyanide (Total)	mg/kg	0.5	No SSV	32	<0.5	38	0				<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	11	11	7.6	38	8.8	30	12	21	<0.5	< 0.5	<0.5	0.5	<0.5 <0.5	
Arsenic Cadmium	mg/kg	0.1	168 882	32	<0.1	1.5	0				15 0.12	41 0.23	13 0.74	13 0.3	8.4 <0.1	33 0.18	0.12	0.29	34 0.25	39 0.27	25 0.18	1.5			17 0.1	23 0.17		32 0.39	23 0.66				0.25	.23 (	27 25 0.33 0.39	
Chromium Copper	mg/kg mg/kg	1 0.5	83500 45200	32 32	14					_	41 16	660 23	71 56	26 12	25 1.6	30 59	190 63	31 26	16 12	14 16	22 47	44 39	29 30	55 25	49 17	35 18	52 30	39 81	57 31	20 15	22 36	38 22	23 110		19 30 59 49	7
Mercury	mg/kg	0.1	1110	32	<0.1	0.47	0				<0.1	0.47	<0.1	0.25	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	<0.1	<0.1	0.12	< 0.1	<0.1	<0.1	< 0.1	0.11	<0.1	< 0.1	0.12	< 0.1	<0.1	.17 (	0.44 0.26	
Nickel Lead	mg/kg	0.5	804 1340	32	4.1	120	0				21 21	24	74 25	23 26	4.1	30 23	25 31	26 68	20 13	22 15	24 22	53	56		23 20	21 19	30	36 66	51 34	21 15	21 27	20 13	65	39	23 24 92 120	
Zinc Chromium (Hexavalent)			201000 251							-	57	64 <0.5	160 <0.5	68	20	92	110 <0.5	67	76	83	96	110	72	87 <0.5	65	51	91	150	100	85	95	83 <0.5	130	10	100 270	_
Organic Matter Total TPH >C6-C40	%	0.4	No SSV No SSV	32	<0.4		0				1.7 <10	2.2	3.8	1.7 <10	<0.4	3.5 28	21 26	3.5 80	<0.4 <10	<0.4 <10			1.7	0.78	2.9	3.3 25	5.3	8.4 37	2.1	<0.4		0.86			4 5.7 200 650	
Naphthalene	mg/kg	0.1	623	32	<0.1	0.38	0				<0.1	<10 <0.1	<10 <0.1	<0.1	<10 <0.1	<0.1	<0.1	0.28	< 0.1	<0.1	< 0.1		< 0.1	<10 <0.1	<10 <0.1	< 0.1	< 0.1	< 0.1	<10 <0.1	<10 <0.1	< 0.1	< 0.1	0.21 <	0.1 <	200 650 <0.1 0.38	
Acenaphthylene Acenaphthene	mg/kg mg/ka	0.1	No SSV 28600	32 32	<0.1 <0.1				+	-	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	0.4 1.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1		<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	0.1 < <0.1 <		<0.1 1.6 <0.1 0.24	
Fluorene Phenanthrene	mg/kg	0.1	19600 No SSV	32	<0.1	1.2	0				<0.1 <0.1	<0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1		<0.1 <0.1	0.31	<0.1 <0.1	<0.1 <0.1		<0.1		<0.1	<0.1 <0.1	<0.1 <0.1		< 0.1	<0.1 <0.1	<0.1 <0.1		<0.1 <0.1	<0.1	0.1		
Anthracene	mg/kg	0.1	150000	32	<0.1	3.9	0				<0.1	< 0.1	<0.1	< 0.1	<0.1	<0.1	< 0.1	0.55	< 0.1	<0.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.6	< 0.1	< 0.1	< 0.1	< 0.1	0.1	.15 (	0.28 3.9	
Fluoranthene Pyrene			20200 15100						<u> </u>		0.17 0.13	0.29 0.18	<0.1 <0.1	0.2 0.21	<0.1 <0.1	1.6 1.7	0.46 0.33	5.1 4.8	<0.1 <0.1	0.31	<0.1 <0.1			<0.1 <0.1	<0.1 <0.1	1.4		3.1 3.9	0.26 0.36	<0.1 <0.1	0.17 0.17		1.2 C		1.6 20 1.7 17	
Benzo[a]anthracene	mg/kg		BaP Surrogate	32	<0.1	9.8	0				<0.1	<0.1	<0.1	<0.1	<0.1	0.81	<0.1	2.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.58	<0.1	1	<0.1	<0.1	<0.1	<0.1		0.1	1 9.8	7
Chrysene	mg/kg	0.1	BaP Surrogate	32	<0.1	10	0			1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	2.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.29	<0.1	0.76	<0.1	<0.1	<0.1	<0.1	0.79 <	0.1	1.2 10	$\exists$
-				32	<0.1	11	0			1	<0.1	<0.1	<0.1	<0.1	<0.1	1.1	<0.1	3.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.1	<0.1	<0.1	<0.1	<0.1			1.4 11	_
Benzo[b]fluoranthene	mg/kg		BaP Surrogate		+	-	U		-	1	1	<b>-</b>	+	+			1	-	1	<del>                                     </del>	+	-														_
Benzo[k]fluoranthene	mg/kg		BaP Surrogate	32	<0.1	4.2	0				<0.1	<0.1	<0.1	<0.1	<0.1	0.51	<0.1	1.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.51	<0.1	<0.1	<0.1	<0.1			0.65 4.2	
Benzo[a]pyrene Indeno(1,2,3-c,d)Pyrene			21.4 BaP Surrogate	32	<0.1	8.1 4.3	0			1	<0.1	<0.1	<0.1	<0.1	<0.1	0.85	<0.1	2.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.66	<0.1	<0.1	<0.1	<0.1			0.97 8.1 0.62 4.3	
	mg/kg					-				-	<b>-</b>	-	-	+		+	-		1	1	+	-														_
Dibenz(a,h)Anthracene	mg/kg	0.1	BaP Surrogate	32	<0.1	1.2	0				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.38	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21 <	0.1	0.15 1.2	_
Benzo[g,h,i]perylene	mg/kg		BaP Surrogate	32	<0.1	3.6	0				<0.1	<0.1	<0.1	<0.1	<0.1	0.63	<0.1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.79	<0.1	<0.1	<0.1	<0.1		0.1	0.73 3.6	
Total Of 16 PAH's Phenol		0.3	No SSV 685	32 32	<2 <0.3			+	-	+	<2 <0.3	<2 <0.3	<2 <0.3	<2 <0.3	<2 <0.3	9.1 <0.3	<2 <0.3	31 <0.3	<2 <0.3	<2 <0.3	<2 <0.3		<2 <0.5		<2 <0.5	3.4 <0.5	<2 <0.5	15 <0.5	<2 <0.5	<2 <0.5	<2 <0.3	<2 <0.3			11 110 <0.3 <0.3	
Stone Content Moisture Content	%	0.1	No SSV No SSV	3			0			1												<u> </u>													$\rightarrow$	7
Total mass of sample receiv		0.001	No SSV	3	1.3	1.6	0														1															-
•				-	1		0			-			+			-					+														+	-
Asbestos in Soil	Type nH Units		No SSV No SSV	3	6.2	6.5	0		-	1				_	-					-	-	-													$-\!\!+\!\!-$	_
Total Cyanide	mg/kg		No SSV																																	_
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/i	0.00125	No SSV	3	0.0053	0.089	0																													
Organic Matter Total Phenols (monohydric)			No SSV No SSV		<0.1 <1		0			-			_	_	-					-	-														$-\!\!\!\!+\!\!\!\!-$	-
Naphthalene Acenaphthylene	mg/kg	0.05	623 No SSV	3	< 0.05		0			1												<u> </u>													$\rightarrow$	4
Acenaphthene	mg/kg	0.1	28600	3	<0.1	<0.1	0																													
Fluorene Phenanthrene			19600 No SSV			<0.1 <0.1				-			+			-					+														+	$\dashv$
Anthracene Fluoranthene	mg/kg	0.1	150000 20200	3	<0.1	<0.1	0													-	-	<del>                                     </del>													-	7
Pyrene	mg/kg	0.1	15100	3	<0.1	<0.1	0																													コ
Benzo(a)anthracene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0																													_
Chrysene	mg/kg	0.05	BaP Surrogate	3	<0.05	<0.05	0								1			[				1		l T	_	]	_		]	_						
Benzo(b)fluoranthene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0																													$\neg$
Benzo(k)fluoranthene	mg/kg		BaP Surrogate	3	<0.1	<0.1	0		1					1							1	1													$\neg$	$\exists$
Benzo(a)pyrene			21.4	3	<0.1								1								+															
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0																													
Dibenz(a,h)anthracene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0																													
Benzo(ghi)perylene	mg/kg		BaP Surrogate	3	<0.05	<0.05	+		+	+	1			+	+	1	1	<del>                                     </del>	1	1	1	1													+	$\dashv$
Speciated Total EPA-16 PA			No SSV						-	-			-							-	-	<u> </u>													$-\!\!\!\!+\!\!\!\!-$	-
Arsenic (aqua regia	mg/kg		168	3	9.6	12	0							1				İ		l	1	İ														1
extractable) Boron (water soluble)			No SSV	3			0																													コ
Cadmium (aqua regia extractable)	mg/kg	0.2	882	3	<0.2	<0.2	0																													
Chromium (aqua regia	mg/kg	1	83500	3	26	32	0			1																										٦
extractable) Copper (aqua regia	mg/kg	1	45200	3	19	37	0		1	1				1	1		1		1	1	1	1												-	$\overline{}$	$\dashv$
extractable) Lead (aqua regia extractable)		1	1340	3	12	53	0		+	+	1			+	+	1	1	-	1	<u> </u>	1	<del>                                     </del>												_	-+-	$\dashv$
Mercury (aqua regia extractable)	mg/kg		1110	3	<0.3	<0.3																														$\neg$
Nickel (aqua regia extractat			804	3	21	92	0		1	1											1	1													$\rightarrow$	$\exists$
Zinc (aqua regia extractable			201000	3	71	200	0		<u> </u>	<u> </u>			<u> </u>	$\pm$	<u>L</u>	<u> </u>	<u>L</u>		<u>L</u>	<u>L</u>		<u>L</u>														$\exists$
			***																		1														=	コ
Petroleum Hydrocarbons TPH C10 - C40	mg/kg	10																																	$\pm$	<b>ゴ</b>



Assessment Criteria :							e (i di kā)	- 1% SOM Sand										
Use MRL Values?																		
OSE MIKE Values !			<del>+</del>		1				CP2AMG-	CP2AUB3	OXDUB2A	OXDOB2A	W52AOB2	OXDOB2A	1	DO041 OD 1	L	D00445
		Ē	Assessmen	Samples					U	2F	32C W	29D	9D	31C			RC2ALOB-L	
		ctio	essi	amp	en l	lue	un.		ES1	ES1	ES2	ES1	ES2	ES		RC2ALOB-I	RC2ALOB-L	RC2AMF-I
		Detection	Assı	of S	- Va	۱۷a	of nce:		0.3m	0.3m	1m	0.3m	1m	0.3m		0.3m	1.00-1.00m	0.30-0.30r
		of [	ia (		μnι	E I	oer e		28-Sep-15 TPS	06-May-15	06-May-15	12-May-15	12-May-15			TPS	TPS	TDC
		Limit of	Generic . Criteria	Number	Minimum Value	Maximum Value	Number of Exceedances		IPS							IPS	IPS	TPS
ACM Type	Unit	N/A	No SSV	0	Σ .		<b>ZШ</b> 0	Locations of Exceedances	-	-	-	_	-	_				
Asbestos Identification	%	0.001	No SSV	32	-	-	0		No Asbestos	No Asbestos	No Asbestos	No Asbestos	No Asbestos	No Asbestos				
Moisture	%	0.02	No SSV	32	5.3	25	0		Detected 20	Detected 5.6	Detected 14	Detected 11	Detected 11	Detected 8.8				
pH Boron (Hot Water Soluble)	mg/kg	N/A 0.4	No SSV No SSV	32 32	4.5 <0.4	9.6 2.3	0		4.5 1.1	9.6 0.88	8.7 1.8	8.6 0.98	8.3 0.76	8.5 0.81				-
Cyanide (Total)	mg/kg	0.5	No SSV	32	<0.5	38	0		<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5				
	mg/kg mg/kg	0.1	168 882	32 32	4.9 <0.1	48 1.5	0		11 0.14	29 0.42	13 0.27	48 <0.1	17 <0.1	25 0.22				-
Chromium	mg/kg	1	83500	32	14	660	0		40	25	48	35	48	20				
	mg/kg mg/kg	0.5	45200 1110	32 32	1.6 <0.1	120 0.47	0		120 <0.1	28 <0.1	28 <0.1	22 <0.1	15 <0.1	55 <0.1				
Nickel	mg/kg	0.5	804	32	7.7	74	0		28	27	45	47	25	26				
	mg/kg mg/kg	0.5	1340 201000	32 32	4.1 20	120 270	0		33 230	42 86	18 81	22 80	16 66	33 100				
Chromium (Hexavalent)	mg/kg	0.5	251 No SSV	5 32	<0.5	<0.5 21	0		1.6	2.0	3.3	1.2	1.1	2.1				
Organic Matter Total TPH >C6-C40	% mg/kg	0.4 10	No SSV	32	<0.4 <10	650	0		1.6 <10	2.8 <10	<10	<10	1.1 <10	10				
	mg/kg	0.1	623 No SSV	32 32	<0.1	0.38 1.6	0		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Acenaphthene	mg/kg mg/kg	0.1 0.1	28600	32	<0.1 <0.1	1.1	0		<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1				
	mg/kg mg/kg	0.1	19600 No SSV	32 32	<0.1 <0.1	1.2 15	0		<0.1 <0.1	<0.1 0.48	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1 0.25				$\vdash$
Anthracene	mg/kg	0.1	150000	32	<0.1	3.9	Ö		<0.1	0.21	< 0.1	< 0.1	<0.1	0.14				
	mg/kg mg/kg	0.1	20200 15100	32 32	<0.1 <0.1	20 17	0		<0.1 <0.1	0.73 0.74	<0.1 <0.1	0.13	<0.1 <0.1	0.51 0.69		<u> </u>	<u> </u>	<del></del>
	mg/kg	0.1	BaP Surrogate	32	<0.1	9.8	0		<0.1	0.39	<0.1	<0.1	<0.1	0.41		<b> </b>	1	
+			_				_		-						<b>-</b>	<del>                                     </del>	<del>                                     </del>	$\vdash$
Chrysene	mg/kg	0.1	BaP Surrogate	32	<0.1	10	U		<0.1	0.35	<0.1	<0.1	<0.1	0.53				
Benzo[b]fluoranthene	mg/kg	0.1	BaP Surrogate	32	<0.1	11	0		<0.1	<0.1	<0.1	<0.1	<0.1	1.5				1
Benzo[k]fluoranthene	mg/kg	0.1	BaP Surrogate	32	<0.1	4.2	0		<0.1	<0.1	<0.1	<0.1	<0.1	0.4				
	mg/kg	0.1	21.4	32	<0.1	8.1	0		<0.1	<0.1	<0.1	<0.1	<0.1	0.91		-		$\vdash$
Indeno(1,2,3-c,d)Pyrene	mg/kg	0.1	BaP Surrogate	32	<0.1	4.3	0		< 0.1	<0.1	<0.1	<0.1	<0.1	0.65				
Dibenz(a,h)Anthracene	mg/kg	0.1	BaP Surrogate	32	<0.1	1.2	n		<0.1	<0.1	<0.1	<0.1	<0.1	0.23				
Diberiz(a,ri)Ariuracerie	mg/kg	0.1	Dar Surroyate		₹0.1	1.2	0		-									-
	mg/kg	0.1	BaP Surrogate	32	<0.1	3.6	0		<0.1	<0.1	<0.1	<0.1	<0.1	0.57				
	mg/kg mg/kg	0.3	No SSV 685	32 32	<2 <0.3	110 <0.5	0		<2 <0.3	2.9 <0.3	<2 <0.3	<2 <0.3	<2 <0.3	6.8 <0.3				
Stone Content	%	0.1	No SSV	3	<0.1	<0.1	0									<0.1	<0.1	<0.1
Moisture Content	%	N/A	No SSV	3	9.9	15	0									15	13	9.9
Total mass of sample received	kg	0.001	No SSV	3	1.3	1.6	U									1.6 Not-	1.3 Not-	1.5 Not-
Asbestos in Soil	Type	N/A	No SSV	3	-	-	0									detected	detected	detected
	pH Units mg/kg	N/A	No SSV No SSV	3	6.2	6.5 <1	0									6.5 <1	6.2 <1	6.4
Water Soluble Sulphate (2:1	g/l	0.00125	No SSV	3	0.0053	0.089	0									0.0053	0.089	0.0078
Leachate Equivalent) Organic Matter	%	0.00120	No SSV	3	<0.1	1	0									1	<0.1	0.6
Total Phenols (monohydric)	mg/kg	1	No SSV	3	<1	<1	0									<1	<1	<1
	mg/kg mg/kg	0.05	623 No SSV	3	<0.05 <0.1	<0.05 <0.1	0									<0.05 <0.1	<0.05 <0.1	<0.05 <0.1
Acenaphthene	mg/kg	0.1	28600	3	<0.1	<0.1	0									<0.1	<0.1	<0.1
	mg/kg mg/kg	0.1	19600 No SSV	3	<0.1 <0.1	<0.1 <0.1	0									<0.1 <0.1	<0.1 <0.1	<0.1 <0.1
Anthracene	mg/kg	0.1	150000	3	<0.1	<0.1	0									<0.1	<0.1	<0.1
Pyrene Pyrene	mg/kg mg/kg	0.1	15100	3	<0.1 <0.1	<0.1 <0.1	0									<0.1 <0.1	<0.1 <0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0					l		l		<0.1	<0.1	<0.1
Chrysene	mg/kg	0.05	BaP Surrogate	3	<0.05	<0.05	0									<0.05	<0.05	<0.05
							_		<del>                                     </del>	-	-	-	-	-	-			
Benzo(b)fluoranthene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	U									<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0									<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	21.4	3	<0.1	<0.1	0									<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0			<u> </u>	<u></u>	<u> </u>		<u> </u>		<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	mg/kg	0.1	BaP Surrogate	3	<0.1	<0.1	0									<0.1	<0.1	<0.1
<u> </u>		0.05		3	<0.05	<0.05	n							l -		<0.05	<0.05	<0.05
	mg/kg mg/kg	1.6	BaP Surrogate No SSV	3	<1.6	<1.6	0			-	<u> </u>					<1.6	<1.6	<1.6
Arsenic (aqua regia	mg/kg	1.0	168	3	9.6	12	0		1			1		1		12	11	9.6
extractable)	mg/kg	0.2	No SSV	3	0.4	1.1	0		-			-		-		0.7	1.1	0.4
Cadmium (aqua regia	mg/kg	0.2	882	3	<0.2	<0.2	0			l	l	İ		İ		<0.2	<0.2	<0.2
Chromium (agua regia							_		1	-		-		-		-		-
extractable)	mg/kg	1	83500	3	26	32	U									28	26	32
Copper (aqua regia extractable)	mg/kg	1	45200	3	19	37	0									19	37	26
Lead (aqua regia extractable)	mg/kg	1	1340	3	12	53	0									17	12	53
Mercury (aqua regia extractable)	mg/kg	0.3	1110	3	<0.3	<0.3	0		L	L	L	L	L	L		<0.3	<0.3	<0.3
	mg/kg	1	804	3	21	92	0									22	92	21
	mg/kg	1	201000	3	71	200	0									71	200	72
																		<del></del>
Petroleum Hydrocarbons												<del>                                     </del>	<b>-</b>		<b>-</b>	<10	<10	<10



Assessment Criteria :						Commerc	cial - 1% S	SOM Sand		-																				
Use MRL Values?											1	ICDAVILEB	DI CODATER 2	CD2ATER 2						SUNDAN	TP2AMGO	ITPZAMISMI	TPZAMISY	TDOMESON	CD2ALOR	ICD2AMEO	I TP2ALOB	T WS7AME	WS2AMF II	CP2AMFO1
		u,	ment	ples						on WS2A101_0							WS2A104_U		WS2A122_C WS2A122_C		B 1D	B 1D	B 2U	B 2U	1D	B 2U	1U	OB 1U	OB 1U	B 1D
		tecti	38088	Sam	/alue	Value	s es		Dep		1m	0.2m	0.2m	1m	1m	0.5m	0.3m	0.5m	1m	0.3m	0.2m	1m	0.2m	1m	0.2m	0.5m	0.3m	0.2m	1m	0.3m
		of De	ric A:	oer of	E E	E E	per of	Strata		31/07/2017		16/11/2017		09/11/2017	06/12/2017	07/08/2017	02/11/2017	02/08/2017	03/08/2017	11/01/2018				_		_				
Constituent	Unit	E E	Gene	Num	Minin	Maxir	Numb	Locations of Exceedances	Zone	TBL	GDC	TPS	TPS	OXC-SBT(W)	OXC-PET(W)	TBL	SGF	TBL	SGF		TPS	XC-PET(W	TPS	DXC-PET(W	TPS	DXC-PET(W	ALV	DXC-PET(W	JAC-PEI(W	MDG
Stone Content Moisture Content	%	0.1 N/A	No SSV No SSV	21 21	<0.1 8.5	<0.1 26	0			<0.1 12	<0.1 19	<0.1 20	<0.1 26	<0.1 15	<0.1 18	<0.1 18	<0.1 16	<0.1 8.5	<0.1 22	<0.1 8.6	<0.1 18	<0.1 25	<0.1 18	<0.1 20	<0.1 22	<0.1 15	<0.1 13	<0.1 12	<0.1 18	<0.1 9.5
Total mass of sample received	kg	0.001	No SSV	21	0.57	2	0			2	2	1.5	1.6	1.7	1.3	2	2	2	2	0.57	1.3	1.4	1.4	1.3	1.9	1.6	2	2	2	2
Asbestos in Soil	Туре	N/A	No SSV No SSV	16 0	-	-	0			Not-detected	Not-detected	Not-detected	Not-detected	-	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not- detected	-	-	-	-	Not- detected	Not- detected	Not- detected	Not- detected	Not- detected	Not- detected
General Inorganics pH - Automated Total Cyanide	pH Units mg/kg	N/A 1	No SSV No SSV	21 16	5 <1	8.6 <1	0			8.2 <1	7.7	8 <1	7.5 <1	7.7	7 <1	8	8 <1	8.5 <1	7.6 <1	8.6	7.8 <1	5 <1	6.2	5.2 <1	7.2	7.5	8.1 <1	7.9 <1	5.6 <1	7.8
Free Cyanide Total Sulphate as SO4	mg/kg mg/kg	1 50	373 No SSV	16 16	<1 350	<1 120000	0			<1 570	<1 57000	<1 1300	<1 1300	<1 120000	<1 1300		<1 1100	<1 440	<1 23000	-	<1 920	<1 850	<1 350	<1 1200	-	-	<1 450	<1 590	<1 3200	-
Water Soluble SO4 16hr extraction (2:1 Leachate	g/l	0.00125	No SSV	5	0.014	0.22	0				-	-		-		0.22		-	-	0.053	-				0.03	0.015				0.014
Equivalent) Sulphide	mg/kg	1	No SSV	16	<1	130	0			130	5.2	<1	<1	<1	<1		<1	1.3	2.5		<1	<1	<1	<1			<1	<1	<1	
Ammonium as NH4 Fraction Organic Carbon	mg/kg N/A	0.5	No SSV No SSV	16 16	<0.5	14 0.026	0			<0.5 0.0023	0.017	<0.5 0.026	<0.5	<0.5	<0.5	-	0.0082	<0.5	<0.5 0.022	-	<0.5 0.023	<0.5 0.012	<0.5	0.0045	-	-	<0.5	<0.5 0.015	<0.5	-
(FOC) Loss on Ignition @ 450oC Total Phenols	%	0.2	No SSV No SSV	11	0.9	9.4	0			1.8	8	9.4	7.8	-	3.4		3.5	0.9	4.8				-		-		3	4.1	3.2	
Phenol Speciated PAHs	mg/kg	1	685 No SSV	11	<1	<1	0			<1	<1	<1	<1	-	<1		<1	<1	<1	-	-	-		-	-		<1	<1	<1	-
Naphthalene Acenaphthylene	mg/kg mg/kg		90.1 No SSV	11	<0.05 <0.05	<0.05 <0.05	0			<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	<0.05 <0.05		<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	-	:	-	:	-	-	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-
Acenaphthene Fluorene	mg/kg mg/kg	0.05	83600 66500	11 11	<0.05 <0.05	<0.05 <0.05	0			<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	<0.05 <0.05	-	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	-	-	-	-	-	-	<0.05 <0.05	<0.05 <0.05		-
Phenanthrene Anthracene	mg/kg mg/kg	0.05	No SSV 535000	11	<0.05 <0.05	0.39 <0.05	0			<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	<0.05 <0.05	-	<0.05 <0.05	<0.05 <0.05	0.39 <0.05	-	-	-	-	-	-	-	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-
Fluoranthene Pyrene	mg/kg mg/kg	0.05	72200 54100	11	<0.05 <0.05	0.36	0			<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	<0.05 <0.05	-	<0.05 <0.05	<0.05 <0.05	0.36	-	-	-	-	-	-	-	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-
Benzo(a)anthracene	mg/kg	0.05	BaP Surrogate		<0.05	0.14	0		$\perp$	<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	0.14	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Chrysene	mg/kg	0.05	BaP Surrogate		<0.05	0.18	0		+	<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	0.18	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Benzo(b)fluoranthene Benzo(k)fluoranthene	mg/kg mg/kg	0.05	BaP Surrogate BaP Surrogate		<0.05	<0.05 <0.05	0			<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	<0.05		-	-	-	-	-		<0.05	<0.05	<0.05	-
Benzo(a)pyrene	mg/kg mg/kg		76.3	11	<0.05	<0.05	0			<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	<0.05		-	-	-	-	-		<0.05	<0.05	<0.05	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	BaP Surrogate		<0.05	<0.05	0			<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	BaP Surrogate		<0.05	<0.05	0			<0.05	<0.05	<0.05	<0.05	-	<0.05		<0.05	<0.05	<0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Benzo(ghi)perylene Total PAH	mg/kg	0.05	BaP Surrogate No SSV	11	<0.05	<0.05	0			<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Speciated Total EPA-16 PAHs Heavy Metals / Metalloids	mg/kg	0.8	No SSV No SSV	11	<0.8	1.37	0			<0.8	<0.8	<0.8	<0.8	-	<0.8		<0.8	<0.8	1.37	-			-		-		<0.8	<0.8	<0.8	-
Arsenic (aqua regia extractable)	mg/kg	1	635	21	4.8	21	0			11	4.8	12	13	5.6	7.6	11	11	13	7.6	21	11	6.3	6.5	5.8	15	12	11	7.1	7.8	9.7
Boron (water soluble) Cadmium (aqua regia	mg/kg mg/kg	0.2	No SSV 410	16 16	<0.2	2.6 0.4	0			<0.2	0.3	2.5 <0.2	1.8 <0.2	2.6 <0.2	<0.2		1.9 <0.2	0.3 <0.2	2.5 0.4	-	<0.2	1.8 <0.2	1.9	1.7 <0.2	-	-	1.6 <0.2	1.9 <0.2	<0.2	-
extractable) Chromium (hexavalent) Chromium (aqua regia	mg/kg	4	49.1	16	<4	<4	0			<4	<4	<4	<4	<4	<4	-	<4	<4	<4	-	<4	<4	<4	<4	-	-	<4	<4	<4	-
extractable) Copper (aqua regia	mg/kg	1	208000	21	13	58	0			16	33	41	50	33	44	29	39	17	49	13	50	58	34	39	27	48	33	22	39	23
extractable) Lead (aqua regia extractable)	mg/kg mg/kg	1	106000 2310	21 21	13 6.9	71 38	0			18 9.3	7.6	28 34	28 36	13 7.3	21 12	71 35	18 16	14 8.5	33 14	32 15	26 19	6.9	17 9	22 12	25 19	26 9.5	21 12	15 20	27 21	19 38
Mercury (aqua regia extractable)	mg/kg	0.3	3600	16	<0.3	<0.3	0			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	-	-	<0.3	<0.3	<0.3	-
Nickel (aqua regia extractable)	mg/kg	1	1770	21	14	48	0			14	28	25	32	20	32	29	28	16	38	20	17	16	21	17	17	23	48	16	14	14
Selenium (aqua regia extractable) Vanadium (aqua regia	mg/kg	1	13000	16	<1	2.2	0			<1	<1	<1	<1	<1	<1		<1	<1	<1	-	<1	<1	<1	<1	-	-	2.2	<1	1.3	-
extractable) Zinc (aqua regia extractable)	mg/kg mg/ka	1	7490 1100000	16 21	19 41	50 110	0			28 57	19 64	50 94	47 92	23 41	35 110	93	38 83	32 70	34 100	- 88	42 78	30 71	34 76	42 64	- 64	81	38 95	26 65	32 55	49
Monoaromatics Benzene	mg/kg	0.001	No SSV 12.5	7	<0.001	<0.001	0			-	-	-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001								<0.001	<0.001		-
Toluene Ethylbenzene	mg/kg mg/kg	0.001	27900 7660	7	<0.001	<0.001	0			-	-	-	<0.001 <0.001	-	-	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	-	-	-	-	-	-	-	<0.001 <0.001	< 0.001	-	-
p & m-xylene o-xylene MTBE (Methyl Tertiary Butyl	mg/kg mg/kg		No SSV 3030	7	<0.001	<0.001	0			-	-	-	<0.001 <0.001	-	-	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001	-			-	-	-	-	<0.001 <0.001	<0.001 <0.001	-	-
Ether) Petroleum Hydrocarbons	mg/kg	0.001	3140 No SSV	7	<0.001	<0.001	0			-	-	-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	<0.001	<0.001	-	-
TPH C10 - C40 TPH-CWG - Aliphatic >EC5 -	mg/kg mg/kg	10 0.001	No SSV 4490	5	<10	18	0			-	-	-	-	-	-	<10		-	-	18	-	-			<10	<10		-		<10
EC6 TPH-CWG - Aliphatic >EC6 -	mg/kg	0.001	10400	7	<0.001	<0.001	0			-		-	<0.001	-		<0.001	<0.001	<0.001	<0.001						-		<0.001	<0.001	-	-
EC8 TPH-CWG - Aliphatic >EC8 -	mg/kg	0.001	1370	7	<0.001	<0.001	0			-			<0.001	-		<0.001	<0.001	<0.001	<0.001	-	-		-	-	-	-	<0.001	<0.001	-	-
EC10 TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	7900	7	<1	<1	0			-	-	-	<1	-	-	<1	<1	<1	<1	-	-	-	-	-	-	-	<1	<1	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	34000	7	<2	<2	0			-	-	-	<2	-	-	<2	<2	<2	<2	-	-	-	-	-	-	-	<2	<2	-	-
TPH-CWG - Aliphatic >EC16 - EC21 TPH-CWG - Aliphatic >EC21 -	mg/kg	8	3620000	7	<8	<8	0			-	-	-	<8	-	-	<8	<8	<8	<8	-	-	-	-	-	-	-	<8	<8	-	-
EU35	mg/kg	8	3620000	7	<8	<8	0			-	-	-	<8	-	-	<8	<8	<8	<8	-	-	-	-	-	-	-	<8	<8	-	-
TPH-CWG - Aliphatic (EC5 - EC35) TPH-CWG - Aromatic >EC5 -	mg/kg	10	No SSV	7	<10	<10	0			-	-	-	<10	-	-	<10	<10	<10	<10	-	-	-	-	-	-	-	<10	<10	-	-
EC7 TPH-CWG - Aromatic >EC7 -	mg/kg	0.001	12.5	7	<0.001	<0.001	0			-	-	-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	<0.001	<0.001	-	-
EC8 TPH-CWG - Aromatic >EC8 -	mg/kg	0.001	27900	7	<0.001	<0.001	0			-	-	-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-		-	<0.001	<0.001	-	-
EC10 TPH-CWG - Aromatic >EC10 -	mg/kg mg/kg	1	2210 12300	7	<0.001	<0.001	0			-	-	-	<0.001	-		<0.001	<0.001	<0.001	<0.001	-			-	-	-	-	<0.001	<0.001	-	-
EC12 TPH-CWG - Aromatic >EC12 -	mg/kg	2	41300	7	<2	<2	0		_	-	-	-	<2	-		<2	<2	<2	<2	-			-	-	-	-	<2	<2	-	-
EC16 TPH-CWG - Aromatic >EC16 -		10	28400	7	<10	<10	0			-	-	-	<10	-		<10	<10	<10	<10		-			-	-		<10	<10		
EC21 TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	28400	7	<10	<10	0		$\top$	-	-	-	<10	-	-	<10	<10	<10	<10	-	-	-	-	-	-	-	<10	<10	-	-
EC35 TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	No SSV	7	<10	<10	0			-	-	-	<10	-		<10	<10	<10	<10	-	-	-	-	-	-	-	<10	<10	-	-
PCBs PCB Congener 077	mg/kg	0.001	0.184 No SSV	0	<0.001	<0.001				-	-	-		-		<0.001		<0.001	-	<0.001	-	-	-	-	-	-	-		-	
PCB Congener 081 PCB Congener 105	mg/kg mg/kg	0.001	No SSV No SSV	3	<0.001	<0.001	0			-	-	-				<0.001 <0.001		<0.001 <0.001		<0.001 <0.001		-	-	-					-	-
PCB Congener 114 PCB Congener 118 PCB Congener 123	mg/kg mg/kg	0.001	No SSV No SSV	3	<0.001	<0.001	0			-	-	-	-	-	-	<0.001	-	<0.001 <0.001	-	<0.001 <0.001	-	-	-	-	-	-	-		-	-
PCB Congener 123 PCB Congener 126 PCB Congener 156	mg/kg mg/kg	0.001	No SSV No SSV No SSV	3 3	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	0			-	-	-	-	-		<0.001 <0.001 <0.001	-	<0.001 <0.001 <0.001	-	<0.001 <0.001 <0.001	-	-	-	-	-	-	-		-	-
PCB Congener 156 PCB Congener 157 PCB Congener 167	mg/kg mg/kg mg/kg	0.001	No SSV No SSV	3	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	0				-	-				<0.001 <0.001 <0.001		<0.001 <0.001 <0.001		<0.001 <0.001 <0.001			-	-	-		-		-	-
PCB Congener 169 PCB Congener 189	mg/kg	0.001	No SSV No SSV	3	<0.001	< 0.001	0				-	-	-	-	-	<0.001 <0.001 <0.001	-	<0.001 <0.001 <0.001	-	<0.001 <0.001 <0.001	-	-	-	-	-	-	-	-		-
Total PCBs	mg/kg	0.012	0.184	3	<0.012				$\pm$	-			-	-		<0.012	-	<0.012		<0.012	-	-	-	-		-	-		-	-
Pesticide and Herbicide Screen in Pesticides/Herbicides Screen in Pesticides Screen in Pesticides Screen in Pesticides Screen in Pesticide and Herbicide Screen in Pesticide and Herbicide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Screen in Pesticide Scree	n P/A	N/A								-		-		-		Absent		Absent		Absent	-	-						-		



Assessment Criteria :					Publi	ic Open Spa	ice (Parks)	- 1% SOM Sand		7																					
Use MRL Values?													CD2A II ER	CD2ATER 2	CD2ATER 2						I SHINDSA1	ITP2AMGO	ITP2AMGO	TP2AMGO	ITDOMEO	CP2ALOB	ICDSAMEO	TD2ALOR	I W/S2AME	TWS2AMFT	CDSAME
		uo	sment	səldi								WS2A101_C WS2A101_C	20	UIAI	UIAI						10.0	B 1D	B 1D	B 2U	B 2U	1D	B 2U	1U	OB 1U	OB 1U	B 1D
		etecti	Sess	f Sam	Value	Value	ces			Depth	0.5m	1m	0.2m	0.2m	1m	1m	0.5m	0.3m	0.5m	1m	0.3m	0.2m	1m	0.2m	1m	0.2m	0.5m	0.3m	0.2m	1m	0.3m
		of De	aric A	ber of	E	E E	ber of edanc		Strata	Date	31/07/2017 TBL	31/07/2017 GDC	16/11/2017 TPS	09/11/2017 TPS	09/11/2017 OXC-SBY(W)	06/12/2017	07/08/2017 TBL	02/11/2017 SGF	02/08/2017 TBL	03/08/2017 SGF	11/01/2018		20/12/2017 XC-PET(W		20/12/2017 XC-PET(V	_	26/06/2018 DXC-PET(W			8 30/05/2018 MXC-PET(W	
Constituent	Unit	Limit	Gene	N I	Minir	Maxi	Num	Locations of Exceedances	Jonata	Zone	TOL	GDC	11 0		OXO-OBT(W)	OXO1 EI(W)	100	001	TOL	301		110	DAG-1 ET(W	110	DAG-I ET(V	1110	DAG-1 E1(VI	ALV	7.0-1 E1(VI	DAGT ET(N	I III
Stone Content Moisture Content	% %	0.1 N/A	No SSV No SSV	21 21	<0.1 8.5	<0.1 26	0				<0.1 12	<0.1 19	<0.1 20	<0.1 26	<0.1 15	<0.1 18	<0.1 18	<0.1 16	<0.1 8.5	<0.1 22	<0.1 8.6	<0.1 18	<0.1 25	<0.1 18	<0.1 20	<0.1 22	<0.1 15	<0.1 13	<0.1 12	<0.1 18	<0.1 9.5
Total mass of sample received	kg	0.001	No SSV	21	0.57	2	0				2	2	1.5	1.6	1.7	1.3	2	2	2	2	0.57	1.3	1.4	1.4	1.3	1.9	1.6	2	2	2	2
Asbestos in Soil General Inorganics	Туре	N/A	No SSV No SSV	16	-	-	0				Not-detected	Not-detected	Not-detected	Not-detected	-	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not- detected	-	-	-	-	Not- detected	Not- detected	Not- detected	Not- detected	Not- detected	Not- detected
pH - Automated Total Cyanide	pH Units mg/kg	N/A 1	No SSV No SSV	21 16	5 <1	8.6 <1	0				8.2 <1	7.7	8 <1	7.5 <1	7.7 <1	7 <1	8 -	8 <1	8.5 <1	7.6 <1	8.6	7.8 <1	5 <1	6.2	5.2 <1	7.2	7.5	8.1 <1	7.9 <1	5.6 <1	7.8
Free Cyanide Total Sulphate as SO4	mg/kg mg/kg	1 50	34 No SSV	16 16	<1 350	<1 120000	0				<1 570	<1 57000	<1 1300	<1 1300	<1 120000	<1 1300	-	<1 1100	<1 440	<1 23000	-	<1 920	<1 850	<1 350	<1 1200	-	-	<1 450	<1 590	<1 3200	-
Water Soluble SO4 16hr extraction (2:1 Leachate	g/l	0.00125	No SSV	5	0.014	0.22	0					-	-	-	-	-	0.22	-	-	-	0.053	-	-	-	-	0.03	0.015	-	-	_ !	0.014
Equivalent) Sulphide Ammonium as NH4	mg/kg mg/kg	1 0.5	No SSV No SSV	16 16	<1 <0.5	130	0				130	5.2 14	<1 <0.5	<1 <0.5	<1 <0.5	<1 <0.5	-	<1	1.3	2.5 <0.5	-	<1 <0.5	<1 <0.5	<1 <0.5	<1	-	-	<1 <0.5	<1 <0.5	<1 <0.5	-
Fraction Organic Carbon (FOC)	N/A	0.001	No SSV	16	<0.001		0				0.0023	0.017	0.026	0.021	0.0038	0.0038	-	0.0082	<0.001	0.022	-	0.023	0.012	0.0094	0.0045	-	-	0.007	0.015	0.0084	-
Loss on Ignition @ 450oC Total Phenols	%	0.2	No SSV No SSV	11 0	0.9	9.4	0				1.8	8	9.4	7.8	-	3.4	-	3.5	0.9	4.8	-	-	-	-	-	-	-	3	4.1	3.2	-
Phenol Speciated PAHs	mg/kg	1	685 No SSV	11 0 11		- <1	0				<1	<1	<1	<1	-	<1	-	<1	<1	<1	-	-	-	-	-	-	-	<1	<1	<1	_
Naphthalene Acenaphthylene Acenaphthene	mg/kg mg/kg		623 No SSV 28600	11	<0.05	<0.05 <0.05 <0.05	0				<0.05 <0.05 <0.05	<0.05 <0.05 <0.05	<0.05 <0.05 <0.05	<0.05 <0.05 <0.05	-	<0.05 <0.05 <0.05		<0.05 <0.05 <0.05	<0.05 <0.05 <0.05	<0.05 <0.05 <0.05		-	-	-			-	<0.05 <0.05 <0.05	<0.05 <0.05 <0.05	<0.05	Ė
Fluorene Phenanthrene	mg/kg mg/kg	0.05	19600 No SSV	11	<0.05	<0.05	0				<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	<0.05 <0.05	-	<0.05 <0.05	<0.05 <0.05	<0.05	-	-	-	-	-	-	-	<0.05	<0.05 <0.05	<0.05 <0.05	-
Anthracene Fluoranthene	mg/kg mg/kg	0.05	150000	11 11		<0.05 0.36	0				<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	<0.05 <0.05	-	<0.05 <0.05	<0.05 <0.05	<0.05 0.36	-	-	-	-	-	-	-	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-
Pyrene Benzo(a)anthracene	mg/kg mg/kg	0.05	15100 BaP	11	<0.05	0.3	0				<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	<0.05 <0.05	-	<0.05	<0.05 <0.05	0.3	-	-	-	-	-	-	-	<0.05 <0.05	<0.05	<0.05 <0.05	-
Chrysene	mg/kg	0.05	Surrogate BaP Surrogate	11	<0.05	0.18	0				<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	0.18	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Benzo(b)fluoranthene	mg/kg	0.05	BaP Surrogate	11	<0.05	<0.05	0				<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Benzo(k)fluoranthene	mg/kg	0.05	BaP Surrogate	11	<0.05	<0.05	0				<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Benzo(a)pyrene Indeno(1,2,3-cd)pyrene	mg/kg mg/kg	0.05	21.4 BaP	11	<0.05 <0.05	<0.05	0				<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	<0.05 <0.05	-	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-	-	-	-	-	-	-	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	Surrogate BaP Surrogate	11	<0.05	<0.05	0				<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Benzo(ghi)perylene	mg/kg	0.05	BaP Surrogate	11	<0.05	<0.05	0				<0.05	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Total PAH Speciated Total EPA-16 PAHs	mg/kg	0.8	No SSV No SSV	0 11	- <0.8	1.37	0				<0.8	<0.8	<0.8	<0.8	-	<0.8	-	<0.8	<0.8	1.37	-	-	-	-	-	-	-	<0.8	<0.8	<0.8	-
Heavy Metals / Metalloids Arsenic (aqua regia	mg/kg	1	No SSV 168	21	4.8	21	0				11	4.8	12	13	5.6	7.6	11	11	13	7.6	21	11	6.3	6.5	5.8	15	12	11	7.1	7.8	9.7
extractable) Boron (water soluble) Cadmium (aqua regia	mg/kg	0.2	No SSV	16	<0.2	2.6	0				<0.2	1.9	2.5	1.8	2.6	2.3	-	1.9	0.3	2.5	-	2.4	1.8	1.9	1.7	-	-	1.6	1.9	2.3	-
extractable) Chromium (hexavalent)	mg/kg mg/kg	0.2	882 251	16 16	<0.2	0.4	0				<0.2	0.3	<0.2	<0.2	<0.2	<0.2	-	<0.2 <4	<0.2	0.4	-	<0.2	<0.2	<0.2 <4	<0.2	-	-	<0.2	<0.2	<0.2	-
Chromium (aqua regia extractable)	mg/kg	1	83500	21	13	58	0				16	33	41	50	33	44	29	39	17	49	13	50	58	34	39	27	48	33	22	39	23
Copper (aqua regia extractable)	mg/kg	1	45200	21	13	71	0				18	23	28	28	13	21	71	18	14	33	32	26	44	17	22	25	26	21	15	27	19
Lead (aqua regia extractable) Mercury (aqua regia extractable)	mg/kg mg/kg	0.3	1340	16	6.9 <0.3	<0.3	0				9.3 <0.3	7.6 <0.3	<0.3	36 <0.3	7.3 <0.3	<0.3	- 35	16 <0.3	8.5 <0.3	<0.3	- 15	19 <0.3	<0.3	9 <0.3	<0.3	- 19	9.5	<0.3	<0.3	<0.3	- 38
Nickel (aqua regia extractable)	mg/kg	1	804	21	14	48	0				14	28	25	32	20	32	29	28	16	38	20	17	16	21	17	17	23	48	16	14	14
Selenium (aqua regia extractable)	mg/kg	1	2550	16	<1	2.2	0				<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-	<1	<1	<1	<1	-	-	2.2	<1	1.3	-
Vanadium (aqua regia extractable)	mg/kg	1	1550	16	19	50	0				28	19	50	47	23	35	-	38	32	34	-	42	30	34	42	-	-	38	26	32	-
Zinc (aqua regia extractable) Monoaromatics Benzene	mg/kg mg/kg	0.001	201000 No SSV 139	21 0 7	41 - <0.001	110 - <0.001	0				57	64	94	92 <0.001	41	110	93 <0.001	<0.001	70 <0.001	<0.001	88	78	71	76	64	64	81	95 <0.001	<0.001	55	49
Toluene Ethylbenzene		0.001	69900	7	<0.001	<0.001					-	-	-	<0.001 <0.001	-	-	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	-	-	-	-	-	-	-	<0.001 <0.001	<0.001 <0.001		-
p & m-xylene o-xylene	mg/kg mg/kg	0.001		7		<0.001	0				-	-	-	<0.001 <0.001	-	-	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	-	-	-	-	-	-	-	<0.001 <0.001	<0.001 <0.001	-	- :
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.001	70800 No SSV	7	<0.001	<0.001	0					-	-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	<0.001	<0.001	-	-
Petroleum Hydrocarbons TPH C10 - C40 TPH-CWG - Aliphatic >EC5 -	mg/kg		No SSV		<10		0				-	-	-	-	-	-	<10	-	-	-	18	-	-	-	-	<10	<10	-	- 1	-	<10
EC6 TPH-CWG - Aliphatic >EC6 -	mg/kg	0.001	109000	7	<0.001	+	0				-	-	-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	<0.001	<0.001	-	-
EC8 TPH-CWG - Aliphatic >EC8 -	mg/kg mg/kg		9720	7	<0.001		0				-	-	-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-					<0.001	<0.001	-	-
EC10 TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	17700	7	<1	<1	0						-	<1			<1	<1	<1	<1			-		-	-		<1	<1		-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	23800	7	<2	<2	0				-	-	-	<2	-	-	<2	<2	<2	<2	-	-	-	-	-	-	-	<2	<2	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	864000	7	<8	<8	0	_			-	-	-	<8	-	-	<8	<8	<8	<8	-	-	-	-	-	-	-	<8	<8	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	864000	7	<8	<8	0				-	-	-	<8	-	-	<8	<8	<8	<8	-	-	-	-	-	-	-	<8	<8	-	-
TPH-CWG - Aliphatic (EC5 - EC35) TPH-CWG - Aromatic >EC5 -	mg/kg	10	No SSV	7	<10	<10	0				-	-	-	<10	-	-	<10	<10	<10	<10	-	-	-	-	-	-	-	<10	<10	-	-
EC7 TPH-CWG - Aromatic >EC5 - EC8	mg/kg	0.001	139	7	<0.001	+	0				-	-	-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	<0.001	<0.001	-	-
TPH-CWG - Aromatic >EC8 -	mg/kg mg/kg	0.001	69900 5140	7	<0.001		0				-		-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	<0.001	<0.001 <0.001	-	-
EC10 TPH-CWG - Aromatic >EC10 -	mg/kg mg/kg	0.001	8260	7	<0.001	<0.001	0				-		-	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-			-	<0.001	<0.001	-	-
EC12 TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	10600	7	<2	<2	0				-		-	<2	-	-	<2	<2	<2	<2		-	-	-	-	-	-	<2	<2	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	7870	7	<10	<10	0				-	-	-	<10	-	-	<10	<10	<10	<10	-	-	-	-	-	-	-	<10	<10	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	7870	7	<10	<10	0				-	-	-	<10	-	-	<10	<10	<10	<10	-	-	-	-	-	-	-	<10	<10	-	-
TPH-CWG - Aromatic (EC5 - EC35) PCBs	mg/kg	10	No SSV	7	<10	<10	0				-	-	-	<10	-	-	<10	<10	<10	<10	-	-	-	-	-	-	-	<10	<10	-	-
PCB Congener 077		0.001	0.049 No SSV	3		<0.001					-	-	-	-	-	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	-	-	-	-	=
PCB Congener 081 PCB Congener 105 PCB Congener 114	mg/kg mg/kg ma/ka	0.001	No SSV No SSV No SSV	3 3	<0.001	<0.001 <0.001 <0.001	0				-			-	-		<0.001 <0.001 <0.001		<0.001 <0.001 <0.001		<0.001 <0.001 <0.001			-				-	-	-	-
PCB Congener 114 PCB Congener 118 PCB Congener 123	mg/kg mg/kg	0.001	No SSV No SSV	3	<0.001 <0.001	<0.001 <0.001	0				-	-	-	-	-	-	<0.001 <0.001	-	<0.001 <0.001	-	<0.001 <0.001	-	-	-	-	-	-	-		-	
PCB Congener 126 PCB Congener 156	mg/kg mg/ka	0.001	No SSV No SSV	3	< 0.001	<0.001	0				-	-	-	-	-	-	<0.001 <0.001	-	<0.001 <0.001	-	<0.001 <0.001	-	-	-	-	-	-	-	==	-	
PCB Congener 157 PCB Congener 167 PCB Congener 169 PCB Congener 189	mg/kg	0.001	No SSV No SSV No SSV	3	< 0.001	<0.001 <0.001 <0.001	0				-	-	-	-	-	-	<0.001 <0.001 <0.001		<0.001 <0.001 <0.001	-	<0.001 <0.001 <0.001	-	-	-		-	-	-		-	-
PCB Congener 169 PCB Congener 189 Total PCBs	mg/kg mg/kg ma/ka	0.001	No SSV No SSV 0.049	3 3	<0.001	<0.001 <0.001 <0.012	0				-		-		-		<0.001 <0.001 <0.012		<0.001 <0.001 <0.012		<0.001 <0.001 <0.012	-		-							-
Pesticide and Herbicide Screen	ì			Ĕ	V.01Z	-5.012	Ĺ										10.012		-0.012		.0.012				<u> </u>				e		
Pesticides/Herbicides Screen in		N/A									-	-	-	-	-	-	Absent	-	Absent	-	Absent	-	-	-	-	-	-	-	-		-



#### Appendix E – Leachate Screening Results

eB Reference: 133735-EWR-REP-EEN-000137 Rev: B02 Page 94 of 99



Assessment Criteria :						Drinking	Water St	andard	,		1								
CaCO (mg/l):	0.00		pH	0.0	0						1								
Calcium (mg/l):	0.00		DOC (mg/l)	0.0	0	Catchr	nent area	: Drinking Water Standard											
					0	•				Location									1
					≛	Value	ø			Sample ID	CP2ATFB 2U (A	WS2A102 C	WS2A104 L	WS2A113 C	WS2A122 C	WS2ALOB 1D	WS2ALOB 1D	CP2AMG-D	CP2AMG-I
			l a	÷	%	>	o e			Depth		0.5m	0.3m	0.5m	1m	0.3m	1m	17m	2m
		of tion	ے ق	ır o	€	Ę	e e			Date		07/08/2017	02/11/2017	02/08/2017	03/08/2017	25/05/2018	25/05/2018	42283	42276
		5 5	Generic Assessm Criteria	Number Samples	ਵ	Maximum	Number e Exceeder		011-	Date	09/11/2017	07/06/2017	02/11/2017	02/06/2017	03/06/2017	23/03/2016	23/03/2016	42203	42276
	Unit	Limit	ss	ᆵ	<u>=</u>	ă	F S		Strata										
Constituents					Σ	_		Locations of Exceedences		Zone									
Sulphate as SO4	mg/l	0.2	250	9	8.7	1500	1	WS2A122_C, 1m			24	170	12	8.7	1500	16	80		
Dissolved Organic Carbon	mg/l	0.1	No WSV	9	4.75	16.9	0				15.3	7.5	10.2	4.75	16.9	6.39	4.98		
Sulphide	mg/l	0.01	No WSV	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Cyanide (total)	mg/l	0.01	0.05	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Cyanide (free)	mg/l	0.01	See Cyanide (total)	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Nitrate (as NO3)	mg/l	0.01	50	9	0.14	2.4	0				2.4	0.14	0.39	0.32	0.18	1.6	0.57		1
Ammonical Nitrogen	ma/l	0.01	No WSV	9	0.01	0.06	0				0.01	0.025	< 0.01	< 0.01	0.045	0.017	0.06		1
Ammonium as NH4	mg/l	0.01	0.5	9	< 0.01	0.077	0				0.013	0.032	< 0.01	< 0.01	0.058	0.022	0.077		1
Arsenic	mg/l	0.01	0.01	9	< 0.01	<0.01	0				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		1
Cadmium	ma/l	0.0005	0.005	9	< 0.0005	< 0.0005	0				< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005		1
Calcium	ma/l	0.012	N/A	9	13	640	0				25	74	24	20	640	13	28		1
Chromium	ma/l	0.001	0.05	9	< 0.001	0.0021	0				0.0015	< 0.001	< 0.001	0.0013	< 0.001	0.0021	< 0.001		
Lead	ma/l	0.005	0.01	9	<0.005	0.0095	0				0.0095	0.0068	0.0058	<0.005	<0.005	0.0087	<0.005		+
Mercury	ma/l	0.0015	0.001	9	< 0.0015	< 0.0015	0				< 0.0015	<0.0015	< 0.0015	< 0.0015	< 0.0015	<0.0015	< 0.0015		
Selenium	ma/l	0.01	0.01	9	<0.01	0.015	1	WS2A122 C, 1m			<0.01	< 0.01	<0.01	<0.01	0.015	<0.01	< 0.01		1
Copper	mg/l	0.001	2	9	0.0044	0.034	0				0.033	0.012	0.016	0.0044	0.034	0.02	0.01		+
Nickel	mg/l	0.001	0.02	9	<0.001	0.0079	0				0.0055	0.0011	0.0016	<0.001	0.0079	0.0025	<0.001		+
Zinc	mg/l	0.001	3	9	0.0032	0.019	0				0.011	0.01	0.0067	0.0032	0.019	0.0093	0.013		+
Hexavalent Chromium	mg/l	0.01	See Total Chromium	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Vanadium	mg/l	0.01	N/A	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01		+
Boron	mg/l	0.01	1	9	<0.01	0.42	0				0.038	0.03	0.078	<0.01	0.11	0.069	0.42		+
Iron	mg/l	0.008	0.2	9	0.013	2.5	3	CP2ATFB_2U (A), 0.2m; WS2A113_C, 0.5m; WS2ALOB_1D, 0.3m			2.5	0.013	0.046	0.52	0.027	1.2	0.027		1
Manganese	ma/l	0.001	0.05	9	0.0023	0.011	0				0.0046	0.0067	0.0023	0.0049	0.011	0.0053	0.0049		+
pH	pH units	0.01	6.5-9.5	9	7.3	7.9	0				7.6	7.9	7.9	7.5	7.7	7.3	7.8		1
Metals								•											
Magnesium Aqueous Extract	ma/l	10	No WSV	9	<10	<10	0					1						<10	<10
Inorganics								•	•		•								
pH			6.5-9.5	9	6.2	9.1	1	CP2AMG-U, 2m				1						9.1	6.2
Chloride Aqueous Extract	mg/l	1	No WSV	9	7.3	10	0											10	7.3
Nitrate Aqueous Extract as NO3	mg/l	1	No WSV	9	<1	2.7	0											<1	2.7
Sulphate Aqueous Extract as SO4	mg/l	10	No WSV	9	43	110	0											43	110
Total Sulphur as S	%	0.01	No WSV	9	0.28	1.9	0											1.9	0.28
Total Sulphate as SO4	%	0.01	No WSV	9	0.24	1.7	0					1						0.24	1.7



						F		10			1								
Assessment Criteria :						Fresi	hwater EC	s .	•										
CaCO (mg/l):	0.00		pH	7.50	)						1								
Calcium (mg/l):	54.75		DOC (mg/l)	38.22	2	Catchr	ment area	Thames											
						٥				Location									
					=	를	တ္				CP2ATFB 2U (A)	WS2A102 C	WS2A104 U	WS2A113 C	WS2A122 C	WS2ALOB 1D	WS2ALOB 1D	CP2AMG-D	CP2AM0
		_	eni	<b>5</b>	Va Va	Vali	of nce			Depth	0.2m	0.5m	0.3m	0.5m	1m	0.3m	1m	17m	2m
		å å	is is is	es es	<u>E</u>	Ē				Date		07/08/2017	02/11/2017	02/08/2017	03/08/2017	25/05/2018	25/05/2018	42283	42276
		et c	eneric ssessr riteria	umbe	l ē	ximu	umber xceede		Strata	Dute	03/11/2017	07700/2017	02/11/2017	02/00/2017	03/00/2017	20/00/2010	25/05/2010	42200	42210
Constituents	Unit	imit etec	Gen Ass Crit	San	[ €	Пах	Exc	Locations of Exceedences	Strata	Zone									
Sulphate as SO4	mg/l	0.2	400	9	8.7	1500	<u> 2 Ш</u>	WS2A122 C, 1m		Zone	24	170	12	8.7	1500	16	80		
Dissolved Organic Carbon	mg/l	100000	No WSV	9	4750000	16900000	0	WOEKIZE_0, IIII		1	15300000	7500000	10200000	4750000	16900000	6390000	4980000		
Dissolved Organic Carbon	mg/l	0.1	No WSV	9	4.75	16.9	0				15.3	7.5	10.2	4.75	16.9	6.39	4.98		
Sulphide	mg/l	0.01	No WSV	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Cyanide (total)	mg/l	0.01	0.001	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Cyanide (free)	mg/l	0.01	0.001	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Nitrate (as NO3) Ammonical Nitrogen	mg/l mg/l	0.01	N/A No WSV	9	0.14 0.01	2.4 0.06	0				2.4 0.01	0.14 0.025	0.39 <0.01	0.32 <0.01	0.18 0.045	1.6 0.017	0.57 0.06		
, amnomodi Nidogen	mgn	0.01	Not		0.01	0.00				<b> </b>	0.01	0.020	70.01	70.01	0.040	0.017	0.00		
Ammonium as NH4	mg/l	0.01	appropriate, see Ammonia	9	<0.01	0.077	0				0.013	0.032	<0.01	<0.01	0.058	0.022	0.077		
Ammonia	mg/l	0.000441	0.2	9	<0.00044	0.003396	0				0.000573351	0.001411324	<0.00044	<0.00044	0.002558026	0.000970286	0.003395999		
Arsenic	mg/l	0.01	0.05	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
			0.00008 ->																
			CaCO3 0-							1		1		1					
			50mg/l 0.00009 ->							1		1		1					
			CaCO3 50-							1		1		1					
Cadmium	/I	0.0005	100mg/l	9	<0.0005	<0.0005	0				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Cadmium	mg/l	0.0005	0.00015 ->	9	<0.0005	<0.0005	U			1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
			CaCO3 100-							1		1		1					
			200mg/l							1		1		1					
			0.00025 -> CaCO3							1		1		1					
			200+mg/l							1		1		1					
Calcium	mg/l	0.012	N/A	9	13	640	0				25	74	24	20	640	13	28		
Chromium	mg/l	0.001	0.0034	9	<0.001	0.0021	0				0.0015	<0.001	<0.001	0.0013	<0.001	0.0021	<0.001		
Lead	mg/l	0.005	0.0012	9	<0.005	0.0095	4	CP2ATFB_2U (A), 0.2m; WS2A102_C, 0.5m; WS2A104_U, 0.3m; WS2ALOB 1D, 0.3m			0.0095	0.0068	0.0058	<0.005	<0.005	0.0087	<0.005		
Mercury	mg/l	0.0015	0.00007	9	<0.0015	<0.0015	0	WOZACOB_ID, U.SIII			<0.0015	<0.0015	<0.0015	<0.0015	< 0.0015	<0.0015	<0.0015		
Selenium	mg/l	0.01	N/A	9	<0.01	0.015	0			1	< 0.01	< 0.01	< 0.01	< 0.01	0.015	< 0.01	< 0.01		
								CP2ATFB_2U (A), 0.2m; WS2A102_C, 0.5m; WS2A104_U, 0.3m;											
Copper	mg/l	0.001	0.001	9	0.0044	0.034	7	WS2A113_C, 0.5m; WS2A122_C, 1m; WS2ALOB_1D, 0.3m;		1	0.033	0.012	0.016	0.0044	0.034	0.02	0.01		
Nickel	ma/l	0.001	0.004	9	<0.001	0.0079	2	WS2ALOB_1D, 1m CP2ATFB 2U (A). 0.2m; WS2A122 C. 1m			0.0055	0.0011	0.0016	<0.001	0.0079	0.0025	<0.001		
Zinc	mg/l	0.001	0.0109	9	0.0032	0.0079	3	CP2ATFB_2U (A), 0.2m; WS2A122_C, 1111  CP2ATFB_2U (A), 0.2m; WS2A122_C, 1m; WS2ALOB_1D, 1m			0.0055	0.0011	0.0016	0.0032	0.019	0.0023	0.013		
Hexavalent Chromium	mg/l	0.001	0.0034	9	<0.01	<0.01	0	z. z z_zz (v), o.z.n, woz nzz o, nn, woz zoo ib, nn		<b> </b>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
-	,		0.02 ->																
			CaCO3 0-						1	1	l	I	l	I		l			
Vanadium	mg/l	0.01	200mg/l	9	< 0.01	<0.01	0			1	<0.01	<0.01	<0.01	<0.01	< 0.01	< 0.01	<0.01		
			0.06 -> CaCO3							1		1		1					
			200+mg/l						1	1	l	I	l	I		l			
Boron	mg/l	0.01	2	9	<0.01	0.42	0				0.038	0.03	0.078	<0.01	0.11	0.069	0.42		
Iron	mg/l	0.008	1	9	0.013	2.5	2	CP2ATFB_2U (A), 0.2m; WS2ALOB_1D, 0.3m			2.5	0.013	0.046	0.52	0.027	1.2	0.027		
Manganese	mg/l	0.001	0.123	9	0.0023	0.011	0				0.0046	0.0067	0.0023	0.0049	0.011	0.0053	0.0049		
pH Metals	pH units	0.01	6-9	9	7.3	7.9	0				7.6	7.9	7.9	7.5	7.7	7.3	7.8		
Magnesium Aqueous Extract	mg/l	10	No WSV	9	<10	<10	0		T		1				T			<10	<10
Inorganics	g.							•											0
pH			6-9	9	6.2	9.1	1	CP2AMG-D, 17m										9.1	6.2
Chloride Aqueous Extract	mg/l	1	No WSV	9	7.3	10	0											10	7.3
Nitrate Aqueous Extract as NO3	mg/l	1	No WSV	9	<1	2.7	0											<1	2.7
Sulphate Aqueous Extract as SO4	mg/l	10	No WSV	9	43	110	0											43	110
Total Sulphur as S	%	0.01	No WSV	9	0.28	1.9	0											1.9	0.28
Total Sulphate as SO4	% %	0.01	No WSV	9	0.24	1.7	0											0.24	1.7



#### Appendix F - Groundwater Screening Results

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	Detection	nent of	n Value n Value	of		Location         WS2A121_           Sample ID         -           Depth         1.94m	_U WS2A123_D - 2.34m	WS2A124_U - 2.30m	WS2ALOB_1D - 0.92m	CP2AMFOB_2U - 1.50m	CP2ALLCDE - 4.24m	- 5.23m	WS2A14D WS2A100  2.58m 5.66m	_U WS2A103_U WS2  1.90m 1.	A106_D WS2A109  .00m 4.47m	9_U CP2AMFOB_2 - n 3.40m	U WS2A100_U - 4.60m	CP2AMFOB_2U CI	- 5.40m	2ALOB_1D WS2A - 0.99m 2.0		D WS2A100_U W - 4.50m	/S2A103_U WS2 - 1.80m 1.	A106_D WS2A1 00m 2.57r	4D WS2A106_E - m 1.01m	WS2A103_U \ - 1.86m	WS2A100_U V - 4.64m	S2ALOB_1D CF - 0.89m	- 5.31m	WS2A12U W - 2.03m	/S2A14D CP2AL - 2.67m 3.9	LCDE WS2A121 99m 1.76m	_U WS2A123_D - 2.25m	_D WS2A12 
Constituents	Unit Limit of I	Generic Assessn Criteria Number	Minimum	Number	Stra  Locations of Exceedences	Date 24/09/2018	8 24/09/2018	24/09/2018	24/09/2018	24/09/2018	24/09/2018 - -	25/09/2018	26/09/2018 27/09/201 	8 27/09/2018 27/0 - -	99/2018 28/09/20	01/08/2018	01/08/2018	03/09/2018	03/09/2018 03	3/09/2018 03/09 - -	/2018 03/09/2018 	3 04/09/2018 ( - -	04/09/2018 06/0 - -	9/2018 06/09/2	018 22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018 2	22/10/2018 22	22/10/2018 22/10/	/2018 23/10/201 	8 23/10/2018	8 23/10/2
anide	pH Units N/A mg/l 10000	6.5-9.5 35 0.05 35	5.6 8.3 <<0.01 <100	3 1 6 1	WS2A14D, -, 2.58m; WS2A106_D, -, 1.00m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m; WS2A14D, -, 2.67m	7.3	7.4	7.2	7.4	8.3 <10000	6.8	6.9 <10000	5.7 6.8 <10000 <10000	6.8	5.6 7 0000 <10000	7.9 0 <10000	6.8	8.2 <10000	7.1	7.9 7 <10000 <10	.5 7.4 000 <10000	6.8	7 (10000 <1	5.6 5.7 0000 <1000	5.8	6.8	6.9 <10000	7.4	6.9	6.8	6 6.8	6.8 7.3 0000 <0.01	7.4	7.3
nide	mg/l 0.01	See Cyanide (total) 35	<0.01 <0.0		WS2A124_U, -, 2.30m; WS2ALOB_1D, -, 0.92m; CP2ALLCDE, -,	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01	<0.01	0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0	.01 <0.01	<0.01	<0.01 <	0.01 <0.0	1 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.0	0.01 <0.01	<0.01	<0.0
				,	4.24m; CP2APOOB_1D, -, 5.23m; WS2A14D, -, 2.58m; WS2A100_U, -, 5.66m; WS2A103_U, -, 1.90m; WS2A106_D, -, 1.00m; WS2A109_U, -, 4.47m; CP2AMFOB_2U, -, 3.40m; WS2A100_U, -, 4.60m; CP2APOOB_1D, -, 5.40m; WS2ALOB_1D, -, 0.99m; WS2A100_U, -,																												,	
as SO4	mg/I 0.045	250 35	83 429	90   26   2	4.50m; WS2A103_U, -, 1.80m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m; WS2A103_U, -, 1.86m; WS2A100_U, -, 4.64m; WS2ALOB_1D, -, 0.89m; CP2APOOB_1D, -, 5.31m;	113	114	284	491	159	856	1950	1960 1700	2190 2	2960 808	272	1780	168	2450	857 1	18 83	1880	1670 3	390   1730	4290	2380	1940	713	2030	1470	1430   116	160 150	168	409
and Nitragana and Ni	mg/l 0.005	No WSV 35 No WSV 35	<0.005 <0.0	12 0	WS2A12U, -, 2.03m; WS2A14D, -, 2.67m; CP2ALLCDE, -, 3.99m; WS2A124_U, -, 2.12m				<0.005		<0.005	<0.005	<0.005 <0.005	<0.005 <0	0.005 <0.005	5 <0.005	<0.005	<0.005	<0.005	<0.005 <0	005 <0.005	<0.005	<0.005 <0	0.005 <0.00	05 <0.005	<0.006	<0.007	<0.008	<0.009	<0.01	<0.011 <0.	0.012 <0.005	<0.005	<0.0
cai Nill Ogen as N	111g/1 0.015	100 00 30	0.16 5.3		WS2ALOB_1D, -, 0.92m; CP2AMFOB_2U, -, 1.50m; CP2ALLCDE, -, 4.24m; CP2APOOB_1D, -, 5.23m; WS2A14D, -, 2.58m; WS2A100_U, -, 5.66m; WS2A103_U, -, 1.90m; WS2A106_D, -, 1.00m; WS2A109_U, -	0.22	0.2	0.21	0.0	1	2.5	2.3	1 4.9	2.5	2.0 0.43	0.43	4.9	0.34	2.0	0.54 0	29 0.16	5.5	2.0	5.1 0.9	3.0	2.9	3.5	0.63	2.4	0.41	1.1 3	2 0.24	0.33	0.5
m as NH4	mg/l 0.015	0.5 35	0.2 6.8	8 25 6	, 4.47m; CP2AMFOB_2U, -, 3.40m; WS2A100_U, -, 4.60m; CP2APOOB_1D, -, 5.40m; WS2ALOB_1D, -, 0.99m; WS2A100_U, -, 4.50m; WS2A103_U, -, 1.80m; WS2A106_D, -, 1.00m; WS2A14D, -,	0.28	0.26	0.27	0.77	1.3	3.2	3.3	1.3 6.3	3.2	3.4 0.55	0.55	6.3	0.44	3.3	0.69 0	37 0.2	6.8	3.3	3.9 1.2	4.7	3.7	4.5	0.84	3	0.53	1.4 4.	4.1 0.31	0.42	0.38
				4	2.57m; WS2A106_D, -, 1.01m; WS2A103_U, -, 1.86m; WS2A100_U, -, 4.64m; WS2ALOB_1D, -, 0.89m; CP2APOOB_1D, -, 5.31m; WS2A12U, -, 2.03m; WS2A14D, -, 2.67m; CP2ALLCDE, -, 3.99m																												'	
ed Organic Carbon (DOC) as N Metals / Metalloids	1 1	No WSV 35				8.69 0.02	6.8 0.05	5.74 0.04	9.47 0.02	3.62 0.05	81.2 0.18	68.9 0.7	16 69.8 0.17 0.6		933 3.99 4.44 2.06	4.59 0.05	77.5 0.07	15.5 0.3	77 0.57	11.4 1: 0.16 0	6.05 15 0.18	61.9 0.23	33.7 § 0.21 4	924 18.3 4.04 0.11	643 4.55	40 0.48	66.1 0.64	9.38 0.51	47.5 1.19	10.6 0.45		79.3     6.97       1.66     0.06		5.71 0.54
(dissolved) ilissolved) n (dissolved)	mg/l 0.00015 mg/l 0.01 mg/l 0.00002	0.01 35 No WSV 35 0.005 35	0.26 3.9	9 0	CP2APOOB_1D, -, 5.31m	0.00147 0.8 <0.00002	0.00113 1.4 2 <0.00002	0.00196 0.85 <0.00002	0.0008 1.5 <0.0002	0.00099 2.5 <0.00002	0.00182 1.1 <0.00002	0.00058 3.5 0.00011	0.00054         0.00229           0.58         0.27           0.00021         <0.00002		0.005 1.9 0.79 00015 <0.0000		0.0025 0.26 <0.00002	0.00108 3.2 <0.00002	0.00055 0 3.1 <0.00002 <	0.00145 0.00 1.2 0 0.00002 <0.0	0.0008 63 0.95 0002 <0.00002	0.00119 0.27 <0.00002	0.00054 <0.0 1.5 2 <0.00002 <0.0	00015 0.0019 2.1 0.41 00002 0.000	97 0.00587 1.9 93 0.0001	0.00071 1.7 <0.00002	0.00097 0.29 <0.00002	0.00079 1.6 <0.00002	0.0004 3.9 0.05	<0.00015 ( 0.41 <0.00002	0.00097         0.00           0.53         1           0.00003         <0.0	00094 0.00111 1.1 0.97 00002 <0.00002	0.00088 1.5 )2 <0.00002	0.000
(dissolved) m (hexavalent) m (dissolved)		No WSV         35           No WSV         35           0.05         35	7.4 630 0.005 <0.0 0.0002 0.03	0 0 05 0 33 0		120 <0.005 0.0002	93 <0.005 0.0002	150 <0.005 0.0007	100 <0.005 <0.0002	8.4 <0.005 <0.0002	<0.005 0.0005	380 <0.005 0.0002	<0.005 <0.005 0.0003 0.0006	530 8 <0.005 0.0002 0	560 480 U/S <0.005 .021 0.0003	5 <0.005 3 <0.0002	600 <0.005 0.0009	9.8 <0.005 0.0003	480 <0.005 0.0003	84 1 <0.005 <0 0.0004 0.0	10 90 005 <0.005 007 <0.0002	520 <0.005 0.0005	450 4 <0.005 <0 <0.0002 0	450 470 0.005 <0.00 0.033 0.000	05 <0.005 07 0.023	610 <0.005 0.0002	630 <0.005 0.0007	110 <0.005 <0.0002	400 <0.005 0.0002	<0.005 0.0002	500 41 <0.005 <0.0 0.0006 0.00	10 110 005 <0.005 0004 0.0003	89 <0.005 \$ <0.0002	170 <0.00 0.00
(dissolved)		2 35			WS2A14D, -, 2.58m; WS2A103_U, -, 1.90m; WS2A106_D, -, 1.00m; WS2A109_U, -, 4.47m; WS2A100_U, -, 4.60m; WS2A121_U, -, 2.00m;				0.003				0.0059 0.0033			7 0.0009		0.0012				0.0017				<0.0005		<0.0005				0028 <0.0005		
solved)				l l	WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m; WS2A103_U, -, 1.86m; WS2A100_U, -, 4.64m; WS2A12U, -, 2.03m; WS2A14D, -, 2.67m; CP2ALLCDE, -, 3.99m; WS2A124_U, -, 2.12m	0.035			0.01	0.01	0.065	0.008	2.6 0.082		330 0.26		0.31	0.004			0.015		0.035				11	0.021	0.12			0.014		
ssolved)	mg/l 0.0002	0.01 35	0.0002 0.0	,	WS2A121_U, -, 1.94m; WS2A123_D, -, 2.34m; WS2A124_U, -, 2.30m; WS2ALOB_1D, -, 0.92m; CP2ALLCDE, -, 4.24m; CP2APOOB_1D, -,	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0006 <0.0002	<0.0002 0.	0037 <0.000	2 <0.0002	<0.0002	<0.0002	<0.0002 <	<0.0002 <0.	0002 <0.0002	<0.0002	<0.0002	0.001	4 0.0015	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0004 0.00	0.0002	<0.0002	<0.000
					5.23m; WS2A14D, -, 2.58m; WS2A100_U, -, 5.66m; WS2A103_U, -, 1.90m; WS2A106_D, -, 1.00m; WS2A109_U, -, 4.47m; WS2A100_U, -, 4.60m; CP2APOOB_1D, -, 5.40m; WS2ALOB_1D, -, 0.99m;																													
nese (dissolved)	mg/i 0.00005	0.05 35	0.0046		WS2A121_U, -, 2.00m; WS2A123_D, -, 3.30m; WS2A100_U, -, 4.50m; WS2A103_U, -, 1.80m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m; WS2A103_U, -, 1.86m; WS2A100_U, -, 4.64m; WS2ALOB_1D, -, 0.89m; CP2APOOB_1D, -, 5.31m; WS2A12U, -,	0.88	1.1	0.61	0.84	0.0077	3.3	0.98	0.2 0.93	0.65	1.3	0.005	1.0	0.0046	1.3	0.75	.0 1.2	0.86	0.49	1.3 0.19	1.1	0.7	0.73	0.8	0.48	3.6	0.18 2.9	9 0.62	1.3	0.25
				2	2.03m; WS2A14D, -, 2.67m; CP2ALLCDE, -, 3.99m; WS2A121_U, -, 1.76m; WS2A123_D, -, 2.25m; WS2A124_U, -, 2.12m																													
y (dissolved) (dissolved)	mg/l 0.00005 mg/l 0.0005	0.001 35 0.02 35		5 10	CP2APOOB_1D, -, 5.23m; WS2A14D, -, 2.58m; WS2A100_U, -, 5.66m; WS2A106_D, -, 1.00m; WS2A100_U, -, 4.60m; WS2A100_U, -, 4.50m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -,	<0.00005 0.013		0.00005	<0.00005 0.0038	<0.00005 0.0013	<0.00005 0.004	<0.00005	<0.00005		0.0005 <0.0000 0.2 0.012		<0.00005	<0.00005 0.0017		0.0072 0.0				0.0005 <0.000			0.019	0.0034			0.044 0.00			
ım (dissolved) um (dissolved)	mg/l 0.0006 mg/l 0.0002	No WSV 35	<0.0006 0.01 0.0002 0.01	16 2 V	1.01m; WS2A14D, -, 2.67m WS2A103_U, -, 1.90m; WS2A106_D, -, 1.00m	0.0048 0.0002	0.0014 <0.0002	0.0016 0.0007	0.0023 <0.0002	0.0015 0.0007	0.0039 <0.0002	0.004 0.0004	0.0021 0.0031 <0.0002 0.0004		.016 0.0076 .012 0.0004	4 0.0013	0.0016 0.001	0.0014 0.0016	<0.0002	0.0053 0.0 0.0003 0.0		0.0034 0.0007	0.0072 <0. <0.0002 <0.	.0006 0.001 .0002 <0.000	9 0.0085 02 0.0071	<del>                                     </del>	0.0011	0.0011	0.0019	0.0033 ( <0.0002 (	0.0017 0.00 0.0004 <0.00	.0002 <0.0002	<0.0006 2 <0.0002	0.002
romatics	mg/l 0.0005 mg/l 0.001 mg/l 0.001	0.001 35	<0.0005 0.1 <0.001 <0.0 <0.001 <0.0	01 0		<0.012 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.003 <0.001 <0.001	<0.0005 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	0.12   0.0078   <0.001   <0.001   <0.001   <0.001	<0.0076 C C C C C C C C C C C C C C C C C C C	0.014 0.001 <0.001 0.001 <0.001	<0.0005 1 <0.001 1 <0.001	<0.0063 <0.001 <0.001	<0.0016 <0.001 <0.001	<0.001	<pre>0.0045</pre>	0.0046 001 <0.001 001 <0.001	<0.0085 <0.001 <0.001	<0.0058 0 <0.001 <0 <0.001 <0	0.090 0.001 <0.00 0.001 <0.00	0.16	<0.0054 <0.001 <0.001	<0.0017 <0.001 <0.001	<0.0036 <0.001 <0.001	<0.0066 <0.001 <0.001	<0.001 <0.001 <	<0.001 <0.0	0.001	0.0016 1 <0.001 1 <0.001	<0.00 ² <0.00 <0.00
enzene kylene e	mg/l 0.001 mg/l 0.001 mg/l 0.001	0.3     35       0.5     35       0.5     35	<0.001 <0.0 <0.001 <0.0	01 0		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001	1 <0.001 1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	001     <0.001	<0.001 <0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001 01 <0.001 01 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	.001   <0.001   .001   <0.001   .001   <0.001	1 <0.001	<0.00 <0.00 <0.0
Methyl Tertiary Butyl	mg/l 0.001	No WSV 35	<0.001 <0.0			<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001		0.001 <0.001	1 <0.001	<0.001	<0.001			001 <0.001	<0.001	<0.001 <0	0.001 <0.00	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001 <0.0	0.001 <0.001		<0.0
WG - Aliphatic >C5 - C6 WG - Aliphatic >C6 - C8	111g/1 0.001	15 35	<0.001 <0.0			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001	<0.001 <0	0.001 <0.001	1 <0.001	<0.001	<0.001		<0.001 <0 <0.001 <0		<0.001	<0.001 <0	0.001 <0.00	0.001	<0.001	<0.001	<0.001	<0.001		<0.001 <0.0	0.001 <0.001		<0.0
WG - Aliphatic >C8 - C10 WG - Aliphatic >C10 - C12	mg/l 0.001 mg/l 0.01	0.3 35 0.3 35	<0.001 0.07 <0.01 <0.0			<0.001	<0.001	<0.001	<0.001	<0.001 <0.01	<0.001 <0.01	<0.001	<0.001 <0.001 <0.01 <0.01		0.001 <0.001 0.01 <0.01		<0.001	<0.001			.01 <0.001	0.077 <0.01		0.001 <0.00		<0.001	<0.001	<0.001	<0.001			0.001 <0.001 0.01 <0.01		<0.0
WG - Aliphatic >C12 - C16 WG - Aliphatic >C16 - C21	mg/l 0.01		<0.01 <0.0	0 0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01		0.01 <0.01 0.01 <0.01	<0.01	<0.01	<0.01	<0.01		.01 <0.01	<0.01	<0.01 <0.01 <0.01	0.01 <0.0	1 <0.01	<0.01	<0.01	<0.01	<0.01			0.01 <0.01	<0.01	<0.0
WG - Aliphatic >C21 - C35	mg/l 0.01	N/A 35	<0.01 0.1	5 0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.15	<0.01 <0.01	<0.01	0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0	.01 <0.01	<0.01		0.01 <0.0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.0	0.01 <0.01	<0.01	<0.0
WG - Aliphatic (C5 - C35) WG - Aromatic >C5 - C7	mg/l 0.01 mg/l 0.001	No WSV         35           0.01         35	<0.01 0.1 <0.001 <0.0	, , ,		<0.01	<0.01	<0.01	<0.01	<0.01 <0.001	<0.01	0.17 <0.001	<0.01 <0.01 <0.001 <0.001	<0.01 <0.001 <0.001	0.01 <0.01 0.001 <0.001		<0.01	<0.01			.01 <0.01 001 <0.001	<0.001		0.01 <0.00 0.001 <0.00		<0.01	<0.01	<0.01	<0.01			0.01 <0.01 0.001 <0.001		<0.00
WG - Aromatic >C7 - C8 WG - Aromatic >C8 - C10	mg/l 0.001 mg/l 0.001	0.7 35 0.3 35	<0.001 <0.00 <0.001 0.01	0		<0.001 <0.001	<0.001	<0.001	<0.001	<0.001 <0.001	<0.001 <0.001	<0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0	0.001 <0.001 0.001 <0.001	1 <0.001	<0.001	<0.001		<0.001 <0 <0.001 <0		<0.001		0.001 <0.00 0.001 <0.00	01 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001		.001 <0.001 .001 <0.001		<0.00
WG - Aromatic >C10 -	mg/l 0.01	0.09 35	<0.01 <0.0			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01 <0.01 <0.01	<0.01 <	0.01 <0.01 0.01 <0.01	<0.01	<0.01	<0.01			.01 <0.01	<0.01		0.01 <0.0°		<0.01	<0.01	<0.01	<0.01			0.01 <0.01 0.01 <0.01		<0.0
WG - Aromatic >C16 -	mg/l 0.01	0.09 35	<0.01 <0.0			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01	<0.01 <	0.01 <0.01		<0.01	<0.01	<0.01	<0.01 <0	.01 <0.01	<0.01	<0.01 <	0.01 <0.0	1 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.0	0.01 <0.01	<0.01	<0.0
WG - Aromatic (C5 - C35)	mg/l 0.01 mg/l 0.01	0.09 35 No WSV 35	<0.01 <0.0 <0.01 0.01			<0.01	<0.01	<0.01	<0.01	<0.01 <0.01	<0.01	<0.01	<0.01 <0.01 <0.01 <0.01		0.01     <0.01		<0.01	<0.01			.01 <0.01	<0.01 0.014		0.01 <0.0° 0.01 <0.0°		<0.01	<0.01	<0.01	<0.01			0.01     <0.01		<0.0
methane ethane methane	mg/l 0.001 mg/l 0.001 mg/l 0.001	No WSV         35           No WSV         35           No WSV         35	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	01 0		<0.001 <0.001 <0.001		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001		0.001 <0.001 0.001 <0.001 0.001 <0.001		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0 <0.001 <0 <0.001 <0		<0.001	<0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001 01 <0.001 01 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001		0.001 <0.001 0.001 <0.001 0.001 <0.001	< 0.001	
methane hloride rofluoromethane hloroethene		0.0005 35 No WSV 35 No WSV 35	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 0 001 0 001 0		<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001	1 <0.001 1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0 <0.001 <0 <0.001 <0	001     <0.001	<0.001 <0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001 01 <0.001 01 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0.0	0.001     <0.001	1 <0.001	<0.00 <0.00
richloro-1,2,2- pethane -dichloroethene (Methyl Tertiary Butyl	mg/l 0.001	No WSV 35		01 0		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0	0.001 <0.001 0.001 <0.001	1 <0.001	<0.001	<0.001	<0.001	<0.001 <0	001 <0.001		<0.001 <0	0.001 <0.00	01 <0.001	<0.001	<0.001		<0.001	<0.001	<0.001 <0.0	0.001 <0.001 0.001 <0.001	1 <0.001	<0.00
	mg/l 0.001 mg/l 0.001 mg/l 0.001	No WSV         35           No WSV         35           No WSV         35	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0			<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001	<0.001	<0.001 <0	0.001     <0.001	1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0	001     <0.001	<0.001 <0.001 <0.001	<0.001 <0	0.001     <0.00	01 <0.001		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001	<0.001 <0.0	0.001     <0.001	1 <0.001	<0.00
romethane	, and the second	Trihalomethan 35 es 2 35				<0.001 <0.001			<0.001	<0.001	<0.001 <0.001	<0.001	<0.001 <0.001 <0.001 <0.001		0.001 <0.001 0.001 <0.001		<0.001	<0.001			001 <0.001 001 <0.001				01 <0.001							0.001 <0.001 0.001 <0.001		
hloroethane hloropropene ,2-dichloroethene	mg/l 0.001 mg/l 0.001	0.003 35 No WSV 35 No WSV 35	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 0 001 0 001 0		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001	1 <0.001 1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	001         <0.001	<0.001 <0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001 01 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 · <0.001 · <0.001 · <	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	.001   <0.001   .001   <0.001   .001   <0.001	1 <0.001 1 <0.001 1 <0.001	<0.00 <0.00 <0.00
nloromethane hloropropane	mg/l 0.001 mg/l 0.001 mg/l 0.001	0.003 35 0.04 35	<0.001 <0.0	01 0		<0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0 <0.001 <0		1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	001 <0.001 001 <0.001	<0.001 <0.001	<0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	0.001	<0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0.001	<0.001	<0.001 <0.0 <0.001 <0.0	.001 <0.001	1 <0.001 1 <0.001	<0.00
omethane	mg/l 0.001	No WSV 35 See	<0.001 <0.0	01 0			<0.001		<0.001	<0.001			<0.001 <0.001 <0.001 <0.001	<0.001 <0		1 <0.001			<0.001		001 <0.001	<0.001	<0.001 <0		01 <0.001				<0.001	<0.001		0.001 <0.001	1 <0.001	<0.00
-dichloromethane -dichloropropene I ,3-dichloropropene		Trihalomethan as es No WSV 35				<0.001 <0.001 <0.001			<0.001 <0.001 <0.001		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0 <0.001 <0 <0.001 <0	001 <0.001	<0.001			01 <0.001 01 <0.001 01 <0.001				<0.001	<0.001	<0.001 <0.0	0.001 <0.001 0.001 <0.001 0.001 <0.001	1 <0.001	
richloroethane hloropropane	ma/l 0.001	0.7 35 N/A 35 No WSV 35	-0.001   -0.0	01 I O I			<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001		<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0 <0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001 0.001 <0.001	1 <0.001 1 <0.001 1 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0	001 <0.001 001 <0.001	<0.001 <0.001	<0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00 0.001 <0.00	0.001 01 <0.001 01 <0.001 01 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001		<0.001 <0.001 <0.001		<0.001 <0.00 <0.001 <0.0 <0.001 <0.0	0.001     <0.001	1 <0.001 1 <0.001	<0.0 <0.0 <0.0
ochloromethane	mg/l 0.001	See Trihalomethan 35 es	<0.001 <0.0	01 0		<0.001			<0.001	<0.001	<0.001	<0.001			0.001 <0.001		<0.001	<0.001			001 <0.001	1		0.001 <0.00			<0.001			<0.001		.001 <0.001		
nloroethene promoethane penzene		0.0004 35 No WSV 35	<0.001 <0.0 <0.001 <0.0	01 0		<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0 <0.001 <0	0.001     <0.001	1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	001 <0.001	<0.001 <0.001	<0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001 01 <0.001 01 <0.001	<0.001	<0.001 <0.001 <0.001		<0.001	<0.001 <0.001 <0.001 <	<0.001 <0.0	0.001 <0.001 0.001 <0.001	1 <0.001	<0.0
-Tetrachloroethane enzene Kylene	mg/l 0.001 mg/l 0.001 mg/l 0.001	0.5 35	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	01 0 01 0		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0 <0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001 0.001 <0.001		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0		<0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001 01 <0.001 01 <0.001 01 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0	<pre>&lt;0.001 &lt;0.0 &lt;0.001 &lt;0.0 &lt;0.001 &lt;0.0 &lt;0.001 &lt;0.0 </pre>	0.001     <0.001	1 <0.001	<0.00 <0.00 <0.00 <0.00
nomethane ne -Tetrachloroethane	mg/l 0.001	No WSV 35 0.5 35 No WSV 35	<0.001 <0.0	01 0		<0.001 <0.001 <0.001		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001			<0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0		1 <0.001		101001	<0.001	<0.001 <0 <0.001 <0 <0.001 <0	001 <0.001	<0.001	<0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001 01 <0.001 01 <0.001		<0.001	<0.001	<0.001	<0.001	<0.001 <0.0	0.001 <0.001 0.001 <0.001 0.001 <0.001	< 0.001	<0.0
pylbenzene penzene ylbenzene rotoluene	mg/l 0.001 mg/l 0.001 mg/l 0.001 mg/l 0.001	No WSV         35           No WSV         35           No WSV         35           No WSV         35	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0 <0.001 <0.0	01 0		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	10.00.	0.001 <0.001 0.001 <0.001 0.001 <0.001 0.001 <0.001		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001		<0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0	001     <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001 01 <0.001 01 <0.001 01 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<pre>&lt;0.001 &lt;0.0 &lt;0.001 &lt;0.0 &lt;0.001 &lt;0.0 &lt;0.001 &lt;0.0 </pre>	001         <0.001           001         <0.001	<0.001 <0.001 <0.001 <0.001	<0.0 <0.0 <0.0
rotoluene rimethylbenzene rylbenzene	mg/l 0.001 mg/l 0.001 mg/l 0.001	No WSV         35           No WSV         35           No WSV         35	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0			<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001	1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	001 <0.001 001 <0.001	<0.001 <0.001	<0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001	<0.001 <0.001	<0.001	<0.001	<0.001	<0.001 <0.001 <0.001 <	<pre>&lt;0.001 &lt;0.0 &lt;0.001 &lt;0.0 &lt;0.001 &lt;0.0 </pre>	0.001 <0.001 0.001 <0.001 0.001 <0.001	<0.001 <0.001 <0.001	<0.0 <0.0 <0.0
rimethylbenzene tylbenzene hlorobenzene opyltoluene	mg/l 0.001 mg/l 0.001 mg/l 0.001 mg/l 0.001	No WSV         35           No WSV         35           No WSV         35           No WSV         35	<0.001 <0.0 <0.001 <0.0	01 0		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0 <0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001 0.001 <0.001	1 <0.001 1 <0.001	<0.001 <0.001 <0.001 <0.001		<0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0	001 <0.001 001 <0.001	<0.001	<0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001 01 <0.001	<0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0 <0.001 <0.0	0.001   <0.001     0.001   <0.001     0.001   <0.001     0.001   <0.001	<0.001 <0.001 <0.001 <0.001	<0.0 <0.0 <0.0
hlorobenzene hlorobenzene nzene	mg/l 0.001 mg/l 0.001 mg/l 0.001	1 35 0.3 35 No WSV 35	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	01 0		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001	1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	001 <0.001 001 <0.001	<0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	001         <0.001           .001         <0.001	<0.001 <0.001 <0.001	<0.0 <0.0 <0.0
richlorobenzene richlorobenzene richlorobenzene	mg/l 0.001 mg/l 0.001 mg/l 0.001 mg/l 0.001	No WSV 35		01 0		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0	0.001 <0.001 0.001 <0.001 0.001 <0.001 0.001 <0.001	1 <0.001 1 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0	001 <0.001	<0.001 <0.001	<0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0	0.001 <0.00 0.001 <0.00 0.001 <0.00 0.001 <0.00	01 <0.001	<0.001 <0.001		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0 <0.001 <0.0	0.001   <0.001     0.001   <0.001     0.001   <0.001     0.001   <0.001		<0.0 <0.0 <0.0
	mg/l 0.00005 mg/l 0.00005	No WSV 35 0.05 35	<0.00005 <0.00 <0.00005 0.04	0005 0 0 47 0		<0.00005 <0.00005	<ul><li>&lt;0.00005</li><li>&lt;0.00005</li></ul>	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005		<0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005	00005 <0.0000 .047 <0.0000	05 <0.00005 05 <0.00005		<0.00005 <0.00005				<0.00005 <0.00005	<0.00005 <0.0 <0.00005 <0.0	00005 <0.000 00005 <0.000	005 <0.00005 005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 < <0.00005 <	<0.00005 <0.00 <0.00005 <0.0	0005 <0.0000 0005 <0.0000	5 <0.00005 05 <0.00005	<0.00
ophenol hloroethyl)ether hlorobenzene hlorobenzene	mg/l 0.00005 mg/l 0.00005 mg/l 0.00005 mg/l 0.00005	0.3 35 No WSV 35 No WSV 35 1 35	<0.00005 <0.00 <0.00005 <0.00	005 0 005 0		<0.00005 <0.00005 <0.00005	<ul> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> </ul>	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<pre>&lt;0.00005 &lt;0.00005 &lt;0.00005 &lt;0.00005 &lt;0.00005 &lt;0.00005 &lt;0.00005 &lt;0.00005</pre>	<ul> <li>&lt;0.00005 &lt;0.</li> <li>&lt;0.00005 &lt;0.</li> <li>&lt;0.00005 &lt;0.</li> <li>&lt;0.00005 &lt;0.</li> </ul>	00005         <0.0000	10.00000	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.	0.00005     <0.0	0005         <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.0 <0.00005 <0.0 <0.00005 <0.0 <0.00005 <0.0	00005 <0.000 00005 <0.000 00005 <0.000	<0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 < <0.00005 < <0.00005 < <0.00005	0.00005         <0.00           <0.00005	<0.00005       0005     <0.0000	<ul> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> </ul>	<0.00 <0.00 <0.00
hlorobenzene hloroisopropyl)ether ylphenol	mg/l 0.00005 mg/l 0.00005 mg/l 0.00005 mg/l 0.00005	0.3 35 No WSV 35 No WSV 35	<0.00005	111 0 1005 0		<0.00005 <0.00005 <0.00005	<ul> <li>&lt;0.0005</li> <li>&lt;0.0005</li> <li>&lt;0.0005</li> <li>&lt;0.0005</li> </ul>	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<pre>&lt;0.00005 &lt;0.00003 &lt;0.00005 &lt;0.00005 &lt;0.00005 &lt;0.00005 &lt;0.00005 &lt;0.00005</pre>	<0.00005 0.	00005	05 <0.00005 05 <0.00005 05 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005	<0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.	0.00005 <0.0 0.00005 <0.0 0.00005 <0.0	0005 <0.00005 0005 <0.00005 0005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.0 <0.00005 <0.0 <0.00005 <0.0	00005 <0.000 00005 <0.000 00005 <0.000 00005 <0.000	005 <0.00005 005 <0.00005 005 <0.00005 005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 < <0.00005 < <0.00005	0.00005 <0.00 <0.00005 <0.00 <0.00005 <0.00	0005 <0.0000 0005 <0.0000 0005 <0.0000	5 <0.00005 5 <0.00005 05 <0.00005	<0.00 <0.00 <0.00
nzene ylphenol	mg/l 0.00005 mg/l 0.00005	No WSV         35           No WSV         35           No WSV         35           No WSV         35	<0.00005 <0.00 <0.00005 <0.00 <0.00005 0.00 <0.00005 <0.00	0005 0 119 0 1005 0		<0.00005 <0.00005 <0.00005	<ul> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> </ul>	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005	<ul> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> </ul>	00005         <0.0000	05 <0.00005 05 <0.00005 05 <0.00005 05 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005	0.00005     <0.0	0005         <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.0 <0.00005 <0.0 <0.00005 <0.0 <0.00005 <0.0	00005 <0.000 00005 <0.000 00005 <0.000	005         <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 0.0019 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005	U.UUU05         <0.00           <0.00005	JUU5         <0.00005           0005         <0.00005	<ul> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.0006</li> </ul>	<0.00 <0.00 <0.00
phenol nethylphenol hloroethoxy)methane	mg/l 0.00005 mg/l 0.00005 mg/l 0.00005 mg/l 0.00005	No WSV 35 No WSV 35 No WSV 35	<b>VO.00000 VO.00</b>	0005 0 0005 0 0005 0		<0.00005 <0.00005 <0.00005	<ul> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> </ul>	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<pre>&lt;0.00005 &lt;0.00008 &lt;0.00005 &lt;0.00008 &lt;0.00005 &lt;0.00008</pre>	<ul> <li>&lt;0.00005 &lt;0.</li> <li>&lt;0.00005 &lt;0.</li> <li>&lt;0.00005 &lt;0.</li> </ul>	00005	05 <0.00005 05 <0.00005 05 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <1 <0.00005 <1 <0.00005 <1	0.00005 <0.0 0.00005 <0.0 0.00005 <0.0	0.00005 0005 <0.00005 0005 <0.00005 0005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.0 <0.00005 <0.0 <0.00005 <0.0	00005 <0.000 00005 <0.000 00005 <0.000	0.00005 005 <0.00005 005 <0.00005 005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 < <0.00005 < <0.00005	0.00005 <0.00 <0.00005 <0.00 <0.00005 <0.0	0005 <0.0000 0005 <0.0000 0005 <0.0000	5 <0.00005 5 <0.00005 5 <0.00005 05 <0.00005	<0.00 <0.00 <0.00 <0.00
richlorobenzene alene hlorophenol coaniline	mg/l 0.00005 mg/l 0.00001 mg/l 0.00005	No WSV         35           See BaP         35           N/A         35           No WSV         35	<0.00005 <0.00 <0.00001 <0.00 <0.00005 <0.00	001 0 0005 0		<0.00005 <0.00001 <0.00005 <0.00005	<0.00001 5 <0.00005		<0.00005		<0.00005	< 0.00005	\0.00001 \ \0.0000	<0.00001 <0.	00001   <0.0000	0.00001	<0.00005 <0.00001 <0.00005	<0.00005 <0.00001 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	0.00005     <0.0	0005         <0.00005	<0.00001	<0.00001 <0.0	00005       <0.000	001 <0.00001	<0.00001	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0	<0.00005 <0.00 <0.00001 <0.00 <0.00005 <0.00 <0.00005 <0.00		01 <0.00001 05 <0.00005	<0.00
nlorobutadiene ro-3-methylphenol	mg/l 0.00005 mg/l 0.00005	0.0006 35 N/A 35	<0.00005 <0.00 <0.00005 <0.00	0005 0		<0.00005 <0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005	<0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 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richlorophenol ylnaphthalene onaphthalene	mg/l 0.00005 mg/l 0.00005 mg/l 0.00005	0.2 35 No WSV 35 No WSV 35 No WSV 35 NVA 35	<0.00005 <0.00 <0.00005 <0.00 <0.00005 <0.00 <0.00005 <0.00	0005 0 0005 0 0005 0		<0.00005 <0.00005 <0.00005 <0.00005	<ul> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> </ul>						<0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005	<ul> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> <li>&lt;0.00005</li> </ul>	00005 <0.0000 00005 <0.0000 00005 <0.0000	05	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005 <0.00005 <0.00005	0.00005 <0.0 0.00005 <0.0 0.00005 <0.0	0005	<0.00005 <0.00005 <0.00005 <0.00005 <0.00005			005         <0.00005	1			<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0 <0.00005 <0 <0.00005 <0 <0.00005 <0	<0.00005 <0.00 <0.00005 <0.00 <0.00005 <0.00 <0.00005 <0.00			<0.00
yipntnaiate	mg/l 0.00005 mg/l 0.00005 mg/l 0.00001 mg/l 0.00001 mg/l 0.00005	N/A       35         No WSV       35         See BaP       35         No WSV       35         No WSV       35         No WSV       35         No WSV       35         No WSV       35         No WSV       35         No WSV       35         No WSV       35         See BaP       35         No WSV       35	<0.00005 <0.00 <0.00001 <0.00 <0.00001 <0.00	0005 0 0001 0 0001 0		<0.00005 <0.00005 <0.00001 <0.00001	<ul><li>&lt;0.00005</li><li>&lt;0.00001</li><li>&lt;0.00001</li></ul>	<0.00005 <0.00001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005	<ul> <li>&lt;0.00005 &lt;0.</li> <li>&lt;0.00001 &lt;0.</li> <li>&lt;0.00001 &lt;0.</li> </ul>	0.0000 00005 <0.0000 00001 <0.0000 00001 <0.0000	05 <0.00005 01 <0.00001 01 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.	0.00005 <0.0 0.00001 <0.0 0.00001 <0.0	0.00005 0005 <0.00005 0001 <0.00001 0001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 <0.0 <0.00001 <0.0 <0.00001 <0.0	00005 <0.000 00001 <0.000 00001 <0.000	0.00005 005 <0.00005 001 <0.00001 001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 <0.00001 <0.00001	<0.00005 < <0.00001 < <0.00001	0.00005   <0.00   <0.00001   <0.0   <0.00001   <0.0	00005         <0.00005	05 <0.00005 05 <0.00005 01 <0.00001 01 <0.00001	<0.000
itrotoluene		N 14/01/	1-0 00005 -0 00	005 0	<del></del>	<0.00005	-0.00005	0.00005	0.0005	-0.0000E	-0.00005	0.0005	0.00005	I 10 0000E 10	00005	0.00005	< 0.00005	<0.00005	<0.00005	0 00005 <0 0	0005 <0.00005	<0.00005	<0.00005 <0.0	00005   <0.000	005   <0.00005	-0.00005			0.00005		<0.00005 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	10005 -0 000C	0.00001 05 <0.00005 05 <0.00005	< 0.00



Assessment Criteria :				Drinking Water Standard		▼																															
CaCO (mo	g/l): 5.00	На	5.00																																		
Calcium (m	37 - 7 -		5.00	Catchment area:	Freshwater not listed																																
	3,	6				Loc	cation WS2A121_U	WS2A123_D WS2A124	_U WS2ALOB_1	CP2AMFOB_2U	CP2ALLCDE	CP2APOOB_1D	WS2A14D W	/S2A100_U V	WS2A103_U W	S2A106_D W	S2A109_U CP2AN	MFOB_2U WS	S2A100_U CP2	2AMFOB_2U CP	2APOOB_1D V	WS2ALOB_1D	WS2A121_U W	S2A123_D WS2A1	00_U WS2A103_	U WS2A106_0	D WS2A14D V	VS2A106_D V	VS2A103_U WS2A	100_U WS2ALO	3_1D CP2APOOB	_1D WS2A	.12U WS2A14D	CP2ALLCDE	WS2A121_U W	/S2A123_D W5	32A124_U CP2/
	cti		l ne	en s		Sam	ple ID -		-	-	-	-	-	-	_	-	-	-	-	-	-	-	-		_	_	<del> </del>	-		_	-	_	_	-	<del>                                     </del>	-	-
	ete	ere ete	\a	\ \ _ \ = 0			Depth 1.94m	2.34m 2.30m	0.92m	1.50m	4.24m	5.23m	2.58m	5.66m	1.90m	1.00m	4.47m 3	.40m	4.60m	1.81m	5.40m	0.99m	2.00m	3.30m 4.50	m 1.80m	1.00m	2.57m	1.01m	1.86m 4.6	4m 0.89r	n 5.31m	2.031	3m 2.67m	3.99m	1 76m	2.25m 2	2.12m 1.
	0		se E	m   Se			Date 24/09/2018	24/09/2018 24/09/201			24/09/2018	25/09/2018	26/09/2018 2								3/09/2018	03/09/2018	03/09/2018 03	3/09/2018 04/09/2		3 06/09/2018		22/10/2018		/2018 22/10/2			2018 22/10/2018	+	23/10/2018 2		3/10/2018 23/1
	9	nt o leri es; erià	를   <u>ਜ਼</u>	ii   eec		Strata	24/03/2010		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		01/00/201	-	-	-		2010 22/10/2	-	5 22/10/2	510 22/10/2010	-	-		- 20/1
Constituents		III   SSS	lini	ğ   ax	Locations of Exceedences		one -											-	-			<u> </u>	-		<del>-  </del>	+ -	+				<del></del>	<del></del>	<del></del>	+ -	<del>                                     </del>	<del>-</del>	
	mg/l 0.000		5 40 00005 4	0.00005	Locations of Exceedences	20		<0.00005 <0.00005	- 5 <0.00005	- <0.00005	-0.00005	<0.00005	-0.00005	-0.0000E	-0.00005	-0.00005	0.00005	00005		- <0.00005	-0.00005	-0.00005	-0.00005	0.0005 -0.000		-0.0000E	-0.00005	-0.00005	-0.00005	2005 -0.000	-0.0000	- 10 OC	-005 -00005	-0.00005	-0.00005	-0.00005	0.00005 <0.
Bromophenyl phenyl ether Hexachlorobenzene	mg/I 0.00	0005 No WSV 3	5 <0.00005 <	0.00005 0			<0.00005	<0.00005 <0.00005	10.0000	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00005 <	0.00005 <0.	00005 <	40.00000	10.00000	<0.00005	<0.00005	<0.00005 <	0.00005 <0.000	005 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	0005 <0.000	05 <0.00005	5 <0.000	005 < 0.00005	<0.00005	<0.00005	10.00000	0.00005 <0.
Phenanthrene	mg/l 0.000	0001 See BaP 3	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.	00000 <	40.00000	<0.00000	<0.00001	<0.00000	<0.00001	0.00001 <0.000	001 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0001 <0.000	01 <0.0000	<0.00	001 <0.00001	<0.00001	<0.00000	<0.00001 <	.0.00001 <0
Anthracene	ma/L L 0 000	0001 See BaP 3	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.0000	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.	00001 <	<0.00001 <	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.000	0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0001 <0.000	01 <0.00001	1 <0.000	001 <0.00001	<0.00001	<0.00001	<0.00001 <0	:0.00001 <0
Carbazole	mg/l 0.00	0005 No WSV 3	5 <0.00005 <	0.00005 0			<0.00005	<0.00005 <0.00005	< 0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <	0.00005 <0.	00005 <	<0.0005 <	<0.00005	<0.00005	<0.00005	<0.00005 <	0.00005 <0.000	0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	0005 < 0.000	J5 <0.0000 ^F	<0.00′ د	J05 <0.00005	<0.00005	<0.00005	<0.00005 <	0.00005 <0
Dibutyl phthalate	mg/l 0.00	0005 0.35 3	5 <0.00005 <	0.00005 0			< 0.00005	<0.00005 <0.00005	< 0.00005	<0.00005	< 0.00005	< 0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <	0.00005 <0.	00005 <	<0.00005 <	<0.0005	<0.00005	< 0.00005	<0.00005 <	0.00005 <0.000	0.00005	< 0.00005	<0.00005	<0.00005	<0.00005 <0.0	0005 < 0.000	J5 <0.0000F	<0.00′	<0.00005	<0.00005	<0.00005	<0.00005 <	J.00005 <0
Anthraquinone	mg/I 0.00	0005 No WSV 3	5 <0.00005 <	0.00005 0			<0.00005	<0.00005 <0.00005	< 0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <	0.00005 <0.	00005 <	<0.00005 <	<0.00005	<0.00005	<0.00005	<0.00005 <	0.00005 <0.000	0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	0005 <0.000	J5 <0.0000F	/0.00 د	J05 <0.00005	<0.00005	<0.00005	<0.00005 <	0.00005 <0
Fluoranthene	mg/l 0.00	0001 See BaP 3	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.0000	₹0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	10.00001	0.00001	0.00001 <0.	00001	40.00001	10.00001	<0.00001	<0.00001	<b>10.00001</b>	0.00001 <0.000	VO.00001	₹0.00001	<0.00001	<0.00001	<0.00001 <0.0	0.000 <0.000	J1 <0.00001	1 <0.000	0001 <0.00001	<0.00001	<0.00001	<0.00001 <	:0.00001 <0.
Pyrene	mg/l 0.00	0001 See BaP 3	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.	00001 <		10.00001	<0.00001	<0.00001	10.00001	0.00001 <0.000	10.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0001 <0.000	J1 <0.00001	<0.00	J01 <0.00001	<0.00001	<0.00001	<0.00001 <	J.00001 <0.
Butyl benzyl phthalate	mg/l 0.00	0005 No WSV 3	5 <0.00005 <	0.00005 0			<0.00005	<0.00005 <0.00005	10.00000	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	10.00000	40.00000	0.00005 <0.		10.0000	10.00000	<0.00005	<0.00005	<0.00005 <	0.00005 <0.000	10.0000	10.00000	<0.00005	<0.00005	<0.00005 <0.0	0005 < 0.000	10.00000	· <0.00	0.00005	<0.00005	<0.00005	<0.00005 <0	J.00005 <0.0
Benzo(a)anthracene	mg/l 0.000	0001 See BaP 3 0001 See BaP 3	5 <0.00001 <	0.00001 0			<0.00001 <0.00001	<0.00001 <0.0000° <0.00001 <0.0000°	<0.00001	<0.00001	<0.00001	<0.00001 <0.00001	<0.00001	<0.00001	<b>40.00001</b>	<0.00001 < <0.00001 <	0.00001 <0.	100001	10.00001	<0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 <0.000 0.00001 <0.000	10.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0001 <0.000 0001 <0.000	10.0000.	1 <0.000	001 <0.00001	<0.00001	<0.00001	<b>10.00001</b>	(0.00001 <0.0 (0.00001 <0.0
Chrysene	mg/r c.co	See BAH Sum	5 <0.00001 <	0.00001		+ +	10.00001	10.00001		1010000	<0.00001	<0.00001	10.00001	10.00001			10.00001	00001 <	10.0000			1	10.00001	0.00001 (0.000	40.00001	10.00001	10.00001	10.00001	<0.00001 <0.0	10.000	10.00001	10.000	40.00001	10.00001	10.00001	10.00001 <	7.00001 <0.0
Benzo(b)fluoranthene	mg/l 0.00	0001 See PAH Sulli 3	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.	00001 <	<0.00001 <	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.000	0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0001 <0.000	<0.00001	1 <0.000	<0.00001	<0.00001	<0.00001	<0.00001 <	(0.00001 < 0.0
Benzo(k)fluoranthene	mg/l 0.00	O001 See PAH Sum of 4	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.0000	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <	<0.00001 <0.	00001 <	<0.00001 <	<0.00001	<0.00001	<0.00001	<0.00001	0.00001 <0.000	0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0.000 <0.000	<0.00001	1 <0.000	<0.00001	<0.00001	<0.00001	<0.00001 <0	<0.00001 <0.0
Benzo(a)pyrene	mg/l 0.00	0.00001 3	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.0000	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.	00001 <	<0.00001 <	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.000	0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0.000 <0.000	J1 <0.00001	<0.00	001 <0.00001	<0.00001	<0.00001	<0.00001 <0	:0.00001 <0.0
Indeno(1,2,3-cd)pyrene	mg/l 0.00	0001 No WSV 3	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.0000	10.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.	00001 <	<0.00001 <	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.000	0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0000 <0.000	10.0000.	1 (0.000	0001 <0.00001	<0.00001	10.00001	10.00001	0.00001 <0.0
Dibenz(a,h)anthracene	mg/l 0.00	0001 See BaP 3	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.	00001 <	<0.00001 <	<0.00001	<0.00001	<0.00001	<0.00001 <	0.00001 <0.000	0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0.000 <0.000	0.00001	1 <0.000	001 <0.00001	<0.00001	<0.00001	<0.00001 <0	(0.00001 < 0.00
Benzo(ghi)perylene	mg/l 0.00	O001 See PAH Sum of 4	5 <0.00001 <	0.00001 0			<0.00001	<0.00001 <0.0000	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <	<0.00001 <0.	00001 <	<0.00001 <	<0.00001	<0.00001	<0.00001	<0.00001	0.00001 <0.000	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	0.000	<0.00001	1 <0.000	<0.00001	<0.00001	<0.00001	<0.00001 <0	<0.0001 <0.00

	of tion ric ssment	ber of	num Value	er of sdences		Location         WS2A121_U           Sample ID         -           Depth         1.94m           Date         24/09/2018	2.34m 24/09/2018	2.30m 24/09/2018	0.92m 24/09/2018	1.50m 24/09/2018	4.24m 24/09/2018	5.23m 25/09/2018	2.58m 26/09/2018	5.66m 27/09/2018 27	1.90m 7/09/2018 27	1.00m 4.47m 7/09/2018 28/09/2018	3.40m 8 01/08/2018	4.60m 01/08/2018	- 1.81m 03/09/2018	5.40m 03/09/2018	- 0.99m 03/09/2018	2.00m 3.30m 03/09/2018 03/09/20	4.50m 18 04/09/2018	- 1.80m 04/09/2018 06	1.00m 2.57 6/09/2018 06/09/	7m 1.01m /2018 22/10/2018	1.86m 22/10/2018	4.64m 22/10/2018	- 0.89m 22/10/2018	5.31m 22/10/2018	- 2.03m 2.670 22/10/2018 22/10/2	3.99m 018 22/10/2018	WS2A121_U - 1.76m 23/10/2018	WS2A123_D - 2.25m 23/10/2018	WS2A124_U - 2.12m 23/10/2018	
onstituents	bH nits N/V 6-9	Numk Samp	5.6 8.3		Locations of Exceedences  WS2A14D, -, 2.58m; WS2A106_D, -, 1.00m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m	Zone - 7.3	7.4	7.2	7.4	- - 8.3	6.8	6.9	5.7	- 6.8	6.8	  5.6 7	7.9	6.8	8.2	7.1	7.9	  7.5 7.4	6.8	7	5.6 5.7	- - 7 5.8	6.8	6.9	- - 7.4	6.9	  6.8 6	6.8	7.3	7.4	7.3	$\pm$
le e	mg/l 0.01 0.001 mg/l 0.01 0.001		<0.01 <0.01 <0.01 <0.01		WS2ALOB_1D, -, 0.92m; CP2ALLCDE, -, 4.24m; CP2APOOB_1D, -, 5.23m; WS2A14D, -, 2.58m; WS2A100_U, -, 5.66m; WS2A103_U, -	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01 <0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01 <0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0. <0.01 <0.	01 <0.01 01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.0 <0.01 <0.0	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	
4	mg/l 0.045 400	35	83 4290	24 , \ \	, 1.90m; WS2A106_D, -, 1.00m; WS2A109_U, -, 4.47m; WS2A100_U, -, 4.60m; CP2APOOB_1D, -, 5.40m; WS2ALOB_1D, -, 0.99m; WS2A100_U, -, 4.50m; WS2A103_U, -, 1.80m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m; WS2A103_U, -, 1.86m; WS2A100_U, -, 4.64m; WS2ALOB_1D, -, 0.89m; CP2APOOB_1D, -, 5.31m; WS2A12U, -, 2.03m; WS2A14D, -, 2.67m; CP2ALLCDE, -, 3.99m; WS2A124_U, -, 2.12m	113	114	284	491	159	856	1950	1960	1700	2190	2960 808	272	1780	168	2450	857	118 83	1880	1670	3390 173	30 4290	2380	1940	713	2030	1470 1430	1160	150	168	409	
trogen as N	mg/l   0.005   No WS\    mg/l   0.015   No WS\    mg/l   0.015   appropria		<0.005 <0.012 0.16 5.3	0 0	, 2.07111, OF ZALLODE, -, 0.33111, WOZA 124_0, -, 2.12111	<0.005 0.22 0.28	<0.005 0.2 0.26	<0.005 0.21	<0.005 0.6	<0.005	<0.005	<0.005 2.5 3.3	<0.005	<0.005	<0.005 2.5	<0.005 <0.005 2.6 0.43 3.4 0.55	<0.005 0.43	<0.005 4.9	<0.005 0.34	<0.005 2.6	<0.005 0.54 0.69	<0.005 <0.005 0.29 0.16		<0.005 2.5	<0.005 <0.0 3.1 0.9	005 <0.005 9 3.6	<0.006 2.9	<0.007 3.5	<0.008 0.65	<0.009 2.4	<0.01 <0.0 0.41 1.1 0.53 1.4	1 <0.012 3.2	<0.005 0.24	<0.005 0.33 0.42	<0.005	#
nic Carbon	mg/l 0.1 No WS\	nia / 35				8.69 0.02	6.8	5.74	9.47	3.62	81.2	68.9	16	69.8	44.1	933 3.99 4.44 2.06	4.59	77.5	15.5	77 0.57	11.4	15.2 6.05 0.15 0.18		33.7	924 18. 4.04 0.1	.3 643	40	66.1	9.38	47.5	10.6 24.2 0.45 1.05		6.97	6.12	0.38 5.71 0.54	
Metalloids ed) d)	mg/l   0.00015   0.05   mg/l   0.01   No WS\    0.00008	35 4	0.00015 0.00873 0.26 3.9	0 0		0.00147	0.00113	0.00196 0.85	0.0008	0.00099 2.5	0.00182	0.00058	0.00054	0.00229	0.00047	0.00873         0.00059           1.9         0.79	0.00121 3.1	0.0025 0.26	0.00108 3.2	0.00055	0.00145	0.00232     0.0008       0.63     0.95	0.00119	0.00054 <	<0.00015 0.000 2.1 0.4	197 0.00587 1 1.9	0.00071	0.00097	0.00079	0.0004 3.9	<0.00015	7 0.00094	0.00111 0.97	0.00088	0.00058 0.88	
solved)	mg/l 0.00002 CaCO3 100mg/l 0.00005 CaCO3 10 200mg/l 0.00025	> 0- 	0.00002 0.05	0		<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00011	0.00021	<0.00002 <	c0.00002	0.00015 <0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002 <0.0000	2 <0.00002	<0.00002 <	<0.00002 0.00	0.0001	<0.00002	<0.00002	<0.00002	0.05	<0.00002 0.000	<0.00002	<0.00002	<0.00002	<0.00002	
lved) avalent) solved)	mg/l 0.002 0.0034	/I 35 / 35	7.4 630 0.005 <0.005 0.0002 0.033	\	WS2A106_D, -, 1.00m; WS2A106_D, -, 1.00m; WS2A106_D, -, 1.01m	120 <0.005 0.0002		150 <0.005 0.0007	100 <0.005 <0.0002	8.4 <0.005 <0.0002	490 <0.005 0.0005	380 <0.005 0.0002	500 <0.005 0.0003	<0.005		560 480 U/S <0.005 0.021 0.0003	18 <0.005 <0.0002	600 <0.005 0.0009	9.8 <0.005 0.0003	480 <0.005 0.0003	84 <0.005 0.0004	110 90 <0.005 <0.005 0.0007 <0.0002		<0.005	450 47 <0.005 <0.0 0.033 0.00	005 < 0.005	<0.005	630 <0.005 0.0007	110 <0.005 <0.0002	400 <0.005 0.0002	440 500 <0.005 <0.00 0.0002 0.000		110 <0.005 0.0003	89 <0.005 <0.0002	170 <0.005 0.0005	
olved)	mg/l 0.0005 0.001	35	<0.0005 0.032	27	WS2A121_U, -, 1.94m; WS2A123_D, -, 2.34m; WS2A124_U, -, 2.30m; WS2ALOB_1D, -, 0.92m; CP2AMFOB_2U, -, 1.50m; CP2ALLCDE, -, 4.24m; CP2APOOB_1D, -, 5.23m; WS2A14D, -, 2.58m; WS2A100_U, -, 5.66m; WS2A103_U, -, 1.90m; WS2A106_D, -, 1.00m; WS2A109_U, -, 4.47m; WS2A100_U, -, 4.60m; CP2AMFOB_2U, -, 1.81m; CP2APOOB_1D, -, 5.40m; WS2ALOB_1D, -, 0.99m; WS2A121_U, -, 2.00m; WS2A123_D, -,	0.0056	0.0036	0.0076	0.003	0.0013	0.0023	0.0096	0.0059	0.0033	0.004	0.032 0.0037	0.0009	0.0033	0.0012	0.0054	0.0073	0.0015 0.0043	0.0017	0.0021	<0.0005 0.00	0.0087	<0.0005	0.0009	<0.0005	0.002	0.0017 0.000	9 0.0028	<0.0005	0.0012	0.001	
<u> </u>	mg/l 0.004 1	35	0.004 430	3 2 1 1	3.30m; WS2A100_U, -, 4.50m; WS2A103_U, -, 1.80m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m; CP2APOOB_1D, -, 5.31m; WS2A12U, -, 2.03m; CP2ALLCDE, -, 3.99m; WS2A123_D, -, 2.25m; CP2AMFOB_2U, -, 1.51m  WS2A14D, -, 2.58m; WS2A106_D, -, 1.00m; WS2A106_D, -, 1.00m; WS2A106_D, -, 1.01m; WS2A106_D, -, 1.86m; WS2A100_U, -,	0,035	0.007	<0.004	0.01	0.01	0.065	0.008	2.6	0.082	0,26	330 0.26	<0.004	0.31	0.004	0.006	0.063	0.31 0.015	0.073	0.035	330 0.5	51 430	11	11	0.021	0.12	2.5 0.92	0.7	0.014	0.009	0.25	
d)			0.0002 0.01	4	WS2A100_D, -, 1.01ml, WS2A103_D, -, 1.00ml, WS2A100_D, -, 4.64m; WS2A12U, -, 2.03m WS2A106_D, -, 1.00m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m WS2A121_U, -, 1.94m; WS2A123_D, -, 2.34m; WS2A124_U, -, 2.30m; WS2ALOB_1D, -, 0.92m; CP2ALLCDE, -, 4.24m;		<0.0002		<0.0002	<0.0002	<0.0002		0.0006	<0.0002		0.0037 <0.0002	<0.004	<0.0002	<0.004	<0.0002	<0.0002	<0.0002 <0.0002	0.075	0.000	330 0.3	014 0.0015	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002 0.000	4 0.0002	<0.0002	<0.0002	<0.0002	
lissolved)	mg/l 0.00005 0.123	35	0.0046 3.6	31 3 	CP2APOOB_1D, -, 5.23m; WS2A14D, -, 2.58m; WS2A100_U, -, 5.66m; WS2A103_U, -, 1.90m; WS2A106_D, -, 1.00m; WS2A109_U, -, 4.47m; WS2A100_U, -, 4.60m; CP2APOOB_1D, -, 5.40m; WS2ALOB_1D, -, 0.99m; WS2A121_U, -, 2.00m; WS2A123_D, -, 3.30m; WS2A100_U, -, 4.50m; WS2A103_U, -, 1.80m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m; WS2A103_U, -, 1.86m; WS2A100_U, -, 4.64m; WS2ALOB_1D, -, 0.89m; CP2APOOB_1D, -, 5.31m; WS2A12U, -, 2.03m; WS2A14D, -, 2.67m; CP2ALCDE, -, 3.99m; WS2A121_U, -, 1.76m;	0.88	1.1	0.61	0.84	0.0077	3.3	0.98	0.2	0.93	0.65	1.3 1.6	0.005	1.6	0.0046	1.3	0.75	1.6 1.2	0.86	0.49	1.3 0.1	1.1	0.7	0.73	0.8	0.48	3.6 0.18	2.9	0.62	1.3	0.25	
lved)				0	WS2A123_D, -, 2.25m; WS2A124_U, -, 2.12m  WS2A121_U, -, 1.94m; WS2A123_D, -, 2.34m; WS2A124_U, -, 2.30m; CP2APOOB_1D, -, 5.23m; WS2A14D, -, 2.58m; WS2A100_U, -, 5.66m; WS2A103_U, -, 1.90m; WS2A106_D, -, 1.00m; WS2A109_U, -, 4.47m; WS2A100_U, -, 4.60m; CP2APOOB_1D, -, 5.40m; WS2ALOB_1D, -, 0.99m; WS2A121_U, -	10100000	10.00000									<0.00005 <0.00005																		<0.00005	<0.00005	
ved) solved)	mg/l 0.0005 0.004	25	20,0006 0,016	25	WS2A123_D, -, 3.40m; WS2ALOB_1D, -, 0.39m; WS2A121_U, -, 2.00m; WS2A123_D, -, 3.30m; WS2A100_U, -, 4.50m; WS2A103_U, -, 1.80m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m; WS2A103_U, -, 1.86m; WS2A100_U, -, 4.64m; CP2APOOB_1D, -, 5.31m; WS2A12U, -, 2.03m; WS2A14D, -, 2.67m; WS2A124_U, -, 2.12m	0.0048		0.0016	0.0038	0.0013	0.004	0.004	0.0021	0.045	0.012	0.2 0.012 0.016 0.0076	0.0009	0.0016	0.0017	0.017	0.0053	0.0088 0.01 0.009 0.0015	0.0034	0.0055	<0.0006 0.00	0.0085	0.0057	0.019	0.0034	0.0019	0.0059 0.04 0.0033 0.003	7 0.0025	0.0033	<0.0006	0.008	
solved)	mg/I 0.0005 No WS\ mg/I 0.0005 0.0109			14	WS2A121_U, -, 1.94m; WS2A123_D, -, 2.34m; WS2A124_U, -, 2.30m; CP2ALLCDE, -, 4.24m; CP2APOOB_1D, -, 5.23m; WS2A14D, -, 2.58m; WS2A106_D, -, 1.00m; WS2A109_U, -, 4.47m; CP2APOOB_1D, -, 5.40m; WS2A106_D, -, 1.00m; WS2A14D, -, 2.57m; WS2A106_D, -, 1.01m; WS2A12U, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D, -, 2.03m; WS2A14D,			0.0007		<0.0005	0.024	0.0004		0.0004		0.012 0.0004 0.16 0.014			0.0016	<0.0002		0.0005 0.0004 0.0037 0.0046						0.0011	<0.0002 0.0036		0.046 0.02		<0.0002 0.0018	<0.0002 0.0016	0.0005	
S	mg/l 0.001 0.01 mg/l 0.001 0.074 mg/l 0.001 0.02	35 35 35 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0 0	2.6/M	<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001	<0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 < 0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	
l Tertiary Butyl	mg/l         0.001         0.03           mg/l         0.001         0.03           mg/l         0.001         No WS\	35 35	<0.001 <0.001 <0.001 <0.001	0		<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001		<0.001 <0.001	<0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.0	001 <0.001 001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001		<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	
/drocarbons Aliphatic >C5 - C6			<0.001 <0.001	0		<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001			<0.001 <0.0		<0.001	<0.001	<0.001	<0.001	<0.001 <0.00		<0.001	<0.001	<0.001	
Aliphatic >C6 - C8  Aliphatic >C8 - C10  Aliphatic >C10 -	) mg/l 0.001 0.01	35	<0.001	1 1	WS2A100_U, -, 4.50m	<0.001 <0.001	<0.001	<0.001	<0.001 <0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001 <0.001 <0.001			<0.001 <0.0 <0.001 <0.0	+	<0.001	<0.001	<0.001	<0.001	<0.001 <0.00 <0.001 <0.00		<0.001	<0.001	<0.001	
Aliphatic >C12 -	mg/l 0.01 0.01 mg/l 0.01 0.01	35	<0.01 <0.01 <0.01 <0.01	0		<0.01	<0.01	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01 <0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01 <0.01 <0.01	<0.01		<0.01 <0. <0.01 <0.	01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.0 <0.01 <0.0	<0.01	<0.01	<0.01	<0.01	
Aliphatic >C21 -	mg/l 0.01 0.01 mg/l 0.01 0.01 ) mg/l 0.01 No WS\	35	<0.01 0.02 <0.01 0.15 <0.01 0.17	+	CP2APOOB_1D, -, 5.23m CP2APOOB_1D, -, 5.23m	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	0.02 0.15 0.17	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01	<0.01 <0.01 <0.01 <0.01 <0.01 <0.01	<0.01	<0.01 <0.01 <0.01	<0.01 <0. <0.01 <0. <0.01 <0.	01 <0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01 <0.0 <0.01 <0.0	<0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	<0.01 <0.01 <0.01	
Aromatic >C5 - C7	mg/l 0.001 0.01	35	<0.001			<0.001 <0.001 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001 <0.001 <0.001 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001	<0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001	<0.001	<0.001	<0.001	
Aromatic >C8 -	mg/l 0.001 0.01	35	<0.001		WS2A100_U, -, 4.50m	<0.001 <0.001 <0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001 <0.001 <0.001 <0.01 <0.01	0.014	<0.001	<0.001 <0.0 <0.001 <0.0	001 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.00 <0.001 <0.00	1 <0.001	<0.001	<0.001	<0.001	<u> </u>
Aromatic >C12 -	mg/l 0.01 0.01	35	<0.01 <0.01	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01	<0.01	<0.01	<0.01 <0.	01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.0	<0.01	<0.01	<0.01	<0.01	
Aromatic >C21 -	mg/l 0.01 0.01	35	<0.01 <0.01 <0.01 <0.01	0		<0.01 <0.01	<0.01	<0.01	<0.01 <0.01	<0.01	<0.01	<0.01	<0.01			<0.01 <0.01 <0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01 <0.01 <0.01	<0.01	<0.01	<0.01 <0. <0.01 <0.		<0.01	<0.01	<0.01	<0.01	<0.01 <0.0 <0.01 <0.0	<0.01	<0.01	<0.01	<0.01	
e e e e e e e e e e e e e e e e e e e	mg/l 0.001 No WS\	/ 35	<0.01 0.014			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.01 <0.01 <0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0.01 <0.001 <0.001	<0.001	<0.001	<0.01 <0.	001 <0.001	<0.01	<0.01	<0.01	<0.01	<0.01 <0.00 <0.001 <0.00	1 <0.001	<0.01	<0.01	<0.01	
methane	mg/l 0.001 N/A	35 35 25	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0		<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	< 0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 <0.001 001 <0.001	<0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	
nene -1,2,2-	mg/l 0.001 No WS\ mg/l 0.001 No WS\ mg/l 0.001 No WS\	/ 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0		<0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001	<0.001 <0.001	<0.001		<0.001 <0.001 <0.001 <0.001	<0.001	<0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001	<0.001 <0.0 <0.001 <0.0			<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.00 <0.001 <0.00	1 <0.001	<0.001	<0.001	<0.001	
Tertiary Butyl		/ 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0		<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001	<0.001	<0.001 <0.0	001     <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	
opane ine ethane	mg/l 0.001 No WS\ mg/l 0.001 0.0025	35	<0.001 <0.001	0		<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 <0.001 001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	
pene oroethene	mg/l         0.001         0.01           mg/l         0.001         No WS\           mg/l         0.001         No WS\           mg/l         0.001         0.01	/ 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0		<0.001 <0.001 <0.001 <0.001		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001			<0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 < 0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	
thane opane e	mg/l 0.001 N/A mg/l 0.001 N/A	35 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.00 <0.001 <0.0 <0.001 <0.0	001 <0.001 001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	
ne methane	mg/l   0.001   No WS\    mg/l   0.001   See     mg/l   0.001   Trihalomet					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.001 <0.001 <0.001	<0.001		<0.001 <0.0	001 <0.001		<0.001	<0.001	<0.001	<0.001 <0.00 <0.001 <0.00		<0.001	<0.001	<0.001	
opropene oropropene	mg/l 0.001 No WS\ mg/l 0.001 No WS\ mg/l 0.001 0.074	/ 35 / 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0 0		<0.001 <0.001		<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001			<0.001 <0.0 <0.001 <0.0 <0.001 <0.0			<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	
ethane pane	mg/l 0.001 0.4 mg/l 0.001 No WS\ See	35 / 35	<0.001 <0.001 <0.001 <0.001	0 0		<0.001 <0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.0 <0.001 <0.0	001 <0.001 001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	
methane ene	mg/l         0.001         Trihalomet es           mg/l         0.001         0.01           mg/l         0.001         N/A		<0.001 <0.001 <0.001 <0.001			<0.001		<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001 <0.001 <0.001	<0.001	<0.001	<0.001		<0.001		<0.001	<0.001	<0.001 <0.0 <0.001 <0.0	001 <0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <0.00 <0.001 <0.00	1 <0.001	<0.001	<0.001	<0.001	
loroethane	mg/l         0.001         No WS\           mg/l         0.001         No WS\           mg/l         0.001         0.02	/ 35 / 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0 0		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001		<0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 < 0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	+
ne	mg/l         0.001         0.03           mg/l         0.001         0.05           mg/l         0.001         No WS\	35 35 / 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0 0 0		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 <0.001 001 <0.001 001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	
loroethane ne	mg/l         0.001         0.03           mg/l         0.001         No WS\           mg/l         0.001         No WS\           mg/l         0.001         No WS\	/ 35 / 35 / 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0 0		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 <0.001 001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	
ne e	mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN           mg/l         0.001         No WSN	/ 35 / 35 / 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0 0 0		<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001     <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001 1 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	
rlbenzene ene rlbenzene	mg/l 0.001 No WS\ mg/l 0.001 No WS\ mg/l 0.001 No WS\ mg/l 0.001 No WS\	/ 35 / 35	<0.001 <0.001 <0.001 <0.001 <0.001 0.0138	0 0 0		<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 0.0138	<0.001 <0.001 <0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 <0.001 001 <0.001 001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	
ene enzene uene enzene	mg/l 0.001 0.02	/ 35 / 35 / 35	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	0 0 0		<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	< 0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0.001	< 0.001	<0.001 <0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001 <0.001 001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001		<0.001 <0.00 <0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<u></u>
enzene	mg/I 0.001 0.02 mg/I 0.001 No WS\	35 / 35 35	<0.001 <0.001	0 0		<0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	<0.001 <0.001	<0.001	<0.001 <0.0 <0.001 <0.0 <0.001 <0.0 <0.001 <0.0	001     <0.001	<0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.00 <0.001 <0.00 <0.001 <0.00 <0.001 <0.00	1 <0.001 1 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	#
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2 MI	Isophorone	mg/l 0.00005 No WSV 35 <0.000	005 <0.00005 0			< 0.00005	<0.0005 <0.000	5 <0.00005	<0.00005	<0.0005	< 0.00005	<0.00005 <0.0	00005 < 0.0000	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	< 0.00005	< 0.00005	<0.0005 <0.000	005 <0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 <0.000	05 <0.00005	<0.00005 <	0.00	0005 < 0.00005 < 0	0005 < 0.00005   < 0.00005   < 0.0	0005 < 0.00005   < 0.00005   < 0.00005	0005 < 0.00005   < 0.00005   < 0.00005   < 0.00005	0005 < 0.00005
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	Bis(2-chloroethoxy)methane	mg/l 0.00005 No WSV 35 <0.000	005 <0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	< 0.00005	<0.00005	<0.00005	<0.00005 <0.0	0.00005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	< 0.00005	<0.00005 <0.000	005 < 0.00005	< 0.00005 < 0.00005	<0.00005 <	0.00005 < 0.00	005 <0.000	05 <0.00005	<0.00005 <	0.00005	<0.00005 <0	<0.00005 <0.00005 <0.0	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005 <0.00007
	1,2,4-Trichlorobenzene	mg/l 0.00005 No WSV 35 <0.000	005 <0.00005 0			<0.00005	<0.0005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	0.0005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 <0.000	05 <0.00005	<0.00005 <	0.00005	<0.00005 <0	<0.00005 <0.00005 <0.0	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005	< 0.00005 < 0.00005 < 0.00005 < 0.00005 < 0.00005
	Naphthalene	mg/l 0.00001 0.002 35 <0.000	001 <0.00001 0			<0.00001	<0.00001 <0.000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	00001 < 0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.00001	<0.00001	< 0.00001	<0.0001 <0.000	001 < 0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 < 0.00	001 < 0.000	01 <0.00001	<0.00001 <	0.00001 <0.0	00001 <	00001 <0.00001 <0.0	00001 <0.00001 <0.00001	00001 <0.00001 <0.00001 <0.00001	00001 <0.00001 <0.00001 <0.00001 <0.00001
Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part	2,4-Dichlorophenol	111g/1 0.00000 0.0012 00 (0.000	005   <0.00005   0			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	00005 < 0.0000	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 < 0.000	05 <0.00005	10.00003	0.00005 < 0.00	005 <	005 < 0.00005 < 0.0	005 <0.00005 <0.00005	005 < 0.00005 < 0.00005 < 0.00005	005 <0.00005 <0.00005 <0.00005 <0.00005
	4-Chloroaniline	111g/1 0.00000 110 110 0	005 < 0.00005   0			<0.00005	<0.00005 <0.000	5 < 0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	0.0000	5 < 0.00005 < 0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	0.00005	<0.00005 <0.00005	<0.00005   <	0.00005 < 0.00	<0.000	05 < 0.00005	10.00005	0.00005   <0.00	0005 <	0005 < 0.00005   < 0.00	0005 < 0.00005   < 0.00005	0005 < 0.00005   < 0.00005   < 0.00005	0005 < 0.00005 < 0.00005 < 0.00005 < 0.00005
Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate   Separate	Hexachlorobutadiene	mg/ didded didded	005 < 0.00005 0			<0.00005	<0.0005 <0.000	5 < 0.00005	<0.00005	<0.00005	<0.00005	<0.00005 < 0.0	0.0000	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	0.00005	<0.00005   <0.00005	<0.00005 <	0.00	0.000	0.00005	<0.00005	0.00005   < 0.0000	15 <1	05 < 0.00005   < 0.0	05 <0.00005 <0.00005	0.00005   <0.00005   <0.00005   <0.00005	0.00005
	2.4.6 Trichlorophonol	111g/1 0.00000 0.01 00 \(\frac{1}{2.000}\)	005 <0.0005 0			<0.00005	<0.0005 <0.000	5 <0.00005	<0.00005	<0.0005	<0.00005	<0.00005 <0.0	0.0000	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.0005	<0.00005	<0.0005 <0.000	0.00005	<0.00005	<0.00005	0.00	0.000	05 <0.00005	<0.00005	0.00005 <0.00005	<1	<0.00005 <0.0	<0.0000 <0.0005	<0.00005 <0.00005 <0.00005 <0.00005 <0.00005	<0.00005
Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property			005 < 0.00005 0		+ +	<0.00005	< 0.00005 < 0.000 < 0.000	5 <0.00005	<0.00005	<0.00005	<0.00005 <0.00005	<0.00005 <0.0	00003 <0.0000	5 <0.00005 <0.	000005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 <0.00005	< 0.00003 < 0.00005	<0.00005	0.00003 <0.00	005 <0.000	05 <0.00005	<0.00005	0.00003 <0.00005	<u> </u>	<0.00005 <0.0	<0.00005 <0.00005	<0.00005	<0.00005
	, ,-		005 < 0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0		- 10.00000	00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005	0.00005 < 0.00	005 < 0.000	05 <0.00005	10.00005	0.00005 < 0.00005	-(	10.00005 <0.0	0.00005 <0.00005	10.00005 <0.00005 <0.00005	10 00005
Methylan   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol   15500   Pol	2-Chloronaphthalene	g.: 0.00000 110 110 1	005 <0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	10.0000	5 <0.00005 <0.	00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005	0.00005 <0.00	005 < 0.000	05 <0.00005	10.00003	0.00005 <0.00005	<u>ე</u>	00005 <0.0	00005 <0.00005	00005 <0.00005 <0.00005	00005 <0.00005 <0.00005 <0.00005
Part   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960   1960	Dimethylphthalate	mg/l 0.00005 0.8 35 <0.000	005 < 0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	00005 < 0.00005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 < 0.000	05 <0.00005	<0.00005	0.00005 < 0.00005	0.00	0005 <0.0	0005 < 0.00005	0005 < 0.00005 < 0.00005	0005 < 0.00005 < 0.00005 < 0.00005
Part   Part   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000	2,6-Dinitrotoluene		005 < 0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	< 0.00005	<0.00005	<0.00005	<0.00005 <0.0	00005 < 0.0000	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	< 0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 <0.000	05 <0.00005	<0.00005 <	0.00005 < 0.00005	0.000	05 <0.0	05 <0.00005	05 <0.00005 <0.00005	05 <0.00005 <0.00005 <0.0000
Part   Part   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000   See   Part   1,000	Acenaphthylene	mg/l 0.00001 See BaP 35 <0.000	001 <0.00001 0			< 0.00001	<0.00001 <0.000	1 <0.00001	< 0.00001	<0.00001	< 0.00001	<0.00001 <0.0	00001 < 0.00003	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.00001	<0.00001	< 0.00001	<0.0001 <0.000	001 < 0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 < 0.00	001 <0.000	01 <0.00001	<0.00001 <	0.00001 < 0.00001	0.000	001 <0.0	001 <0.00001	001 <0.00001 <0.00001	001 <0.00001 <0.00001 <0.00001
referred per per per per per per per per per per	Acenaphthene	mg/l 0.00001 See BaP 35 <0.000	001 <0.00001 0			<0.00001	<0.0001 <0.000	1 <0.00001	< 0.00001	<0.00001	< 0.00001	<0.00001 <0.0	00001 < 0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.00001	<0.00001	< 0.00001	<0.0001 <0.000	001 <0.00001	< 0.00001 < 0.00001	<0.00001 <	0.00001 < 0.00	001 <0.000	01 <0.00001	<0.00001 <	0.00001 < 0.00001	0.0	0001 <0.0	0001 <0.00001	0001 <0.00001 <0.00001	0001 <0.00001 <0.00001 <0.00001
Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part	2,4-Dinitrotoluene		005 <0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	0.0005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.0005 <0.000	0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 < 0.000	05 <0.00005	<0.00005 <	0.00005 < 0.00005	ე.	00005 <0.0	00005 < 0.00005	00005 <0.00005 <0.00005	00005 <0.00005 <0.00005 <0.00005
	Dibenzofuran	mg/l 0.00005 No WSV 35 <0.000	005 <0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	00005 < 0.00005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 < 0.000	05 <0.00005	<0.00005 <	0.00005 < 0.00005	0.0	00005 <0.0	00005 <0.00005	0005 <0.00005 <0.00005	0005 < 0.00005 < 0.00005 < 0.00005
Part   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000	4-Chlorophenyl phenyl ether	mg/l 0.00005 No WSV 35 <0.000	005 <0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	00005 < 0.00005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 <0.000	05 <0.00005	<0.00005 <	0.00005 < 0.00005	).(	00005 <0.0	00005 <0.00005	00005 <0.00005 <0.00005	00005 <0.00005 <0.00005 <0.00005
Part   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000   10,0000	Diethyl phthalate	mg/l 0.00005 No WSV 35 <0.000	005 < 0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	00005 < 0.0000	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 < 0.000	05 < 0.00005	<0.00005 <	0.00005 < 0.00005	0.0	00005 <0.0	00005 <0.00005	0005 <0.00005 <0.00005	00005 <0.00005 <0.00005 <0.00005
Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Process   Proc	4-Nitroaniline	mg. states no hours	005 < 0.00005 0			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	0.0005 < 0.00005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005 <	0.00005 < 0.00	005 <0.000	05 <0.00005	<0.00005 <	0.00005 < 0.00005	0.00	0005 <0.0	0005 <0.00005	0005 < 0.00005 < 0.00005	0005 <0.00005 <0.00005 <0.00006
Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part	Azobenzene	mg/l 0.00001 N/A 35 <0.000	001 < 0.00001		+ + +					<0.0000	<0.0001	<0.00001 <0.0	00001 <0.0000 00001 <0.0000	1 <0.00001 <0.	00007 <0.0000	7 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<0.0001	<0.0001	<0.0001	<0.0001 <0.000	002 <0.0000E	<pre>&lt; 0.00001</pre>	<0.00001	0.0001 <0.00 0.00001 <0.00	001 <0.000	07 <0.0001	<0.0001	0.00001 <0.00001	).UL	0001 <0.0	0001 <0.00001 -0.0005	0001 <0.00001 <0.00001 0005 <0.00005 <0.00005	0001 <0.00001 <0.00001 <0.00001 0005 <0.00005 <0.00005 <0.00005
	Bromophenyl phenyl ether	mg/l 0.00005 No WSV 35 <0.000	005 < 0.00005 0		<del>-   -  </del>			5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00003 <0.0	00005 <0.00005 00005 <0.000005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	0.00003	<0.00005 <0.00005	<0.00005	0.00005 < 0.00 0.00005 < 0.00	0.000	05 <0.00005	<0.00005	0.00005 <0.00005	) N	0005 <0.0	10.0000	0005 <0.00005 <0.00005	
Appliance   mg/I   0.00006   mg/I   0.00006   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005	Hexachlorobenzene	ma// 1 0 00005 1 0 00005 1 35 1/0 000	005 1 / 0 00005 1 0 1		+ +	<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	00005 < 0.0000	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005	0.00005 <0.00	005 < 0.000	05 <0.00005	<0.00005	0.00005 < 0.00005	ე.ი	0005 <0.0			
Appliance   mg/I   0.00006   mg/I   0.00006   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005	Phenanthrene	mg/l 0.00001 See BaP 35 <0.000	001 <0.00001 0			<0.00001	<0.00001 <0.000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	00001 < 0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.000	001 < 0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 < 0.00	001 < 0.000	01 <0.00001	<0.00001 <	0.00001 < 0.00001	-	00001 <0.0			
Appliance   mg/l   0.00006   mg/l   0.00006   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005	Anthracene	mg/L 0.00001 0.0001 35 <0.000	001 <0.00001 0			<0.00001	<0.0001 <0.000	1 <0.00001	<0.00001	<0.0001	<0.00001	<0.00001 <0.0	00001 < 0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.0001	<0.00001	<0.00001	<0.00001 <0.000	001 < 0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 < 0.00	001 <0.000	01 <0.00001	<0.00001 <	0.00001 <0.00001	(		0.00001 <0.00001	0.00001 <0.00001 <0.00001	0.00001 <0.00001 <0.00001 <0.00001
Appliance   mg/l   0.00006   mg/l   0.00006   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005   0.00005	l Carbazole	mg/l 0.00005 No WSV 35 <0.000	005 <0.00005 0			< 0.00005	<0.0005 <0.000	5 <0.00005	<0.00005	<0.0005	< 0.00005	<0.00005 <0.0	0.00005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	< 0.00005	<0.00005	< 0.00005	<0.0005 <0.000	005 < 0.00005	<0.00005 <0.00005	<0.00005 <	0.0005 <0.00	005 < 0.000	05 <0.00005	<0.00005 <	0.00005 < 0.00005	(	(0.00005 <0.0	0.00005 <0.00005	0.00005 < 0.00005 < 0.00005	0.00005 < 0.00005 < 0.00005 < 0.00005
	Dibutyl phthalate	mg/l   0.00005   0.008   35   <0.000	005 1 < 0 00005 1 0 1			<0.00005	<0.00005 <0.000	< 0.00005	<0.00005	<0.00005	< 0.00005	<0.00005 <0.0	0.00005	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	< 0.00005	<0.00005	< 0.00005	<0.00005 <0.000	005 < 0.00005	< 0.00005 < 0.00005	<0.00005 <	0.00005 < 0.00	005 < 0.000	<0.00005	<0.00005 <	0.00005 < 0.00005	:(	<0.00005 <0.0	<0.00005 <0.00005	<0.00005 <0.00005 <0.00005	<0.00005 <0.00005 <0.00005 <0.00005
	Anthraquinone	mg/I 0.00005 No WSV 35 <0.000	<del>- 1                                   </del>			<0.00005	<0.00005 <0.000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.0	0.0000	5 <0.00005 <0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005	<0.00005 <	0.00005 <0.00	005 < 0.000	05 <0.00005	<0.00005 <	0.00005 < 0.00005		0.00005 < 0.0			
	Fluoranthene	100//	001 L<0 00001 L			<0.00001	<0.00001 <0.000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	00001 < 0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.00001	<0.0001	< 0.00001	<0.0001 <0.000	001 < 0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 < 0.00	001 < 0.000	01 <0.00001	<0.00001 <	0.00001 < 0.00001		0.00001 <0.0	(0.00001		(0.00001
	Pyrene	mg/l   0.00001   N/A   35   <0.000	001 < 0.00001 0			<0.00001	<0.00001 <0.000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	00001 <0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.000	001 < 0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 <0.00	001 <0.000	01 <0.00001	<0.00001 <	0.00001 < 0.00001	)	.00001 <0.0			
	Butyl benzyl phthalate	mg/l 0.00005 No WSV 35 <0.000	005 < 0.00005   0			<0.00005	<0.00005 <0.000	5 < 0.00005	<0.00005	<0.00005	<0.00005	<0.00005   <0.0	0.0000	5 < 0.00005 < 0.	.00005 <0.0000	5 <0.00005	<0.00005	<0.00005	<0.00005	<0.00005 <0.000	005 < 0.00005	<0.00005   <0.00005	<0.00005   <					0.00005   <0.00005	(	(0.00005 < 0.0	<0.00005 <0.00005	<0.00005 <0.00005 <0.00005	10.00000
	Benzo(a)anthracene	mg/l 0.00001 See BaP 35 <0.000	001 <0.00001 0		<del>                                     </del>	<0.00001	<0.0001 <0.000	1 <0.00001	<0.0001	<0.00001	<0.00001	<0.00001 <0.0	0.00001 <0.00003	1 <0.00001 <0.	.00001 .0000	1 <0.0001	<0.00001	<0.00001	<0.00001	<0.0001 <0.000	0.00001	<0.00001 <0.00001	<0.00001	0.00001   <0.00	001   <0.000	01 <0.00001	<0.00001	0.00001 <0.00001		0.00001 <0.0	0.00001 <0.00001	0.00001 <0.00001 <0.00001 0.00001 <0.00001 <0.00001	0.00001         <0.00001         <0.00001         <0.00001           0.00001         <0.00001
	Renzo(h)fluoranthene	mg/l 0.00001 5ee bar 35 <0.000	001 < 0.00001		+ +	<0.00001 <0.00001	<0.00001 <0.000	1 <0.00001	<0.00001 <0.00001	<0.0001	<0.0001 <0.0001	<0.00001 <0.0	00001 <0.0000.	1 <0.00001 <0.	00001 <0.0000	1 <0.0001	< 0.00001 < 0.00001	<0.0001 <0.00001	<0.00001 <0.00001	<0.0001 <0.000	001 <0.00001	< 0.00001	<0.00001 <	0.00001 <0.00	001 <0.000	01 <0.00001	<0.0001	0.00001 \0.00001	1	0.00001 <0.0 0.00001 <0.0	0.00001 <0.00001 0.00001 <0.00001	0.00001 <0.00001 <0.00001 0.00001 <0.00001 <0.00001	0.00001 <0.00001 <0.00001 <0.00001 0.00001 <0.00001 <0.00001 <0.00001
$ \left[ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Benzo(k)fluoranthene					<0.00001	<0.00001 <0.000	1 <0.00001	<0.00001	<0.0001	<0.0001	<0.00001 <0.0	00001 <0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.0001	<0.0001	<0.00001	<0.00001	<0.00001 <0.000	001 <0.00001	<0.00001 <0.00001	<0.0001								0.00001 <0.00001	0.00001 <0.00001 <0.00001	0.00001 <0.00001 <0.00001 <0.00001
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Benzo(a)pyrene	mg/l 0.00001 0.00000017 35 <0.000	001 l <0.00001 l 0 l		+ +	<0.00001	<0.00001 <0.000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	00001 < 0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.0001 <0.000	001 <0.00001	<0.00001   <0.00001	< 0.00001	0.00001 < 0.00	001 < 0.000	01 <0.00001	<0.00001	0.00001 < 0.00001	)	.00001 <0.0	.00001 <0.00001	.00001 <0.00001 <0.00001	.00001 <0.00001 <0.00001 <0.00001
z(a,h)anthracene mg/l 0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.00001 <0.000	Indeno(1,2,3-cd)pyrene					<0.00001	<0.00001 <0.000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.0	00001 < 0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.00001	<0.00001	<0.00001	<0.00001 <0.000	001 < 0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 < 0.00	001 < 0.000	01 <0.00001	<0.00001	0.00001 < 0.00001	0.0	00001 <0.0	00001 <0.00001	00001 <0.00001 <0.00001	00001 <0.00001 <0.00001 <0.00001
0.00001   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00001$   $0.00$	Dibenz(a,h)anthracene	mg/l 0.00001 N/A 35 <0.000	001 <0.00001 0			<0.00001	<0.0001 <0.000	1 <0.00001	<0.00001	<0.00001	<0.0001	<0.00001 <0.0	00001 < 0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.0001	<0.00001	<0.00001	<0.00001 <0.000	001 < 0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 < 0.00	001 <0.000	01 <0.00001	<0.00001 <	0.00001 <0.00001	0.00	0001 <0.0	0001 <0.00001	0001 <0.00001 <0.00001	0001 <0.00001 <0.00001 <0.00001
	Benzo(ghi)perylene	mg/l 0.00001 0.0000082 35 <0.000	001 <0.00001 0			< 0.00001	<0.0001 <0.000	1 <0.00001	< 0.00001	<0.00001	<0.00001	<0.00001 <0.0	00001 < 0.0000	1 <0.00001 <0.	.00001 <0.0000	1 <0.00001	<0.0001	<0.00001	<0.0001	<0.0001 <0.000	001 < 0.00001	<0.00001 <0.00001	<0.00001 <	0.00001 < 0.00	001 < 0.000	01 <0.00001	<0.00001 <	0.00001 < 0.00001	0.000	0.0	01 <0.00001	01 <0.00001 <0.00001	01 <0.00001 <0.00001 <0.00001

Measured Cu Concentration (dissolved) (µg Γ¹)	Measured Zn Concentration (dissolved) (µg Γ ¹ )	Measured Mn Concentration (dissolved) (µg Γ¹)	Measured Ni Concentration (dissolved) (µg l ⁻¹ )	рН	DOC	Ca	Site-specific PNEC Dissolved Copper (µg I ⁻¹ )	BioF	Bioavailable Copper Concentration (μg l	Risk Characterisation Ratio
15				5.8	10	60	11.41	0.09	1.31	1.31
15				6	10	60	11.41	0.09	1.31	1.31
15				6.2	10	60	12.43	0.08	1.21	1.21
15				8.4	10	60	16.49	0.06	0.91	0.91
15				8.7	10	60	14.79	0.07	1.01	1.01
15				8.5	10	60	14.79	0.07	1.01	1.01
15				7	10	3	38.40	0.03	0.39	0.39
15				7	10	3.1	38.41	0.03	0.39	0.39
15				7	10	3.3	38.42	0.03	0.39	0.39
15				7	10	92	42.53	0.02	0.35	0.35
15				7	10	93	42.57	0.02	0.35	0.35
15				7	10	95	42.57	0.02	0.35	0.35
15				7	10	60	41.21	0.02	0.36	0.36
15				7	11	60	44.30	0.02	0.34	0.34
15				7	12	60	46.80	0.02	0.32	0.32
15				7	13	60	48.59	0.02	0.31	0.31
15				7	14	60	49.59	0.02	0.30	0.30
15				7	15	60	49.68	0.02	0.30	0.30
15				7	16	60	49.68	0.02	0.30	0.30
15				7	17	60	49.68	0.02	0.30	0.30
	15			5.9	10	60	11.41	0.09		
	15			6	10	60	11.41	0.09		

15			6.1	10	60	11.12	0.09	
15			7.9	10	60	34.24	0.03	
15			8	10	60	30.40	0.03	
15			8.2	10	60	22.64	0.04	
15			7	10	2.9	38.40	0.03	
15			7	10	3	38.40	0.03	
15			7	10	3.2	38.41	0.03	
15			7	10	158	42.57	0.02	
15			7	10	160	42.57	0.02	
15			7	10	162	42.57	0.02	
	80		5.4	10	60	1.00	0.09	
	80		5.5	10	60	11.41	0.09	
	80		5.6	10	60	11.41	0.09	
	80		8.4	10	60	16.49	0.06	
	80		8.5	10	60	14.79	0.07	
	80		8.7	10	60	14.79	0.07	
	80		7	10	0.9	38.28	0.03	
	80		7	10	1	38.29	0.03	
	80		7	10	1.2	38.30	0.03	
	80		7	10	199	42.57	0.02	
	80		7	10	200	42.57	0.02	
	80		7	10	202	42.57	0.02	
		10	6.4	10	60	18.32	0.05	
		10	6.5	10	60	22.24	0.04	
		10	6.6	10	60	26.42	0.04	
		10	8.6	10	60	14.79	0.07	

		10	8.7	10	60	14.79	0.07	
		10	8.8	10	60	14.79	0.07	
		10	7	10	1.9	38.34	0.03	
		10	7	10	2	38.35	0.03	
		10	7	10	2.1	38.35	0.03	
		10	7	10	87	42.34	0.02	
		10	7	10	88	42.38	0.02	
		10	7	10	89	42.42	0.02	
		10	7	15	60	49.68	0.02	
		10	7	20	60	49.68	0.02	
		10	7	21	60	49.68	0.02	
		10	7	16	60	49.68	0.02	
15			7	15	60	49.68	0.02	
15			7	16	60	49.68	0.02	
15			7	18	60	49.68	0.02	
15			7	20	60	49.68	0.02	
	80		7	15	60	49.68	0.02	
	80		7	16	60	49.68	0.02	
	80		7	18	60	49.68	0.02	
	80		7	20	60	49.68	0.02	
	80		7	21	60	49.68	0.02	
15			7	21	60	49.68	0.02	
25			7	10	60	41.21	0.02	
40			6.6	10	60	26.42	0.04	

Site-specific PNEC Dissolved Zinc (µg I ⁻¹ )	BioF	Bioavailable Zinc Concentration (μg l [°]	Risk Characterisation Ratio
19.90	0.55		
22.47	0.49		
25.04	0.44		
53.30	0.20		
57.16	0.19		
54.59	0.20		
41.90	0.26		
41.83	0.26		
41.69	0.26		
34.38	0.32		
34.35	0.32		
34.31	0.32		
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31		
21.19	0.51	7.72	0.71
22.47	0.49	7.28	0.67

23.75	0.46	6.88	0.63
46.88	0.23	3.49	0.32
48.17	0.23	3.39	0.31
50.73	0.21	3.22	0.30
41.98	0.26	3.89	0.36
41.90	0.26	3.90	0.36
41.76	0.26	3.92	0.36
33.19	0.33	4.93	0.45
33.16	0.33	4.93	0.45
33.13	0.33	4.93	0.45
14.76	0.74		
16.05	0.68		
17.33	0.63		
53.30	0.20		
54.59	0.20		
57.16	0.19		
44.55	0.24		
44.32	0.25		
43.92	0.25		
32.68	0.33		
32.67	0.33		
32.65	0.33		
27.61	0.39		
28.89	0.38		
30.18	0.36		
55.87	0.20		

57.16	0.19		
58.44	0.19		
42.91	0.25		
42.80	0.25		
42.69	0.26		
34.50	0.32		
34.48	0.32		
34.45	0.32		
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31	4.63	0.42
35.32	0.31	4.63	0.42
35.32	0.31	4.63	0.42
35.32	0.31	4.63	0.42
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31		
35.32	0.31	4.63	0.42
35.32	0.31	7.72	0.71
30.18	0.36	14.45	1.33

Site-specific PNEC Dissolved Manganese (μg Γ	BioF	Bioavailable Manganese Concentration (μg Γ	Risk Characterisation Ratio
2124.20	0.06		
2134.94	0.06		
2144.58	0.06		
123.00	1.00		
123.00	1.00		
123.00	1.00		
146.69	0.84		
153.84	0.80		
167.85	0.73		
1521.55	0.08		
1521.55	0.08		
1521.55	0.08		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
2129.72	0.06		
2134.94	0.06		

2139.89	0.06		
144.53	0.85		
123.00	1.00		
123.00	1.00		
139.45	0.88		
146.69	0.84		
160.89	0.76		
1521.55	0.08		
1521.55	0.08		
1521.55	0.08		
2098.77	0.06	4.69	0.04
2105.69	0.06	4.67	0.04
2112.22	0.06	4.66	0.04
123.00	1.00	80.00	0.65
123.00	1.00	80.00	0.65
123.00	1.00	80.00	0.65
123.00	1.00	80.00	0.65
123.00	1.00	80.00	0.65
123.00	1.00	80.00	0.65
1521.55	0.08	6.47	0.05
1521.55	0.08	6.47	0.05
1521.55	0.08	6.47	0.05
2153.29	0.06		
2157.32	0.06		
2028.53	0.06		
123.00	1.00		

123.00	1.00		
123.00	1.00		
123.00	1.00		
123.00	1.00		
123.00	1.00		
1521.55	0.08		
1521.55	0.08		
1521.55	0.08		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14		
899.90	0.14	10.93	0.09
899.90	0.14	10.93	0.09
899.90	0.14	10.93	0.09
899.90	0.14	10.93	0.09
899.90	0.14	10.93	0.09
899.90	0.14		
899.90	0.14		
2028.53	0.06		



# Appendix G – Surface Water Screening Results

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Assessment Criteria :						Fres	hwater EQ	s	,		1								
CaCO (mg/l):			pH																
Calcium (mg/l):	54.75		DOC (mg/l)	38.22		Catch	ment area:	Thames		Location	2ASW1(S)	2ASW1(E)	2ASW1(E)	2ASW3(S)	2ASW3(S)	2ASW3(S)	2ASW4(S)	2ASW4(S)	2ASW4(S)
			<b>#</b>		Value	Value	ses			Sample ID	_ `		_		_	_	_ `	`	_
		Fig.	ic smeı a	er of les	E S	aximum 1	mber of ceedenc			Depth Date		0.00m 28/08/2018	0.00m 15/08/2018	0.00m 17/08/2018	0.00m 28/08/2018	0.00m 24/09/2018	0.00m 28/08/2018	0.00m 15/08/2018	0.00m 08/10/2018
	L It	Limit of Detection	Generic Assessn Criteria	Number	Minim	axim			Strata			_	_	_	_		_	_	_
Constituents pH	pH Units	N/A	6-9	9	7.1	<b>≥</b> 8.2	0 0	Locations of Exceedences		Zone	- 8	8.2	8.2	7.4	7.4	7.2	7.2	7.1	7.2
Total Cyanide Free Cyanide	mg/l mg/l	0.01	0.001 0.001	9	<0.01 <0.01	<0.01 <0.01	0				<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Sulphate as SO4 Sulphate as SO4	mg/l mg/l	0.045 0.045	400 400	9	8.36 8.4	40.4 40.4	0				40.4 40.4	32.4 32.4	9.59 9.6	13 13	9.53 9.5	14.9 14.9	8.36 8.4	19.2 19.2	35.2 35.2
Sulphide Ammoniacal Nitrogen as N	mg/l mg/l	0.005 0.015	No WSV No WSV	9	<0.005 0.055	0.56 5	0				<0.005 0.061	<0.005 0.14	<0.005 0.055	0.56 0.5	<0.005 3.2	<0.005 2.6	<0.005 2.9	<0.005 0.12	0.081
Ammonium as NH4	mg/l	0.015	Not appropriate,	9	0.071	6.4	0				0.078	0.18	0.071	0.64	4.1	3.4	3.7	0.15	6.4
	_		see Ammonia Not																
Ammonium as NH4	mg/l	0.015	appropriate, see Ammonia	9	0.071	0.15	0						0.071					0.15	
Dissolved Organic Carbon (DOC)	mg/l	0.1	No WSV	9	3.56	57.8	0				3.56	4.79	5.5	53.7	57.8	36.3	42.5	56.3	42.8
Nitrate as N Heavy Metals / Metalloids	mg/l	0.01	No WSV	9	0.18	6.93	0				5.96	6.93	1.72	0.23	0.3	0.19	0.23	0.18	1.19
Arsenic (dissolved) Boron (dissolved)	mg/l mg/l	0.00015	0.05 No WSV	9	0.00032	0.0114	0				0.0007	0.00032	0.00035	0.00061 0.23	0.0114 0.19	0.00228	0.00647 0.21	0.0034 0.27	0.00467 0.17
boron (dissolved)	mg/i	0.01	0.00008 -> CaCO3 0-	3	0.022	0.21					0.037	0.033	0.022	0.23	0.19	0.11	0.21	0.27	0.17
			50mg/l																
			0.00009 -> CaCO3 50-																
Cadmium (dissolved)	mg/l	0.00002	100mg/l 0.00015 ->	9	0.00002	0.00004	0				0.00003	<0.00002	<0.00002	0.00002	0.00004	<0.00002	<0.00002	<0.00002	<0.00002
			CaCO3 100- 200mg/l																
			0.00025 -> CaCO3																
Calcium (dissolved)	mg/l	0.012	200+mg/l No WSV	9	26	93	0		<u> </u>	<u>L</u> _	93	89	37	77	65	26	39	60	45
Chromium (hexavalent) Chromium (dissolved)	mg/l mg/l	0.005	No WSV 0.0034	9	<0.005 0.0002	<0.005	0				<0.005 0.0003	<0.005 0.0002	<0.005 0.0008	<0.005 0.0005	<0.005 0.0008	<0.005 0.0002	<0.005 0.0004	<0.005 0.0007	<0.005 <0.0002
Copper (dissolved)	mg/l	0.0005	0.001	9	<0.0005	0.0041	6	2ASW1(S), _, 0.00m; 2ASW1(E), _, 0.00m; 2ASW1(E), _, 0.00m;			0.0036	0.0034	0.0036	<0.0005	0.0023	0.0041	<0.0005	0.0009	0.0035
Iron (dissolved)	mg/l	0.004	1	9	<0.004	1.5	2	2ASW3(S), _, 0.00m; 2ASW3(S), _, 0.00m; 2ASW4(S), _, 0.00m 2ASW3(S), _, 0.00m; 2ASW4(S), _, 0.00m			0.019	<0.004	0.059	0.91	0.54	1.5	1.3	0.91	0.31
Lead (dissolved)	mg/l	0.0002	0.0012	9	0.0002	0.001	0				<0.0002	<0.0002	0.0003	0.001	0.001	<0.0002	0.0002	0.0005	0.0004
Manganese (dissolved)	mg/l	0.00005	0.123	9	0.00079	0.36	6	2ASW3(S), _, 0.00m; 2ASW3(S), _, 0.00m; 2ASW3(S), _, 0.00m; 2ASW4(S), _, 0.00m; 2ASW4(S), _, 0.00m; 2ASW4(S), _, 0.00m			0.0039	0.00079	0.0013	0.2	0.18	0.3	0.36	0.21	0.3
Mercury (dissolved) Nickel (dissolved)	mg/l mg/l	0.00005	0.00007 0.004	9	<0.00005 <0.0005	<0.00005 0.0069	0	2ASW3(S), _, 0.00m; 2ASW3(S), _, 0.00m			<0.00005 0.001	<0.0005 <0.0005	<0.00005 0.001	<0.00005 0.0036	<0.00005 0.0065	<0.00005 0.0069	<0.00005 0.002	<0.00005 0.0039	<0.00005 0.0029
Selenium (dissolved) Vanadium (dissolved)	mg/l mg/l	0.0006 0.0002	N/A No WSV	9	<0.0006	0.0022 0.0016	0	2A0W5(0), _, 0.00III, 2A0W5(0), _, 0.00III			0.0015	0.0007	<0.001 <0.0006 0.0012	0.0014 0.0012	0.0014 0.0016	0.0022	0.0015 0.0013	0.0013 0.0007	0.0019 0.0003
Zinc (dissolved)  Monoaromatics	mg/l	0.0005	0.0109	9	0.0035	0.031		2ASW1(E), _, 0.00m			0.0066	0.0054	0.031	0.0081	0.0035	0.0053	0.0015	0.0042	0.0044
Benzene	mg/l	0.001	0.01	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene Ethylbenzene	mg/l mg/l	0.001	0.074 0.02	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
p & m-xylene o-xylene	mg/l mg/l	0.001 0.001	0.03 0.03	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
MTBE (Methyl Tertiary Butyl Ether)	mg/l	0.001	No WSV	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Petroleum Hydrocarbons  TPH-CWG - Aliphatic > C5 - C6	mg/l	0.001	0.01	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TPH-CWG - Aliphatic >C6 - C8	mg/l	0.001	0.01	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TPH-CWG - Aliphatic >C8 - C10	mg/l	0.001	0.01	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TPH-CWG - Aliphatic >C10 -	mg/l	0.01	0.01	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
C12 TPH-CWG - Aliphatic >C12 -	mg/l	0.01	0.01	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
C16 TPH-CWG - Aliphatic >C16 -	mg/l	0.01	0.01	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
C21 TPH-CWG - Aliphatic >C21 -	mg/l	0.01	0.01	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
C35 TPH-CWG - Aliphatic (C5 -	-						0					<0.01					<0.01		
C35)	mg/l	0.01	No WSV	9	<0.01	<0.01				-	<0.01		<0.01	<0.01	<0.01	<0.01		<0.01	<0.01
TPH-CWG - Aromatic >C5 - C7	mg/l	0.001	0.01	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TPH-CWG - Aromatic >C7 - C8 TPH-CWG - Aromatic >C8 -	mg/l	0.001	0.01	9	<0.001	<0.001	0			-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
C10 TPH-CWG - Aromatic >C10 -	mg/l	0.001	0.01	9	<0.001	<0.001	0		-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
C12 TPH-CWG - Aromatic >C12 -	mg/l	0.01	0.01	9	<0.01	<0.01	0		-		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
C16 TPH-CWG - Aromatic >C16 -	mg/l	0.01	0.01	9	<0.01	<0.01	0		-		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
C21 TPH-CWG - Aromatic > C21 -	mg/l	0.01	0.01	9	<0.01	<0.01	0			-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
C35 TPH-CWG - Aromatic (C5 -	mg/l	0.01	0.01	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
C35) VOCs	mg/l	0.01	No WSV	9	<0.01	<0.01	0				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chloromethane Chloroethane	mg/l mg/l	0.001	No WSV No WSV	9	<0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Bromomethane Vinyl Chloride	mg/l mg/l	0.001	No WSV N/A	9	<0.001	<0.001	0				<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001
Trichlorofluoromethane 1,1-Dichloroethene	mg/l mg/l	0.001	No WSV No WSV	9	<0.001	<0.001 <0.001 <0.001	0				<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001
1,1,2-Trichloro-1,2,2-	mg/l	0.001	No WSV	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trifluoroethane Cis-1,2-dichloroethene	mg/l	0.001	No WSV	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MTBE (Methyl Tertiary Butyl Ether)	mg/l	0.001	No WSV	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-Dichloroethane 2,2-Dichloropropane	mg/l mg/l	0.001	No WSV No WSV	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Trichloromethane 1,1,1-Trichloroethane	mg/l mg/l	0.001 0.001	0.0025 0.1	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
1,2-Dichloroethane 1,1-Dichloropropene	mg/l mg/l	0.001 0.001	0.01 No WSV	9	<0.001 <0.001	<0.001 <0.001	0		L=	<u>L</u>	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Trans-1,2-dichloroethene Benzene	mg/l mg/l	0.001 0.001	No WSV 0.01	9	<0.001 <0.001	<0.001 <0.001	0			E	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Tetrachloromethane 1,2-Dichloropropane	mg/l mg/l	0.001	N/A N/A	9	<0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Trichloroethene Dibromomethane	mg/l mg/l	0.001	0.01 No WSV	9	<0.001	<0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
	9/1	3.001			. 5.001	3.001		•		•			.0.001			.0.001		.0.001	.3.001



Assessment Criteria :						Frest	water EQ	s											
CaCO (mg/l):	0.00		рН	7.50															
Calcium (mg/l):	54.75		DOC (mg/l)	38.22		Catchr	nent area:	Thames		Location	2ASW1(S)	2ASW1(E)	2ASW1(E)	2ASW3(S)	2ASW3(S)	2ASW3(S)	2ASW4(S)	2ASW4(S)	2ASW4(S)
			_ <u>_</u> _		Value	Value	se			Sample ID		_ `		_	_				
		- uo	smer c	er of	-	E I	r of dence			Depth Date	0.00m 25/09/2018	0.00m 28/08/2018	0.00m 15/08/2018	0.00m 17/08/2018	0.00m 28/08/2018	0.00m 24/09/2018	0.00m 28/08/2018	0.00m 15/08/2018	0.00m 08/10/2018
	¥	Limit of Detection	Generic Assessr Criteria	Number Samples	nimum	i i	Number Exceede		Strata		_	_	_	_	_	_	_	-	_
Constituents	Unit	ے ت	See	Sa	Ξ	Ĕ	ZÄ	Locations of Exceedences		Zone	-	_	_	_	_	_	_	_	
Bromodichloromethane	mg/l	0.001	Trihalomethan es	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cis-1,3-dichloropropene	mg/l	0.001	No WSV	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Trans-1,3-dichloropropene Toluene	mg/l mg/l	0.001	0.074	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
1,1,2-Trichloroethane 1,3-Dichloropropane	mg/l mg/l	0.001	0.4 No WSV	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Dibromochloromethane	mg/l	0.001	See Trihalomethan es	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tetrachloroethene 1,2-Dibromoethane	mg/l mg/l	0.001	0.01 N/A	9	<0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Chlorobenzene	mg/l	0.001	No WSV	9	<0.001	<0.001	0				< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001
1,1,1,2-Tetrachloroethane Ethylbenzene	mg/l mg/l	0.001	No WSV 0.02	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
p & m-Xylene Styrene	mg/l mg/l	0.001	0.03 0.05	9	<0.001 <0.001	<0.001 <0.001	0				<0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Tribromomethane	mg/l	0.001	No WSV	9	<0.001	<0.001	0				< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
o-Xylene 1,1,2,2-Tetrachloroethane	mg/l mg/l	0.001 0.001	0.03 No WSV	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Isopropylbenzene Bromobenzene	mg/l mg/l	0.001	No WSV No WSV	9	<0.001 <0.001	<0.001 <0.001	0		<del>                                     </del>	<del>                                     </del>	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
n-Propylbenzene 2-Chlorotoluene	mg/l mg/l	0.001 0.001	No WSV No WSV	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
4-Chlorotoluene	mg/l	0.001	No WSV	9	<0.001	<0.001	0				< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
1,3,5-Trimethylbenzene tert-Butylbenzene	mg/l mg/l	0.001	No WSV No WSV	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
1,2,4-Trimethylbenzene sec-Butylbenzene	mg/l mg/l	0.001	No WSV No WSV	9	<0.001	<0.001 <0.001	0		<u> </u>		<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
1,3-Dichlorobenzene	mg/l	0.001	No WSV	9	<0.001	<0.001	0				< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001
p-Isopropyltoluene 1,2-Dichlorobenzene	mg/l mg/l	0.001	No WSV 0.02	9	<0.001 <0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
1,4-Dichlorobenzene Butylbenzene	mg/l mg/l	0.001	0.02 No WSV	9	<0.001 <0.001	<0.001 <0.001	0		-		<0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
1,2-Dibromo-3-chloropropane 1,2.4-Trichlorobenzene	mg/l mg/l	0.001	N/A No WSV	9	<0.001	<0.001 <0.001	0				<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001
Hexachlorobutadiene	mg/l	0.001	0.0006	9	<0.001	<0.001	0				< 0.001	<0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,3-Trichlorobenzene SVOCs	mg/l	0.001	No WSV	9	<0.001	<0.001	0				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Aniline Phenol	mg/l mg/l	0.00005 0.00005	No WSV 0.0077	9	<0.00005 <0.00005	<0.00005 0.002	0		-		<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 0.00033	<0.00005 0.002	<0.00005 <0.00005	<0.00005 0.0011	<0.00005 <0.00005	<0.00005 <0.00005
2-Chlorophenol Bis(2-chloroethyl)ether	mg/l mg/l	0.00005	0.05 No WSV	9	<0.00005 <0.00005	<0.00005 <0.00005	0				<0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
1,3-Dichlorobenzene	mg/l	0.00005	No WSV	9	<0.00005	<0.00005	0				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00005	< 0.00005	<0.00005	< 0.00005
1,2-Dichlorobenzene 1,4-Dichlorobenzene	mg/l mg/l	0.00005 0.00005	0.02 0.02	9	<0.00005 <0.00005	<0.00005 <0.00005	0				<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
Bis(2-chloroisopropyl)ether 2-Methylphenol	mg/l mg/l	0.00005	No WSV No WSV	9	<0.00005 <0.00005	<0.00005 <0.00005	0		-		<0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
Hexachloroethane Nitrobenzene	mg/l mg/l	0.00005 0.00005	No WSV No WSV	9	<0.00005 <0.00005	<0.00005 <0.00005	0				<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
4-Methylphenol	mg/l	0.00005	No WSV	9	<0.00005	0.0066	0				< 0.00005	<0.00005	<0.00005	0.0021	0.0066	< 0.00005	0.0025	<0.00005	< 0.00005
Isophorone 2-Nitrophenol	mg/l mg/l	0.00005	No WSV No WSV	9	<0.00005 <0.00005	<0.00005 <0.00005	0				<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
2,4-Dimethylphenol Bis(2-chloroethoxy)methane	mg/l mg/l	0.00005	No WSV No WSV	9	<0.00005 <0.00005	<0.00005	0		-		<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
1,2,4-Trichlorobenzene Naphthalene	mg/l	0.00005	No WSV 0.002	9	<0.00005	<0.00005 <0.00001	0				<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001
2,4-Dichlorophenol	mg/l mg/l	0.00005	0.0042	9	<0.00005	<0.00005	0				< 0.00005	<0.00005	<0.00005	< 0.00005	<0.00005	< 0.00005	<0.00005	<0.00005	<0.00005
4-Chloroaniline Hexachlorobutadiene	mg/l mg/l	0.00005	0.0006	9	<0.00005 <0.00005	<0.00005 <0.00005	0		<u> </u>		<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
4-Chloro-3-methylphenol 2,4,6-Trichlorophenol	mg/l mg/l	0.00005	0.04 N/A	9	<0.00005	<0.00005 <0.00005	0		-		<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
2,4,5-Trichlorophenol	mg/l	0.00005	No WSV	9	<0.00005	<0.00005	0				< 0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00005	<0.00005	< 0.00005
2-Methylnaphthalene 2-Chloronaphthalene	mg/l mg/l	0.00005 0.00005	No WSV No WSV	9	<0.00005 <0.00005	<0.00005 <0.00005	0				<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
Dimethylphthalate 2,6-Dinitrotoluene	mg/l mg/l	0.00005 0.00005	0.8 No WSV	9	<0.00005 <0.00005	<0.00005 <0.00005	0		<del>                                     </del>	$\vdash$	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
Acenaphthylene Acenaphthene	mg/l mg/l	0.00001	See BaP See BaP	9	<0.00001	<0.00001	0				<0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001	<0.00001 <0.00001	<0.00001	<0.00001	<0.00001 <0.00001	<0.00001 <0.00001
2,4-Dinitrotoluene	mg/l	0.00005	No WSV	9	<0.00005	<0.00005	0				<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Dibenzofuran 4-Chlorophenyl phenyl ether	mg/l mg/l	0.00005 0.00005	No WSV No WSV	9	<0.00005 <0.00005	<0.00005 <0.00005	0				<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
Diethyl phthalate 4-Nitroaniline	mg/l mg/l	0.00005 0.00005	No WSV No WSV	9	<0.00005 <0.00005	<0.00005 <0.00005	0		$\vdash$	$\vdash \neg$	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
Fluorene Azobenzene	mg/l mg/l	0.00001	N/A No WSV	9	<0.00001 <0.00005	<0.00001 <0.00005	0				<0.00005 <0.00005	<0.00003 <0.00001 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00003 <0.00001 <0.00005	<0.00005 <0.00005	<0.00003 <0.00001 <0.00005	<0.00003 <0.00001 <0.00005	<0.00005 <0.00005
Bromophenyl phenyl ether	mg/l	0.00005	No WSV	9	< 0.00005	<0.00005	0				<0.00005	< 0.00005	<0.00005	<0.00005	< 0.00005	<0.00005	< 0.00005	< 0.00005	< 0.00005
Hexachlorobenzene Phenanthrene	mg/l mg/l	0.00005 0.00001	0.00005 See BaP	9	<0.00005 <0.00001	<0.00005 <0.00001	0				<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001	<0.00005 <0.00001
Anthracene Carbazole	mg/l mg/l	0.00001	0.0001 No WSV	9	<0.00001 <0.00005	<0.00001 <0.00005	0		<del>                                     </del>	$\vdash \neg$	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005
Dibutyl phthalate Anthraquinone	mg/l mg/l	0.00005 0.00005	0.008 No WSV	9	<0.00005 <0.00005	<0.00005 <0.00005	0				<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005	<0.00005 <0.00005
Fluoranthene	mg/l	0.00001	0.0000063	9	<0.00001	< 0.00001	0				< 0.00001	< 0.00001	<0.00001	< 0.00001	<0.00001	< 0.00001	<0.00001	<0.00001	< 0.00001
Pyrene Butyl benzyl phthalate	mg/l mg/l	0.00001	N/A No WSV	9	<0.00001 <0.00005	<0.00001 <0.00005	0		L		<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005	<0.00001 <0.00005
Benzo(a)anthracene Chrysene	mg/l mg/l	0.00001	See BaP See BaP	9	<0.00001	<0.00001 <0.00001	0			$\Box$	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001
Benzo(b)fluoranthene	mg/l	0.00001	0.000017	9	<0.00001	<0.00001	0				< 0.00001	< 0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.00001	<0.00001	< 0.00001
Benzo(k)fluoranthene Benzo(a)pyrene	mg/l mg/l	0.00001	0.000017 0.00000017	9	<0.00001	<0.00001 <0.00001	0				<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001
Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene	mg/l mg/l	0.00001	No WSV N/A	9	<0.00001	<0.00001 <0.00001	0		<del>                                     </del>	<del>                                     </del>	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001	<0.00001 <0.00001
Benzo(ghi)perylene	mg/l	0.00001	0.0000082	9	<0.00001	<0.00001	0				<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001



# Appendix H – Preliminary Waste Assessment

eB Reference: 133735-EWR-REP-EEN-000137 Rev: B02 Page 97 of 99

# **ATKINS** CatWasteSoil

Site Name	Route Section 2A 2015 Soil
Location	
Site ID	
Job Number	
Date	11/28/2018
User Name	Charlotte.Hidson@atkinsglobal.com
Company Name	Atkins

Hole ID	Sample Depth	Hazardous Waste Y/N	HP1	HP2	HP3	HP4	HP5	HP6	HP7	HP8	HP9	HP10	HP11	HP12	HP13	HP14	HP15	HP16
WS2A02C	3.6m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A01D	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2ALLCU	2.5m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
FCGF2A15C	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A14C	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A19U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A-3D	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A 15D	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2a	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2a12C	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
FCT2A2D	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A4U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A16U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A6C	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A7D	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A8C	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A9U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A10C	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A11D	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A13C	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2 A17U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
FCMG2A1U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2 AFCNG 2AID	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
W52A 18D	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A19U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A 20D	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CP2AMG-U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CP2AUB32E	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
OXDUB2A32C W	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
OXDOB2A29D	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
W52AOB29D	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
OXDOB2A31C	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
RC2ALOB-D	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
RC2ALOB-U	1.00-1.00m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
RC2AMF-U	0.30-0.30m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

### Classification Assessment Tool of Soil Wastes - Hazard Summary Sheet

### **ATKINS** CatWasteSoil

Site Name	East West Rail Section 2A 2017
Location	
Site ID	
Job Number	
Date	1/15/2019
User Name	Charlotte.Hidson@atkinsglobal.com
Company Name	Atkins

Hole ID	Sample Depth	Hazardous Waste Y/N	HP1	HP2	HP3	HP4	HP5	HP6	HP7	HP8	HP9	HP10	HP11	HP12	HP13	HP14	HP15	HP16
WS2A101_C	0.5m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A101_C	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CP2AJLFB_2U	0.2m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CP2ATFB_2U (A)	0.2m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CP2ATFB_2U (A)	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
TP2ABR_2D	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A102_C	0.5m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A104_U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A113_C	0.5m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2A122_C	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
SHDP2A110_C	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
TP2AMGOB_1D	0.2m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
TP2AMGOB_1D	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
TP2AMGOB_2U	0.2m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
TP2AMGOB_2U	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CP2ALOB_1D	0.2m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CP2AMFOB_2U	0.5m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
TP2ALOB_1U	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2AMFOB_1U	0.2m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS2AMFOB_1U	1m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CP2AMFOB_1D	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

