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Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Appendix 14.10: Geotechnical Interpretative Report

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Cambridge Waste Water Treatment Plant Relocation

Geotechnical Interpretative Report

July 2023

Mott MacDonald Bentley Limited is a joint venture between Mott MacDonald Limited and JN Bentley Limited. Registered in England and Wales no: 3827321. Registered Office: Keighley Road, Skipton, North Yorkshire BD23 2QR.

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Executive summary

This report presents the findings from the ground investigation works, including geophysical and geotechnical investigations and assesses the ground conditions to determine the nature and engineering properties of the underlying ground. This report includes recommendations for the geotechnical design and should be read in conjunction with the documents listed under Previous GI data and Project Specific GI data in Table 2.1 of section 2.1.

The report includes a review and analysis of data obtained from the ground investigation and associated laboratory works which in short included intrusive works including rotary coring and percussive boreholes with associated in situ testing and sampling for geotechnical and environmental laboratory testing. Additionally, the ground investigation included a geophysical survey (Electrical Resistivity Survey) and hydrogeological testing (pumping test). The results of the geo-environmental and hydrogeological testing are summarised in separate reports. The results and implications of the geotechnical testing are reviewed and analysed in the following sections.

Summarizing the ground conditions, the formations encountered from bottom to top were the Lower Greensand formation and the Gault Clay formation that underlie the whole site. Overlaying these, at the existing WWTW to the west, River Terrace Deposits were encountered and to the east the outcrop of the local West Melbury Chalk formation. Finally, Alluvium was encountered in proximity to the River Cam and Made Ground was localised mainly associated with the existing WWTW. Groundwater was encountered in most of the boreholes during the investigation and was monitored for longer terms in specific locations showing relatively shallow water table. Ground and groundwater conditions are summarised in Section 4.

Geotechnical risks have been discussed and highlight in Section 5 .

Engineering considerations have been provided and are included within Section 6.

Construction works at surface within the existing WWTW have been discussed in Section 6.3.

Design considerations for the Main Sewer tunnelling works have been included within Section 6.4. The current alignment of the tunnel is expected to be entirely within the Gault Clay. Swelling pressures will require to be managed whilst mechanical wear is expected to be low. Gault Clay is generally non-dispersible whilst faulting has not been identified along the route. Several crossings with existing assets will require to be managed through early engagement with the relevant operating authorities. It is recommended that a Geotechnical Baseline Report is completed to manage contractual risk.

Shaft construction is discussed in Section 6.5. design methodology will require considering the cost benefit of different shaft construction methods. Shaft construction is within a mixture of Made Ground, River Terrace Deposits, West Melbury Chalk and Gault Clay. Excavations should avoid the deeper Lower Greensand formation where confined hydraulic pressures exist. Decommissioning of temporary shafts will require careful planning. Connections between shafts 1 and 2 will require to be developed to ensure local ground movements, potentially through combining.

Foundation design for the Main WWTP is included within Section 6.6. Shallow foundations are anticipated to be within West Melbury Chalk with deeper piled foundations in Gault Clay. Single pile capacity for both CFA and Rotary Bored piles is included within Section 6.6.1.3. Attention is drawn to the design of buried structures due to high groundwater levels and highly variable live loads for water retaining structures. Dissolution features in West Melbury Chalk are not expected.

The Final Effluent and Storm Water pipelines are anticipated to be constructed using a mixture of tunnelling and open cut method before reaching the outfall. See section 6.7. Open cut is considered to be completed in a mixture of Chalk, River Terrace and Alluvium deposits. Cuttings in chalk are likely to be stable near vertical in the temporary case though should be battered back to 1V 2H for working safety, whilst in River Terrace and Alluvium slopes should not exceed 1V 3H.

At the location of the proposed outfall structure Alluvium, including pockets of peat is present at the outfall area. In case found below foundation level, the recommended method is dig and replace as the GI found that the vertical extent of the layer is expected to be shallow, and the more competent Gault Clay will be encountered close to the proposed foundation level.

Temporary and permanent embedded wall design supporting information, including Rankine earth pressure coefficients, is provided in Section 6.9.

Earthworks are primarily anticipated to reuse existing West Melbury Chalk. Chalk is anticipated to be excavated and compacted without restriction on earthmoving and compaction methods. Most of the chalk is anticipated to be classified as Class 1A in accordance with the Specification for Highway Works. For roads, a thin capping layer is likely for construction on weathered Chalk but unlikely for unweathered chalk.

The aggressiveness of soils to buried concrete has been classified in accordance with BRE Special Digest 1. West Melbury Chalk has been classified as DS-1 and AC-1, whilst Gault Clay has been classified as DS-4 and AC-3s.

Recommendations for further work to improve the sustainability of the construction include:

1. Continued development of design and subsequent stages
2. Supplementary ground investigation, such as:
    a. Investigation into small strain stiffness for foundation assessment.
    b. Investigate the deeper Kimmeridge Clay
    c. Investigate the extents of soft Gault Clay around Shaft 3
    d. Investigate the external roads
3. Completion of preliminary pile load tests, to optimise pile design
4. Completion of a trial embankment to determine compactive effort and performance.

1 Introduction

1.1 About the Project

The following text is extracted from the project documentation relating to the Cambridge Waste Water Treatment Plant Relocation Project.

Anglian Water is planning to build a modern, low carbon Waste Water Treatment Plant (WWTP) for Greater Cambridge. The new facility will provide vital services for the community and environment, recycling water and nutrients, producing green energy, helping Greater Cambridge to grow sustainably.

The new WWTP is targeting net zero carbon and being energy neutral. It is proposed to adapt to changing social and environmental priorities, increasing resilience to storm flows and flooding and provide a long-term solution to how we best treat waste water for a growing Greater Cambridge population.

The design of the facility will contribute to Anglian Water's goal to reach net zero carbon emissions by 2030 by reducing energy consumption and contributing towards the circular economy. The new facility will significantly reduce carbon emissions compared to the existing Cambridge facility and will be operationally net zero and energy neutral.

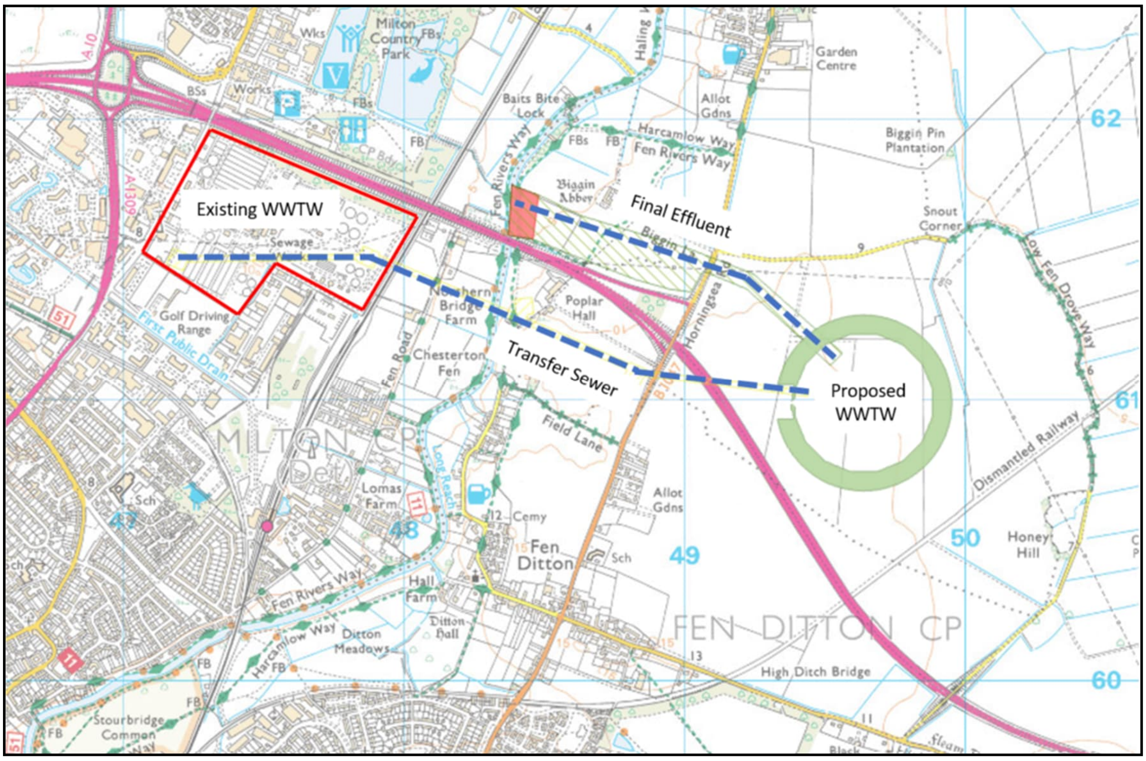
The efficient and effective recycling and re-use of waste water is core to public health and the circular economy. The design of the facility further supports a circular economy by:

- more effectively recycling nutrients, in the form of phosphorous and ammonia, found in waste water,
- treating the biosolids captured as part of the wastewater treatment process, creating an enhanced soil conditioner for use by local agriculture,
- generating biogas which, when processed and exported into the local gas network, will be used to heat the homes of the local community as a renewable fuel source
- Improving storm resilience and the quality of the recycled water we return to the River Cam

The new facility will provide greater resilience and improved storm management, meaning storm overflows and Combined Sewer Overflows (CSOs) are far less likely to occur. This means that, as Greater Cambridge continues to grow, the facility will be able to treat a greater volume of storm flows to a higher standard than would be the case at today's facility.

The new facility is being designed to reduce concentration in final treated effluent discharges of phosphorus, ammonia, total suspended solids and biological oxygen demand (BOD), compared to the existing Cambridge facility. This means that when the new facility starts to operate, water quality in the River Cam will improve.

Figure 1.1 Site Location Plan

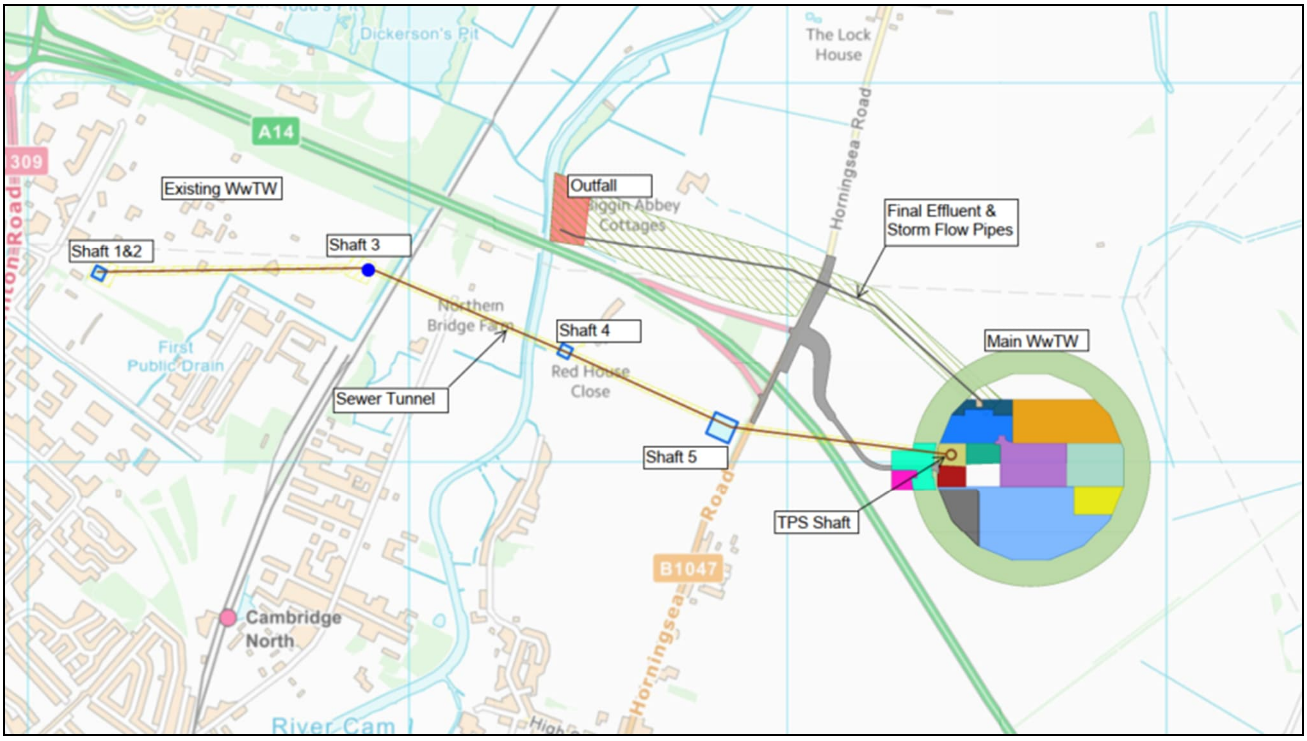


1.2 Description of Proposed Works

In order to facilitate the Project Requirements as set out in Section 1.1, it is currently understood that the civils design aspects will require to include the following items for construction:

- The decommissioning of the existing WWTP – this is not considered as part of this scope of works
- Construction of a new waste-water treatment plant to the south east of the existing plant
- The transferral of the waste stream from the existing site to the new location, through a new proposed transfer sewer.
- Inclusion of intermediate shafts along the proposed transfer sewer route to facilitate inspection and cleaning
- The transferral of the treated effluent from the proposed WWTP to the River Cam, including transfer pipelines and outfall structure.
- Associated earthworks relating to the main WWTP.
- An indicative layout of the proposed scheme is provided in Figure 1.2.

Figure 1.2 Indicative Site Layout Plan



1.3 Purpose of this report

The Purpose of this report is to provide a geotechnical interpretation relating to the proposed works as described in Section 1.2.

This report will provide consideration of the historical ground investigations, provide a summary of the new investigations, provide a revised ground model for the scheme, provide geotechnical properties for the geological strata and groundwater encountered, summarise geotechnical risk and provide outline engineering recommendations.

1.4 Geotechnical Category of Project

The Geotechnical Category of this project is deemed to be Category 2. This is defined in BS EN 1997-1 (British Standards, 2013) as “Projects which include conventional types of geotechnical structures, earthworks, and activities, with no exceptional geotechnical risks, unusual or difficult ground conditions or loading conditions. Designs for Category 2 should normally include quantitative geotechnical data and analysis to ensure that the fundamental requirements are satisfied. Routine procedures for field and laboratory testing and for design and execution may be used.”

1.5 Report Limitations and Exclusions

To the extent that this document is based on information supplied by other parties, Mott MacDonald Ltd accepts no liability for any loss or damage suffered by the client stemming from any conclusions based on data supplied by parties other than Mott MacDonald Ltd and used by Mott MacDonald Ltd in preparing this report.

To the extent that this document is based on information obtained in previous or recent ground investigations, persons using or relying on it should recognise that any such investigation can examine only a fraction of the subsurface conditions. In any ground investigation there remains a risk that pockets of hazards may not be identified, because investigations are necessarily based on sampling at localised points. Certain indicators or evidence of hazardous substances or conditions may have been outside the portion of the subsurface investigated or monitored, and thus may not have been identified or their full significance appreciated.

Mott MacDonald is not insured for, and therefore will not undertake surveys to identify asbestos or provide any guidance on the treatment of asbestos, or similar for toxic mould. Should the presence of asbestos or toxic mould be suspected during the course of the study, Mott MacDonald would recommend the appointment of a specialist contractor to address the issue and would not provide advice on risk or remedial measures.

This report is not intended to address risks associated with contaminated land or hydrogeological risk as these are being provided under separate cover reports.

This report is not intended to be used for Detailed Design. To address further risk associated with design and construction it may be required to conduct further ground investigation(s) and require the production of a Geotechnical Design Report as defined in BS EN 1997-1:2004 (Eurocode 7).

1.6 Summary of report history

The factual reports went through numerous revisions mainly due to the length of the laboratory testing programme and due to addressing of the comments made by the Engineer. Despite some intermediate issues were labelled as 'Final' the Engineer only considers Issue 06 for Phase A and Issue 05 for Phase B for Phase B (both dated 25/01/23) as Final.

This section has been provided to assist the reader in understanding the chronology of the ground investigation work and subsequent reporting. This is relevant to highlight the challenges in receiving geotechnical information within a timely manner, the subsequent revision history to this report and where gaps within the available information may still exist. After numerous rounds of comments, these missing pieces of information are now considered as not available or non-recoverable, which the report states in the sub-sections of data interpretation where necessary. Such items are e.g. the absence of remoulding conditions in certain strength tests and the orientation of shearing missing in direct shear test of certain undisturbed samples.

The ground investigation Site Works took place in two phases. First between the months of July and October 2021, referred to as 'Phase A', and between March and April 2022, that is referred to as 'Phase B'. Site Works of Phase A were limited to October 2021 due to restrictions placed on the intrusive works due to the planning permission. The first revision of this report processed a partial amount of geotechnical laboratory data (about 50%) from Phase A GI only. At the time the distribution of the available testing results was not consistent to the amount of tests, such as, some testing results had been fully reported whilst others had not been reported at all.

The second revision of the report included the addition of engineering recommendations for the proposed works associated with the CWWTPR, to be found in Section 6. The second revision didn't contain any change in the amount of processed data compared to the first revision.

The third revision of the report uses the data made available after the completion of the entire laboratory testing programme for Phases A and Phase B. Two separate factual reports were received for each phase, Phase A on (09/11/2022), Phase B on (09/12/2022) which have been commented upon and returned to the Ground Investigation Contractor on the date 16/12/2022. Some of the discrepancies, missing information regarding this revision is detailed below. Some of the initially scheduled tests were cancelled in agreement with the Engineer due to restrictions, i.e., not appropriate sample quality or quantity for the particular test. However, there were some tests that were not mentioned as restricted, nor they were available to the date of completion of this revision. These included mostly large shear box tests that were scheduled with the amalgamation of two samples. 1 no. of frost heave test was specified but the results were not available. In case of the triaxial testing of remoulded samples the remoulding conditions were not confirmed within the factual data. Although a one-year long monitoring of selected boreholes was carried out, no further groundwater monitoring data was provided within the revised AGS, therefore the data was limited to the interval between July 2021 and February 2022. Since no response was received within the expected timeframe (1 working week) to the comments, including no confirmation about when the revised report will be available, processing of the data started with the above-mentioned reports, which could be formally considered as draft until the comments have been responded to. The responses to the comments along with the revised Factual Report and AGS data were received only on 22/02/2023, therefore it could not be incorporated in the current revision of the GIR.

The fourth revision (current) of the report incorporates the review and interpretation of the factual reports along with associated AGS data received on 21/02/2023 and 22/02/2023 for both Phase A and Phase B of the Ground Investigation. These additionally account for most of the comments made on the previous revisions and include most of the missing laboratory test results and monitoring data mentioned as being absent in the previous revision. Exceptions are the missing large shear box tests which were confirmed to have been restricted and in the case of the triaxial testing of remoulded samples the remoulding conditions are available in only about 30% of the tests.

The number of tests for which the results were made available in the factual reports and associated AGS data processed within this GIR are listed in Section 3.4.1.

1.7 Summary of key changes

The intention of this revision to the report is to validate findings of previous versions, whilst highlighting changes, increase confidence levels in the choice of recommended parameters, remove certain caveats in engineering assessment and update recommendations where necessary.

Some of the changes, that are assessed to be most relevant are highlighted in the below list, noting that the list is not exhaustive:

- Numbers of testing carried out, available and considered for the interpretation were amended in text and tables where necessary and/or where the difference in the new number of tests compared to the existing ones was considerable
- Inclusion of lab progress spreadsheet with all scheduled and restricted lab tests in Appendix D.
- Specific charts updated with additional data available and design lines reviewed and modified in case found necessary.
- Frost Heave test results were made available confirming that the Chalk material collected from trial pits is frost susceptible.
- Orientation of shearing for small Shearbox tests was made available for about half of the undisturbed samples tested
- Remoulding conditions for triaxial tests of remoulded samples were made available for only about one third of the tests leaving the interpretation of these tests with unchained.
- Groundwater conditions amended with obtainment of full dataset within the AGS file.
- Risk register reviewed and revised where necessary.

2 Desk Study Summary

2.1 Sources of Information

A project database of geological and geotechnical information has been created for the project using site data, data and information from previous ground investigations in the area, and other publicly available information. The sources of data that have been reviewed and referenced are listed in Table 2.1 which also includes related historical ground investigations in vicinity to the site and previous ground investigations related to the project that provided information for the desk study and aided the understanding of the ground and the construction of the ground model.

Table 2.1 List of Sources

Type of data or information	Sources
Geology and Geological Map of Cambridge	• British Geological Survey (BGS), GeoIndex www.bgs.ac.uk/geoindex , consulted 2021/2022 • Published geological maps and information accessed through the British Geological Survey (BGS)
Other maps	• The British Geological Survey (BGS) 1:50,000 scale geological map, Sheet 188 (Cambridge)
Topography and Utilities detection	• LIDAR data: DEFRA, Defra Survey Data Download
Previous GI data	• Report 407854|01|DV3 Milton - Outline Ground Engineering and Tunnelling Overview, Mott MacDonald 2019 • Cambridge Waste-Water Treatment Plant Relocation Geotechnical and Geoenvironmental Report January 2021; Document reference: 415458/10 | A • A Report on a Ground Investigation for Cambridge Waste-water Treatment Plant Relocation (WWTPR) Cambridgeshire (Factual) – Final AHm/20.245/Final • A Report on a Ground Investigation for Cambridge Water Recycling Centre Development (Phase 1A), Cambridgeshire, (Factual) – 20/11/2018 – AHm/GNB/18354 • A Report on a Ground Investigation for Cambridge Sewage Treatment Works, (Factual) – 14/06/2005 – ACS/05.029 • Cambridge WRC Growth Scheme, Land Contamination Risk Assessment, AW, 2014 • Cambridge Riverside Tunnel Project, Ground Investigation Interpretative Report, 1990 9S11493. • Ground investigations and geotechnical surveys for A14 • A14 Cambridge to Huntingdon Improvement Scheme, Addendum Ground Investigation Report, HAGDMS No. 30452, HA5228983-ACJV-HGT-SG_GIR-RP-C-0001 Revision C01.
Project specific GI data	• Report on a ground investigation for Cambridge Waste-water Treatment Plant Relocation, Factual Report, TE8364, Final, Issue Number 06, Soil Engineering 25/01/2023. • Report on a ground investigation for Cambridge Waste-water Treatment Plant Relocation Phase B, Factual Report, TE8364, Final, Issue Number 05, Soil Engineering 25/01/2023. • CWRP, Geophysical report, Anglian Water, RSK, 2190769-R01(00). • Stuart Wells Limited. (2021). Cambridge WwTW Pumping Test Report. Report No: SWL21-122-01-PT-01. • Archaeology: Cambridge Waste Water Treatment Plant, Cambridgeshire, Geophysical Survey Report, CWRP21.

Type of data or information	Sources
Hazards / Risks	• For information refer to Cambridge Waste-water Treatment Plant Relocation Preliminary Risk Assessment: 415458 | 12 | A • EIA survey data: Anglian Water - CWWTPR (moata.com) • UXO: Zeticauxo categorizes the area as low risk (Risk Maps | Zetica UXO)
General information	• MOATA: Anglian Water - CWWTPR (moata.com)
Full list of resources can be found in the references and bibliography Section 7	

2.2 Site Description and Settings

This Section focuses on the existing conditions as encountered at surface. Indicative proposals have been annotated to high resolution aerial photographs as extracted from the MOATA Portal Anglian Water - CWWTPR (moata.com). Note that these sections consider the geometry and locations of the structures as of June 2022.

The site location is shown in Figure 1.2. The site description has been separated into three sections:

- The proposed WWTP which is located in the east
- The existing WWTP which lies in the west
- Infrastructure associated with proposed WWTP which lies between the existing and

proposed WWTPP. This includes:

  - the wastewater transfer tunnel which connects from the existing WWTP to the proposed WWTP (and shafts associated with the wastewater transfer tunnel)
  - the treated effluent pipeline which connects from the proposed WWTP to the River Cam where the effluent will discharge.

The detailed description of these three sites is found in the following subsections.

2.2.1 Existing WWTP Site

The existing WWTP lies within the administrative boundary of Cambridge City Council. The site is located approximately 3.5km to the north of Cambridge City Centre. The site is bounded by Cowley Road to the south, the A14 to the north, Milton Road to the west (A1309) and the railway line to the east. Surrounding site uses include industrial estates, a golf driving range and a former park and ride which is currently used as a waste transfer site. The site is currently occupied by Anglian Water WWTP. There are Anglian Water offices along the western boundary and tanks, buildings, access roads and filter beds associated with the WWTP across the remainder of the site.

Figure 2.1 Existing WWTP site

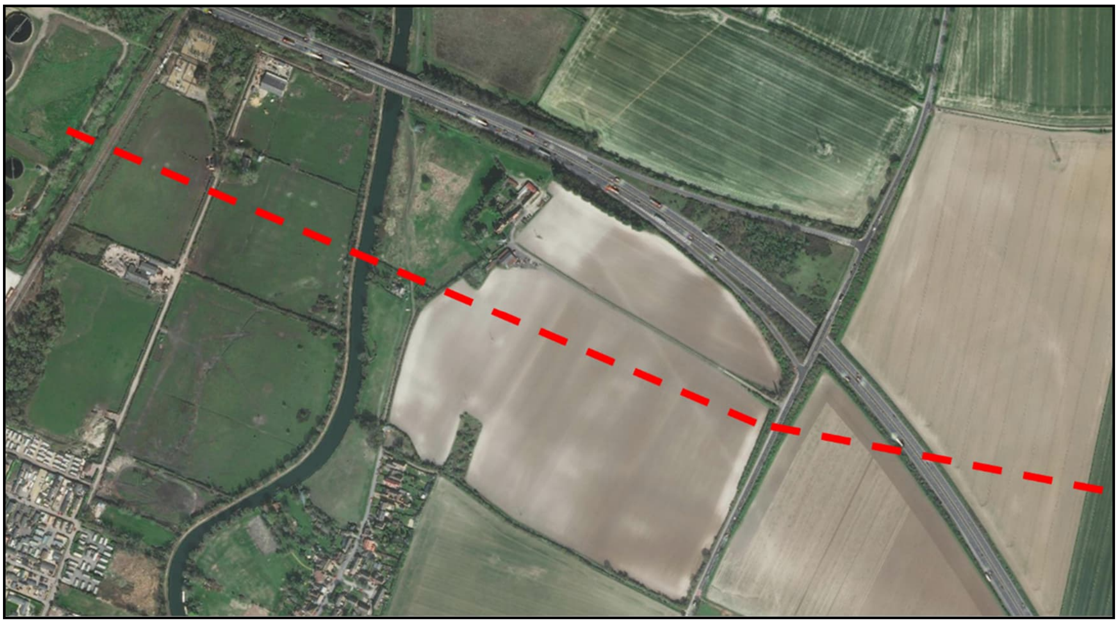
2.2.2 Sewer Transfer Route

The proposed sewer tunnel extends from the westernmost part of the existing treatment works bounded by Cowley Road south of the A14, across the River Cam and until within the proposed sewage treatment works. The following crossings are expected for the current route of the sewer tunnel alignment, from west to east:

- Railway line which connects Cambridge North with Waterbeach
- Fen Road
- The River Cam
- Horning Sea Road (B1047)
- A14 Main Road

The route of the proposed Sewer transfer is presented in Figure 2.2 below and the associated proposed shafts in the indicative site layout plan of Figure 1.2.

Figure 2.2 Proposed Sewer Transfer Route



2.2.3 Proposed WWTP Site

The proposed site is located in agricultural fields and bounded by other agricultural land in all directions and comprises a number of fields separated by hedgerows and ditches. The land has been recently cropped and ploughed but is not currently being used by the owners for farming.

The site for the proposed Waste-water Treatment Plant spans across a flat farmland bounded by A14 to the south, Horningsea Road to the west and Low Fen Drove Way to the north and east. This part covers an area of approximately 45Ha located about 700m East of Milton, and about 800m south of the village of Horningsea. To the west of the proposed WWTP lies Junction 34 of the A14, a junction intersected by Horningsea Road which extends north, parallel to the western boundary of the site area. Horningsea Road connects Fen Ditton to the south and the village of Horningsea in the north.

Figure 2.3 Proposed WWTP Site

2.2.4 Proposed Final Effluent Route and Outfall Structure

The Final Effluent Pipeline extends from the proposed Waste-water Treatment Plant north of the A14 crossing Horningsea Road and terminates to the River Cam where the Outfall structure is proposed to be located. It is anticipated that FE and SW routes will pass underneath/through the local B1047 Horningsea Road. The proposed route of the Final Effluent is presented in Figure 2.4 below and in Figure 1.2 where the associated structure and the Outfall structure is depicted.

Figure 2.4 Proposed Final Effluent Route

2.2.5 Surveys Datum

The approximate National Grid Reference for the site is TL497615.

2.3 Site Access

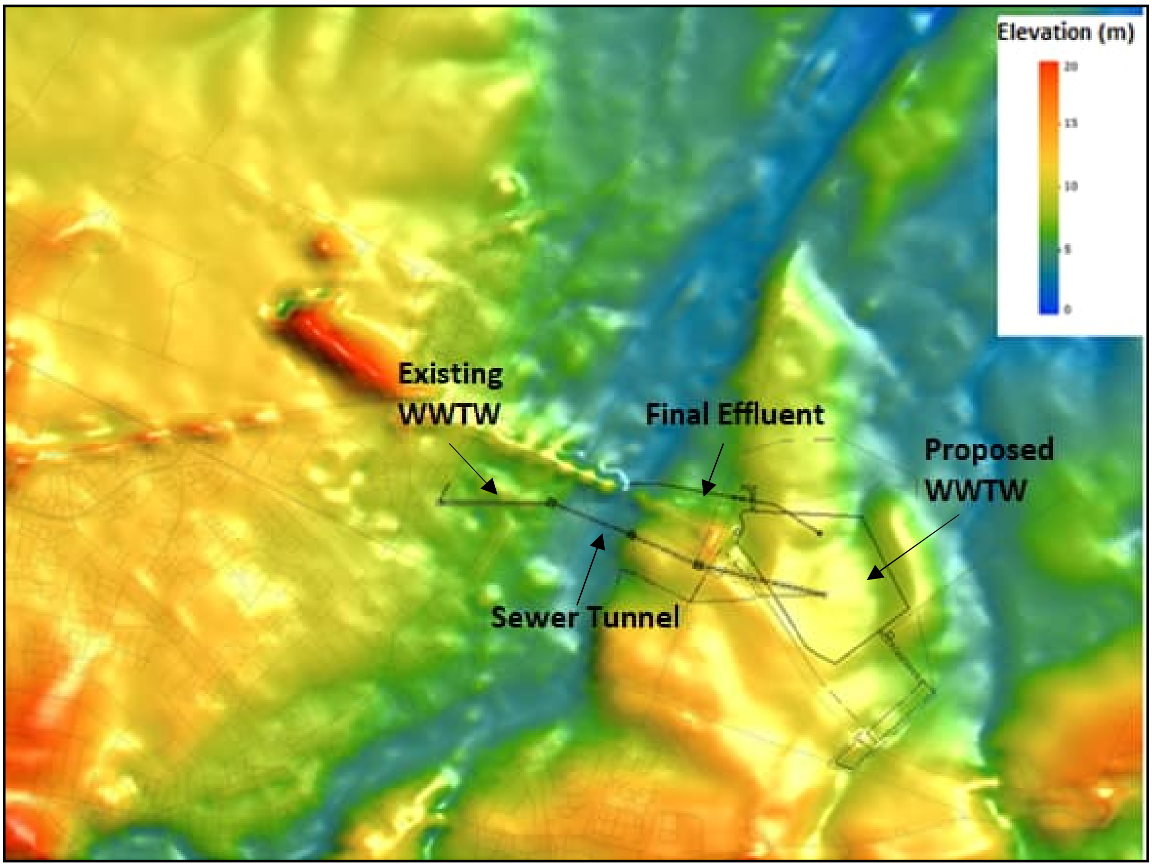
Available routes of access to the sites including accesses for construction and temporary accesses along with their permit status are presented in Figure 7.2.

2.4 Topography

The topography across the parts of the site varies between 3.8m-11.8 mAOD. In more detail, from elevations recorded at borehole locations, elevation slightly reduces from East to West in the proposed Waste-water Treatment Works varying between 6.4m-11.8 mAOD. In the existing WWTW elevations vary between 4.1m and 7.1 mAOD with the exception of one location at the east of the site, where Shaft 3 is proposed, rising slightly above 9 mAOD as it is situated over a stockpile. Lastly, along the tunnel route elevations vary between 4.3m and 11.6 mAOD and along the Final Effluent alignment from 3.8m to 9.7 mAOD with the elevation rising in proximity to the main STW site. Ordnance Survey mapping indicates that proposed WWTP site is located around the 10 mAOD contour on the east side of the River Cam. There is a general elevation reduction from west to east across the proposed WWTP,

The topography as indicated by the LIDAR survey is shown in Figure 2.5.

Figure 2.5 Topography of the Site area



Source: 3D Ground Model, Lidar data (DEFRA, environment.data.gov.uk)

2.5 Hydrology

The River Cam flows in a Northeast-Southwest direction, passing between the villages of Milton and Horningsea, at about 1km distance from the main site. The outfall structure of the Final Effluent will be situated close to the riverbank and the waste-water tunnel will need to pass beneath the river at about 80m west of Shaft 4 approximately where the Sewer Tunnel is indicated by the arrow in Figure 2.5 above. The River Cam is about 21m to 22m wide at surface around that location based on Google Earth and the river surface shared [CAMEST-ZZZ-3DM-C-0013].

The minimum distance of the center of the proposed Waste-water treatment works from the River Cam is about 1.330m. No other major rivers are found in proximity to the area; however, several ditches and drains are present as shown in Appendix A.1. A set of drainage features connected to Black Ditch which discharges to the north along the boundary of Stow-cum-Quy Fen to Bottisham Lode ditch. Quy Water, located to the east of the site, and the Black Ditch, are the main watercourses contributing to Bottisham Lode ditch. Bottisham Lode discharges to the River Cam near Waterbeach, about 5 km downstream of the A14 crossing.

In regards with the existing WWTW the minimum distance of the River Cam is about 350m. Additionally the Todd's Pit and Dickerson's Pit are found north of the site at about 250m distance from the A14.

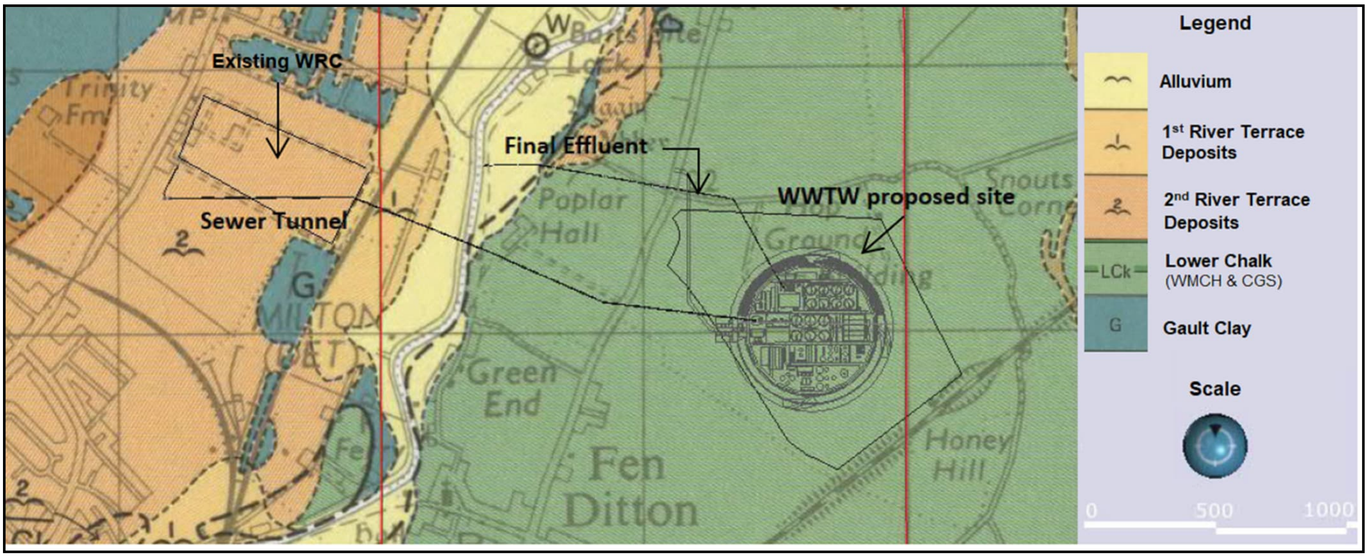
2.6 Ecology

Key findings from the Ecological surveys have been detailed in the report with reference 100415458 | 01 | A, with the title Cambridge Waste-water Treatment Plant Relocation, Preliminary Environmental Information. Therein, the likely effects of the proposed development on biodiversity are investigated.

2.7 Geology

The geology can be seen in the geological map published by the British Geological Survey (BGS) and has been further interpreted using an updated 3D geological model which is discussed in Section 4.2. The following figure is an extract from the Geological map of Cambridge available on the BGS map portal [R25.] overlain by the proposed works.

Figure 2.6 Geological map



*Source: BGS map portal. Geological map of Cambridge, sheet 188 solid and drift [R25.]

2.7.1 Topsoil and Made Ground

Made Ground:

The 1:50,000 scale BGS map indicated no Made Ground present on site or in the surrounding area. However, Made Ground were expected and encountered at the existing WWTW along the sewer tunnel alignment and in a few remote localised cases at the area of the proposed WWTW and along the Final Effluent Route.

The geotechnical properties of the Made ground are described in Section 4.3.

2.7.2 Superficial Deposits

According to the 1:50,000 BGS Map of Cambridge [R25.] two kinds of superficial deposits were expected in the area. Alluvium associated with the River Cam and River Terrace deposits.

The map indicates Alluvium to be present at the westernmost part of the Final Effluent Route and along the Tunnel alignment circumambient to the banks of River Cam.

The geotechnical properties of the Alluvium are described in Section 4.4.

According to the 1:50,000 BGS Map of Cambridge [R25.] First and Second River Terrace Deposits were expected in proximity to the River Cam and would be associated mainly with the Existing WWTW and the westernmost of the Final Effluent alignment.

The geotechnical properties of the River Terrace Deposits are described in Section 4.6.

2.7.3 Solid Geology

West Melbury Chalk:

According to the 1:50,000 BGS Map of Cambridge [R25.] the West Melbury Chalk, which is part of the formerly known Lower Chalk, extends in the eastern part of the site where the proposed WWTW is to be located and the eastern part of Final Effluent and Tunnel alignments. It is anticipated by literature (Bristow et al., 1997) [R61.] and (Worssam, 1969) [R63.] , that at the base of the Chalk, the Cambridge Greensand is potentially present.

The geotechnical properties of the West Melbury Chalk are described in Section 4.7 followed by the geotechnical properties of the Cambridge Greensand in section 4.8.

Gault Clay:

According to the 1:50,000 BGS Map of Cambridge [R25.] the Gault Clay is found surfacing west, north and south of the existing WWTW and in a very small area at the westernmost part of the Final Effluent alignment next to the Alluvium. It is known and expected to be the bedrock underlying the West Melbury Chalk formation across site.

The geotechnical properties of the Gault Clay formation are described in Section 4.9.

Lower Greensand Formation:

The Lower Greensand Formation, according to the 1:50,000 BGS Map of Cambridge [R25.] , is surfacing further to the west and the north of the site and is underlain by the Gault Clay Formation throughout the site. The Lower Greensand is known to be unconformably underlain by the Kimmeridge Clay in the area.

The geotechnical properties of the Lower Greensand are described in Section 4.10.

2.8 Hydrogeology

Due to the Chalk Formation surfacing the site is designated as having a high groundwater vulnerability. The Chalk, as well as the Lower Greensand, which is found much deeper, are classified by the Environment Agency as Principal Aquifers. The site is not located within a groundwater Source Protection Zone, and local abstractions that have been identified in the surrounding area from available Envirocheck mapping almost exclusively relate to abstractions from the Lower Greensand. Only a small number of unlicensed abstractions, located to the east of the STW site, are presumed to be related to the Lower Chalk.

The analysis of the pumping test carried out as part of this ground investigation is summarised in Section 4.13.3.

2.9 Utilities and Existing Buried Services

Available utilities information was provided as part of the Pre-construction Information and included among other buried and overhead telecommunication utilities, air valves, sewer pumping stations, pipelines and manholes. Figure 7.3 presents a layout with locations of the utilities associated with the sites and is available in MOATA. All work considered the requirement for HSE GS6 “Avoiding danger from overhead power lines”, which includes establishment of exclusion zones and passageway through barriers beneath the line.

2.10 Unexploded Ordnance

The Zetica UXO online maps indicate that the site is in a low-risk area for unexploded ordnance. For further information refer to Cambridge Waste-water Treatment Plant Relocation Preliminary Risk Assessment: 415458 | 12 | A [R44.] .

2.11 Historical development

Generally, the key anthropogenic activities affecting the site ground conditions during human times are: agricultural land-use with associated land drains, ditches and the use of fertilizers and the development of roads and rail routes. Residential infrastructure is found in proximity along the sewer tunnel route on the westernmost end of which lies the existing Water Recycling Center (WRC). The latter is associated with buried utilities and pipes and Made Ground.

The history of the proposed site, associated infrastructure, and existing WWTP, has been summarised in Table 2.2 from the available 1:10,560, 1:10,000,1:2:500, 1:1:500, 1:500 land use mapping (from 1886 - 2019), provided within the Envirocheck Reports [R41.] [R42.]

In addition, Google Earth Pro [R43.] provides aerial views of the site and surrounding area dated between 1945 and 2021. This information indicates that the proposed WWTP footprint and infrastructure within the red line boundary has not changed significantly since 1945. The existing WWTP has changed since 1945 as detailed in Table 2.2 below.

Table 2.2: Summary of historical development of the sites

Date (scale)	Proposed WWTP	Existing WWTP	Associated Infrastructure
1886 - 1888 (1:2500)	The site's current land use is undeveloped rural agricultural land. A hop ground building, and associated pump, is located approximately 350m south of snout corner. The Cambridge and Mildenhall railway line runs northeast-southwest within the red line boundary, 250m south-east of the proposed site footprint.	The Cambridge railway line runs north-south along the eastern boundary of the current WWTP.	The land use is predominantly agricultural with public drains and roads present. Biggin Abbey and Poplar Hall are present east of present-day Horningsea Road. A clay pit is present 100m north east of Poplar Hall and a coprolite pit is present 300m south of Poplar Hall, adjacent to Field Lane.
1886-1888 (1:10,560)	No significant changes	The sites land use is agricultural land with public drains.	No significant changes.
1904 (1:10,560)	No significant changes.	Site is a sewage farm.	Coprolite pit and clay pit are noted as disused.
1927 (1:10,560)	No significant changes.	Sewage farm has expanded within the site boundary.	No significant changes.
1927 (1:2,500)	No significant changes.	Sludge beds on site and sewage carrier pipes from site to south east.	No significant changes.
1971-1972 (1:2500)	Railway has been dismantled.	Pump house at the western site boundary.	No significant changes.
1973-1974 (1:10,000)	No significant changes.	Modifications to sewage works with the addition of buildings and large tanks.	No significant changes.
1969-1988 (1:1,250)	No significant changes.	Large tanks are shown as settling tanks. Pump house and square storage tanks on site.	No significant changes.
1979 (1:1,250)	No significant changes.	Electricity substation near north eastern site boundary.	No significant changes.
1981-1985 (1:10,000)	The A45 (now A14) has been constructed which runs northwest southeast along the south western boundary of the proposed WWTP site.	Modifications to sewage works. Addition of large tanks. Agricultural machinery market southern edge of site.	A45 trunk road (now A14) is now present on site, running west to south east, crossing the River Cam and Horningsea Road.
1992 (1:1,250)	No significant change	Tanks are shown as settling tanks.	No significant change
1992 (1:10,000)	No significant change	Car Park at the southern west corner of site	Electricity substation is present east of the current WWTP, south of the A14.
1993 (1:1,250)	No significant change	Gas holder tanks and gas burner on site.	No significant change
2000 (1:10,000)	No significant change	Agricultural machinery market is now a golf driving range.	Several electricity pylons across the site, running towards the substation in the west, 50m east of existing WWTP.
2019 (1:10,000)	No significant change	No significant changes.	No significant change
Note: Maps with no significant changes have been excluded from the table Source: Cambridge Waste-water Treatment Plant Relocation Preliminary Risk Assessment: 415458 | 12 | A. [R44.]			

3 Ground Investigation

3.1 General

This section includes information of the works caried out by Soil Engineering Geoservices Ltd (SEGL) during the recent ground investigation. The GI works are described in detail in the SoW report 421008 | 01 | C [R20.] and along with the received results according to Factual Reports [TE8364] [R18.] and [R19.] summarised in the following sections. The processing of the factual data and summary of suggested parameter selection is summarised in Section 4 and Appendix A.3.

3.2 Aims of Ground Investigation

The aim of the current ground investigation was to assess the key geotechnical unknowns and better assess risks associated with ground engineering and tunnelling including excavation of deep shafts and earthworks. Refer to Section 5 for the list of geotechnical risks identified during different stages, and Appendix B for the Geotechnical Risk Register.

The following key investigation objectives are identified:

- Establish stratigraphy at the site including the top level and thickness of artificial ground, West Melbury Chalk, Gault Clay and Lower Greensand.
- Stratigraphic logging and correlation of key hazards.
- To identify risk of cavities, voids and dissolution features in the West Melbury Chalk.
- Mineralogical testing of Gault Formation to understand the risks of shrink-swell potential, dispersibility and ground aggressivity.
- Understand the aggressivity of soils to buried concrete, including tests to understand potentially pyrite-bearing aggressive ground conditions to derive sulphate class of concrete.
- Groundwater installations to establish water levels within the Chalk aquifer, and any superficial secondary aquifers, including seasonal fluctuations in groundwater levels.
- Provide information on the strength characteristics of the West Melbury Chalk and the Gault Clay Formations.
- Provide information on the deformation characteristics and stress-strain relationship of the West Melbury Chalk and Gault Clay.
- Understand creep characteristics, frost-susceptibility, intact and rock mass characteristics of the West Melbury Chalk.
- Understand permeability of the underlying materials to develop dewatering requirements and its potential impacts on groundwater and inform the Hydrogeology Impact Assessment (HIA)
- Determine the level of horizontal in-situ stress in Gault Clay.
- Provide information on Gault Clay to aid decision on the type of the Tunnel excavation equipment to be employed for the sewer tunnel and final effluent pipeline.
- Understand the potential impacts of tunnelling on existing infrastructure including Network Rail and Highways England assets
- Aid the understanding and development of future loading restrictions above the sewer tunnel
- Earthworks related testing to assess re-use of superficial deposits, West Melbury Chalk and Gault Clay arisings.
- Assess excavatability and compactive effort of the West Melbury Chalk.

- Identify the presence of Made Ground and contamination screening, for disposal options, and remediation strategy and re-use (if possible and/or required)
- To derive parameters of subgrade soils required for road design
- To identify the type of excavated material in case of both shallow and deep excavations to define appropriate excavation plant and understand potential wearing

3.3 Summary of Fieldwork

The following Table 3.1 provides a summary of the exploratory holes conducted as part of the Site Works phases of GI. The exploratory hole location plan of the current ground investigation is presented in Figure 7.4 in Appendix A.1. The detailed summary of the exploratory holes is presented in Table 7.1 (rotary boreholes), Table 7.2 (cable percussion boreholes) and Table 7.3 (trial pits) in Appendix A.1.

Table 3.1: Summary of fieldwork

Type	Depth range (m)	Quantity
Rotary Boreholes	10 - 50	63
Percussive Boreholes (SPTs)	10 - 35	14
Trial Pits	2.2 – 3.1	26
Electrical Resistivity Tomography (ERT) Survey	15586 linear meters	22 survey lines

3.3.1 Cable Percussion Boreholes

A total of 14 No. of boreholes, see Table 7.2 for designations, were formed to depths between 10m and 35m using conventional light cable percussion techniques with 200mm and 150mm diameter temporary steel casings.

3.3.2 Rotary Drilling

A total of 64No. of rotary coring boreholes were drilled at depths ranging between 10m and 50m, in order to obtain information on the solid geology beneath the site. A total of 7No. of these boreholes were formed using rotary open hole drilling methods, these include the pumping test locations and are about 13m of depth targeting the bottom of the Chalk.

A number of 4 boreholes were formed in proximity to specific rotary coring boreholes to facilitate pressuremeter testing. The depths of these boreholes ranged between 18m and 31m.

3.3.3 Trial Pits

A total of 26 No. of trial pits were excavated with a JCB to depths between 2.2m and 3.1m. A total of 20 of the trial pits were formed within the footprint of the proposed sewage treatment works and a total of 6 of them were formed along the route of the proposed Final Effluent Pipeline.

The trial pits were formed to assess the mass soil fabric of near surface deposits, to facilitate in-situ strength and permeability testing, (i.e CBR, HV, Soakaways) and soil sampling for geotechnical and geo-environmental testing.

3.3.4 Inspection Pits, Utilities and Services

A hand dug inspection pit was excavated to a depth of 1.20m at each of the exploratory borehole locations to check for the presence of buried services and reduce risk of damaging them. Prior to the excavation, the hole was scanned with a cable avoidance tool (CAT) at 300mm intervals to the base of each pit.

An additional inspection pit was dug for the purposes of recovering two large bulk disturbed samples for geotechnical laboratory testing of the soft stockpile material at the location of BH_TUN_006 (Shaft 3) within the existing sewage treatment works.

An additional 2No. of hand-dug pits were formed to investigate the potential occurrence of peat in the location of the proposed outfall structure.

3.3.5 Scope of Geophysical Works

3.3.5.1 Electrical Resistivity Tomography (ERT) Survey

To determine the possible presence and location of subsurface features associated with voids and dissolution features within the West Melbury Marly Chalk Formation. An investigation depth of 15mbgl (meters below ground level) was required. An Electrical Resistivity Tomography (ERT) survey along 22 No. of survey lines (profiles) was undertaken, utilising the Syscal Pro 72 electrode earth resistivity system to image the ground up to 30mbgl in the centre of the profiles, allowing to additionally obtain information of the vertical extends of the West Melbury Chalk. Resistivity data were collected with the electrode configuration in both the Wenner-Schlumberger and Dipole-Dipole array to ensure maximum certainty of data collected.

Eighteen of the already drilled boreholes were used to tie in the data from preliminary logs and assist the ERT interpretation for 17 of the 22 profiles.

3.3.5.2 Downhole Televiewer Surveys and Downhole Geophysical testing

A total of 3 No. of downhole optical and acoustic televiewer (OTV/ ATV) were carried out by a specialist subcontractor in 3 different locations, BH_STW_013, BH_STW_018, BH_TUN_018. Prior to the surveys, controlled flushing of the specific boreholes was carried out to purge boreholes in the two later locations. Casing was then retracted, and water column was let to settle for 12 to 24 hours to allow the logging in better conditions. The optical log in BH_STW_013 was stopped due to poor fluid visibility.

In addition to the downhole televiewer survey described above, downhole geophysics tests were carried out in two of these boreholes (BH_STW_018 and TUN_018). These tests comprised a 3-arm calliper, measuring three diameters of the borehole and natural gamma log.

3.3.6 Sampling

Sampling included Geotechnical and Environmental sampling as explained in the following subsections.

3.3.6.1 Geotechnical Sampling

SPT:

Representative disturbed samples of all materials encountered were obtained and placed in sealed containers for transport to the laboratory.

Trial Pits:

Disturbed soil samples were obtained from each Trial Pit at regular intervals and for every change of strata for geotechnical and chemical analysis as required from the project specification [R20.]

Inspection Pits:

Disturbed soil samples were obtained from each inspection pit.

Core samples:

The borehole cores samples were recovered, photographed and sampled according to the specification requirements as described in the ground investigation factual report [R17.] . Subsamples of the core were obtained at depths specified when unexpected conditions or change of strata occurred. All undisturbed samples (CS) were wrapped in alternating layers of plastic film and wax then wrapped in protective plastic and placed into core boxes for secure transfer. Disturbed samples (CD/ CD) from core were placed within a plastic tub or bag.

3.3.6.2 Contaminated Land Sampling

Trial Pits:

Small, disturbed samples for environmental testing were obtained at locations specified in a variety of glass and/or plastic containers as required by the project specification [R20.] .

Inspection Pits:

Small, disturbed samples for environmental testing were also obtained at locations specified by Mott MacDonald Contaminated Land Specialists, in a variety of glass and/or plastic containers as required by the project specification. These were kept refrigerated after collection to meet sample holding times, then despatched to laboratory within 24 hours.

Core samples:

In several cases, samples were taken from core (CES) for environmental purposes.

Photo Ionisation Detection (PID):

In order to determine the presence or absence of volatile organic compounds, all environmental samples were subject to head space testing using a photo ionisation detector.

3.3.6.3 Groundwater Sampling

Groundwater samples were obtained from the completed standpipe installations as detailed in Section 3.3.8.1 below.

3.3.6.4 Ground-gas Sampling

Ground gas samples were obtained from the completed standpipe installations as detailed in Section 3.3.8.2 below.

3.3.7 In-situ Testing

Table 3.2 provides a summary of the geotechnical in-situ testing undertaken during the ground investigation.

Table 3.2 Summary of Geotechnical In-situ Tests

In Situ Test	Formation	Quantity
Variable-head Permeability Tests	River Terrace Deposit (Superficial Deposit)	3
	West Melbury Chalk	29
Packer Tests	West Melbury Chalk	7

In Situ Test	Formation	Quantity
	Gault Clay	2
Pressuremeter Tests	West Melbury Chalk	13
	Gault Clay	14
Plate Load Tests	West Melbury Chalk	7
Televiewer Tests	West Melbury Chalk	3
Soakaways	Alluvium (Superficial Deposit)	2
	Weathered Chalk (Superficial Deposit)	7
CBR Tests	Weathered Chalk (Superficial Deposit)	16
	West Melbury Chalk	6
Vane Tests	Topsoil	12
	Made Ground	6
	Weathered Chalk (Superficial Deposit)	21
SPTs	Alluvium	4
	River Terrace Deposit (Superficial Deposit)	2
	West Melbury Chalk	95
	Gault Clay	161

3.3.7.1 Standard Penetration Tests (SPT)

Standard Penetration tests were carried out in all 14 cable percussion boreholes at 1m intervals throughout boring operations. A split spoon sampler or a solid 60° cone was used and a 63.5kg hammer dropping 760mm. The results were given as a SPT ‘N’ value or as blow count for a given penetration on the respective borehole logs. The SPT N60 value, which is the SPT N value corrected for field procedures and apparatus, was derived from the SPT N value by taking into account the hammer energy ratio.

3.3.7.2 Hand Vane Testing (HV)

A total No. of 39 Hand Vane tests were carried out in suitable material encountered within trial pits to provide an approximate undrained shear strength of the cohesive soils. The testing was undertaken at interval of 0.5m in suitable material recovered and contained within the excavation bucket.

3.3.7.3 California Bearing Ratio Tests (CBR)

Results of 1 test per trial pit are available from the performed CBR tests at each trial pit at depth of 0.5m, aiming to obtain an indication of the thickness of the subgrade required to support road pavement. Further information on in-situ CBR per subgrade material is provided in the Section 4.6.7 and Section 4.7.9.

3.3.7.4 Pressuremeter Testing (PMT)

A number of 1 or 2 Pressuremeter tests were performed in 11 locations in the proposed WWTP area and along the proposed sewer tunnel route, using either a high-pressure dilatometer (HPD) or a self-boring pressuremeter (SBP), depending on the ground conditions at scheduled depths. In cases that a separate open hole was drilled exclusively for the pressuremeter testing the borehole ID is indicated with the ‘PM’ suffix.

3.3.7.5 Plate Load Tests (PLT)

A No. of 7 Plate Load tests were undertaken in order to provide information both on the settlement characteristics and to determine the bearing capacity of the ground in locations within the footprint of the proposes WWT works. The testing was performed using a 600mm diameter plate and a tracked mechanical excavator of 25T for provision of the reaction force. Incremental pressures were applied, including unloading. Pressure increments started from 20kN/m^2 and reached a maximum of 621kN/m^2.

3.3.7.6 Permeability Testing

Packer Testing

Packer testing was undertaken in 5 boreholes at a frequency of 1 or 2 tests per location, aiming to provide detailed information on the permeability of the ground at discrete depths. For each test double packers were used to isolate the zone of testing. In most cases the tested West Melbury Chalk was determined unsuitable material for this type of testing as the necessary pressure could not be built due to bypass of either top or bottom packer. Consequently, Variable Head testing was specified to obtain the desirable data. Packer test was attempted within the Gault Clay as well, however the test was deemed not suitable for the layer due to its low permeability, therefore Variable Head testing was carried out instead.

Variable Head Testing

Falling Head tests (FHT) and/or Rising Head tests (RHT) were carried out in 17 locations during the formation of boreholes or in standpipes installations, to assess the permeability of the strata. Eight of which were located in the plant area, seven along the tunnel alignment, and one at the Final Effluent.

Soakaway Testing

A total of 9 No. of Soakaway tests were implemented at trial pits across the main site and Final Effluent Route, to assess the infiltration rates of the surfacing material at each location.

Pumping Tests

Pump tests were performed in 4 designated boreholes at the area of the proposed Terminal Pumping Station (TPS) to facilitate this testing. The purpose was to investigate the groundwater source, to obtain aquifer parameters of the West Melbury Chalk in the area, and calculations for dewatering to inform the construction of the permanent shaft of TPS. For further information refer to the pumping test report [R22.] and the pumping test analysis [R23.] .

3.3.8 Installations and Instrumentation

A total of 36 No. standpipes were installed in 28 different borehole locations to monitor ground gas and/or ground water in each of the locations, targeting the superficial deposits, the West Melbury Chalk and/or the Cambridge Greensand Member.

Both 19mm and 50mm diameter UPVC tubes were used. The standpipes were installed with slotted pipe response zones at various depths (summarised in Table 3.3). All standpipe positions were approved by the Mott MacDonald engineer and Site supervisor, and a bentonite seal was installed above and below the response zone in all locations. All pipework was capped and protected with a metal stopcock cover and a plastic cap. Seven installations were installed with a gas valve to facilitate long-term groundwater and gas monitoring.

3.3.8.1 Groundwater Monitoring

Response zones for Groundwater monitoring ranged between 0.5m and 13.7m of depth targeting to monitor groundwater levels in superficial deposits, in the West Melbury Chalk Formation and in the Cambridge Greensand.

A full summary of boreholes and their respective groundwater installations are summarised in Table 3.3.

Table 3.3 Summary of Groundwater Monitoring locations in exploratory holes

<table>
<tr><th>Borehole ID</th><th>Slotted Section (mbgl)</th><th>Response Zone Top (mbgl)</th><th>Response Zone Base (mbgl)</th><th>Monitored Formation</th></tr>
<tr><td colspan="5">Proposed WWT Works</td></tr>
<tr><td>BH_STW_001</td><td>2.00-9.00</td><td>1.50</td><td>9.50</td><td rowspan="11">Chalk</td></tr>
<tr><td>BH_STW_005A</td><td>1.50-9.50</td><td>0.50</td><td>10.00</td></tr>
<tr><td>BH_STW_009</td><td>1.50-11.50</td><td>1.50</td><td>12.00</td></tr>
<tr><td>BH_STW_011B</td><td>1.50-9.20</td><td>1.50</td><td>9.70</td></tr>
<tr><td>BH_STW_015</td><td>1.50-12.00</td><td>1.50</td><td>12.00</td></tr>
<tr><td>BH_STW_018</td><td>1.50-11.70</td><td>1.50</td><td>12.20</td></tr>
<tr><td>BH_STW_022B</td><td>11.30-11.70</td><td>0.70</td><td>11.70</td></tr>
<tr><td>BH_STW_023</td><td>2.00-14.00</td><td>2.00</td><td>14.50</td></tr>
<tr><td>BH_STW_024</td><td>1.50-11.00</td><td>1.50</td><td>11.00</td></tr>
<tr><td>BH_STW_025</td><td>2.00-8.50</td><td>2.00</td><td>9.00</td></tr>
<tr><td>BH_STW_026</td><td>1.50-9.50</td><td>1.50</td><td>10.00</td></tr>
<tr><td>BH_STW_010B</td><td>11.50-12.00</td><td>11.50</td><td>12.00</td><td rowspan="2">Cambridge Greensand</td></tr>
<tr><td>BH_STW_031B</td><td>13.10-13.60</td><td>13.10</td><td>13.60</td></tr>
<tr><td colspan="5">Terminal Pumping Station (TPS) Shaft</td></tr>
<tr><td>BH_TPS_001b</td><td>4.00-12.00</td><td>0.00</td><td>13.70</td><td rowspan="4">Chalk</td></tr>
<tr><td>BH_TPS_002b</td><td>4.00-12.00</td><td>0.00</td><td>13.30</td></tr>
<tr><td>BH_TPS_003b</td><td>4.00-12.00</td><td>0.00</td><td>13.30</td></tr>
<tr><td>BH_TPS_004b</td><td>3.85-11.85</td><td>0.00</td><td>13.30</td></tr>
<tr><td colspan="5">Final Effluent Pipeline</td></tr>
<tr><td>BH_FE_001</td><td>1.50-3.50</td><td>1.50</td><td>3.90</td><td>Superficial Deposits</td></tr>
<tr><td>BH_FE_002</td><td>1.50-4.00</td><td>1.50</td><td>5.00</td><td>Chalk</td></tr>
<tr><td colspan="5">Sewer Tunnel route</td></tr>
<tr><td>BH_TUN_001A</td><td>1.25-4.25</td><td>1.25</td><td>4.75</td><td rowspan="2">Superficial Deposits</td></tr>
<tr><td>BH_TUN_006</td><td>1.50-6.00</td><td>1.50</td><td>6.00</td></tr>
<tr><td>BH_TUN_005B</td><td>7.00-10.00</td><td>7.00</td><td>10.00</td><td>Gault Clay</td></tr>
<tr><td>BH_TUN_011</td><td>1.50-5.00</td><td>1.50</td><td>5.00</td><td></td></tr>
</table>

Borehole ID	Slotted Section (mbgl)	Response Zone Top (mbgl)	Response Zone Base (mbgl)	Monitored Formation
BH_TUN_014	1.25 – 11.25	1.25	11.75	Chalk
BH_TUN_016	1.50-10.30	1.50	10.80	
BH_TUN_018	1.50-9.70	1.50	10.20	
Source: SEGL Factual report, TE8364/ DRpt01 & TE8364A/FRpt04				

Post-fieldwork groundwater monitoring was undertaken on several site visits. The results are presented in Section 4.13.2. In accordance with the specification, monitoring of groundwater had to be carried out at weekly intervals during fieldwork periods in all scheduled installations. The results from the available Groundwater monitoring data are summarised in Section 4.13.2.

Specifically, boreholes BH_STW_001, 009, 015, 023, 024, 025 and 026, were designated for long term monitoring, with scheduled monthly visits for a calendar year.

Noting that the long-term monitoring programme lasted only for 1 year therefore data doesn't cover potential changes over multiple years and it excludes the effects of potential long-term changes in climate.

3.3.8.2 Ground Gas Monitoring

A No. of 8 boreholes were installed with an additional gas monitoring standpipe. Following the installation, monitoring for CH_4, CO_2, CO, H_2S and O_2 was carried out using GA5000 gas analyser.

Response zones for ground gas monitoring ranged between 0.5m and 12.0m targeting to monitor the superficial deposits or the West Melbury Chalk Formation.

A full summary of boreholes and their respective ground gas installations are summarised in Table 3.4 below.

Table 3.4 Summary of Ground Gas Monitoring locations in exploratory holes

Borehole ID	Slotted Section (mbgl)	Response Zone Top (mbgl)	Response Zone Base (mbgl)	Monitored Formation
Proposed WWT Works				
BH_STW_009	1.50-3.00	1.50	12.00	Chalk
BH_STW_015	1.50-3.00	1.50	12.00	
BH_STW_022A	1.00-2.00	1.00	2.00	
BH_STW_013C	0.50-1.50	0.50	1.50	Superficial Deposits
Sewer Tunnel route				
BH_TUN_001PM	0.50-1.50	0.50	1.50	Superficial Deposits
BH_TUN_006	1.50-3.50	1.50	6.00	
BH_TUN_011	1.50-2.50	1.50	5.00	Chalk
BH_TUN_014	1.25-2.50	1.25	11.75	
Source: SEGL Factual report, TE8364/ DRpt01 & TE8364A/FRpt04				

Monitoring of gas levels commenced following cessation of the fieldwork period and produced no detectable levels of hydrogen sulfide and encountered detectable levels of methane, carbon dioxide, carbon monoxide and oxygen. During monitoring of BH_STW_009, levels of carbon dioxide were recorded between 1.8% and 1.9% with oxygen levels between 18.6% and 20.4%. Elevated lower explosive limits of methane were detected during monitoring rounds one and three in BH_TUN_006 between 4% and 6%. During monitoring of BH_TUN_001PM, elevated levels of carbon dioxide were recorded between 2.6% and 3.0% with oxygen levels of between 13.4% and 15.4 %. In BH_TUN_014, oxygen levels of 19% and detectable levels of methane and carbon dioxide were reported. The results of the gas monitoring are presented in the factual reports [R18.] and [R19.] . . For the geoenvironmental assessment refer to chapter 5.2.14 'Land Quality' of the Environmental Impact Assessment (EIA) for the DCO submission (30.01.2023).

3.4 Summary of Laboratory Testing

The scope of the testing was to assist the geotechnical design and in establishing physical and chemical parameters of the ground in terms of classification, consolidation and compressibility, shear strength (effective and undrained for both intact and remoulded samples), permeability and behaviour in compaction. Besides the geotechnical laboratory testing, a geo-environmental testing program was carried out as summarised in 3.4.2.

It should be noted that a large timeframe has passed between sampling and testing (in cases exceeding 10 months) which comes with increased risk to the quality results particularly in reference to natural moisture content, particularly for bulk samples stored in plastic bags, which are suitable for short-term storage only. Undisturbed wax-coated samples are also at risk, as according to [R39.] the long-term effectiveness of dips and coatings remain uncertain. Stress relief for samples excavated from the ground also may lead to inconsistencies in data provided.

3.4.1 Geotechnical Laboratory Testing

The geotechnical laboratory testing undertaken on soil and groundwater samples recovered from the exploratory holes is summarised in Table 3.5 below. The quantities presented indicate the number of the completed laboratory tests with available results that were considered in the interpretation.

For a full list of scheduled, restricted, and carried out tests refer to the lab testing progress spreadsheet shared by the contractor and presented in Appendix D.

Table 3.5 Summary of Geotechnical Laboratory Testing

Test type	Test results	Quantity in Topsoil	Quantity in Made Ground	Quantity in Alluvium	Quantity in River Terrace Deposit	Quantity in Weathered Chalk	Quantity in West Melbury Chalk	Quantity in Cambridge Greensand	Quantity in Gault Clay	Quantity in Lower Greensand	Total Quantity (*)
Classification	Particle Size Distribution	2	10	20	9	14	79	4	99	8	245
	Moisture Content	26	20	34	11	51	237	6	190	6	581
	Bulk or Dry Density	2	7	2	2	6	186	1	166	3	375
	Atterberg Limits	8	11	18	6	15	117	2	108	5	290
	Organic Matter Content	16	8	-	1	19	10	-	-	2	56
	Loss on Ignition	7	-	-	-	7	-	-	-	-	14
	Dispersibility	-	-	-	-	-	7	-	29	-	36
	Linear Shrinkage	-	-	-	-	-	-	-	12	-	12
	Frost Heave	-	-	-	-	-	-	-	-	-	2
Compressibility	Voids ratio /Oedometer	-	-	-	-	-	34	-	64	-	98
	Swelling Potential	-	-	-	-	-	-	-	51	-	51
Total stress/ Strength tests	Undrained Shear Strength in Triaxial Compression	-	3	-	-	-	-	-	18	-	21
	Consolidated Undrained in Triaxial Compression	-	-	-	-	-	12	-	29	-	41
	Direct Shear Strength, Large Shear Box	-	-	-	-	-	-	-	-	-	0**
	Direct Shear Strength, Small Shear Box	-	-	-	-	-	20	-	23	-	43
	Laboratory Vane/ Hand Vane	-	-	-	-	-	-	-	43	-	43
	Laboratory CBR	-	3	-	-	-	15	-	4	-	22

Test type	Test results	Quantity in Topsoil	Quantity in Made Ground	Quantity in Alluvium	Quantity in River Terrace Deposit	Quantity in Weathered Chalk	Quantity in West Melbury Chalk	Quantity in Cambridge Greensand	Quantity in Gault Clay	Quantity in Lower Greensand	Total Quantity (*)
Rock Properties	**Intact Dry Density**	-	-	-	-	-	14	-	-	-	14
	Saturation Moisture Content	-	-	-	-	74		-	-	-	74
	Porosity	-	-	-	-	-	59	-	-	-	59
	UCS\ deformability	-	-	-	-	-	18	-	25	-	43
Earthworks	**Proctor Tests**	-	5	-	-	-	44	-	12	-	61
	Chalk Crushing Value	-	-	-	-	-	31	-	-	-	31
	Shear box tests	-	2	-	-	-	13	-	3	-	18
	Triaxial tests: CU/UU	-	0/1	-	-	-	3/23	-	1/7	-	4/31
Permeability	**Laboratory Permeability Tests**	-	-	-	7	1	-	-	-	-	8
Chemical and electrochemical	**pH**	-	11	-	2	18	10	-	39	-	78
	Redox Potential	-	-	-	-	-	-	-	41	-	41
	Carbonate Content	-	-	-	-	12	59	-	-	2	73
Mineralogical	X-Ray Diffraction	-	-	-	-	-	-	-	14	-	14

*Total quantity of test results accounted for in the interpretation. Some results are available as part of other geotechnical testing (e.g., Classification tests).

** All scheduled Large Shearbox tests were confirmed to have been restricted.

In addition to the above, logging of the cores has provided additional rock core data and information including:

- Description of Strata
- Total Core Recovery (TCR)
- Solid Core Recovery (SCR)
- Rock Quality Designation (RQD), for the West Melbury Chalk formation
- Fracture Index (I_r)

3.4.2 Geo-environmental Laboratory Testing

Assessing the geo-environmental risks and the results of the geo-environmental testing is out of the scope of this report. For the geoenvironmental assessment refer to chapter 5.2.14 ‘Land Quality’ of the Environmental Impact Assessment (EIA) for the DCO submission (30.01.2023).

4 Ground Conditions

4.1 General

This section includes a summary of descriptions of the ground strata recorded in the borehole logs along with their geotechnical parameters. It also presents extracts from the updated ground model. The borehole logs are included in the Contractor's Factual Reports [R18.] and [R19.]

A site-specific ground model was created across the site based historical exploratory hole information. The site-specific ground model was then updated the recent ground investigation information from exploratory holes with supplementary information from the BGS map [R25.] also presented in Figure 2.6.

The model was also used to visualize and understand the spatial scattering of the geotechnical data that is frequently mentioned in the following sections.

4.2 Ground Model

The purpose of this section is to highlight the differences and transitions in geology across the site and summarise the occurrence of the geological strata along with their lateral and vertical extents in specific areas of interest.

The areas were divided according to significant differences in geology accounting for the presence and sequence of strata as well as the elevations that the strata were encountered. In that sense the areas were dived as presented in Table 4.1 below, and in Figure 7.4: GI works layout showing the Ground Model distinctive areas

The interpolated top of strata levels and variation in strata thickness across the site is presented in a 3D Subsurface Ground Model and geological cross sections presented in Appendix A.2 It is noted that the boreholes shown may be offset from the actual section line, thus the depth of a particular horizon shown is an extrapolation of strata encountered at the location of the section line. Where applicable, offset is indicated in metres under borehole ID.

4.2.1 Existing WWTP and Proposed Sewer Tunnel alignment West of River Cam

The area is presented in Figure 7.4 and the ground profile in the Tunnel alignment long-section, Section B of Figure 7.6 in Appendix A.2. The extents of the existing WWTP are presented on the left (West) side long section. The area of the existing WWTP extends until chainage 710.6m is characterized by a laterally extensive presence of Made Ground underlain by River Terrace Deposits of various thickness.

The encountered strata from surface to maximum exploratory depth included Made Ground associated with the existing WWTW, River terrace deposits and the Gault Clay were found along the section and the Lower Greensand formation which was only confirmed by BH_TUN_001A and BH_TUN_006 for this area. The summary of geological strata can be found in Table 4.1.

The top of the Gault Clay beneath the River Terrace Deposits was described as firm instead of stiff to very stiff that it was generally described as seen in the cross section beneath the existing WWTW. Additionally, borehole BH_TUN_005 encountered soft Gault Clay. A proposal to have this investigated further was issued on the 14th of January 2022 with a document entitled Supplementary Ground Investigation – Scope of Works with reference 421008 | 04 | A |.

4.2.2 Sewer Tunnel alignment east of River Cam and Proposed WWTP Site

The area is presented in Figure 7.4 and in cross Sections C and D of Figure 7.7 and Figure 7.8 respectively and the right side (East) of Section B of Figure 7.6 in Appendix A.2.

The encountered strata from surface to maximum exploratory depth included the Weathered West Melbury Chalk, the West Melbury Chalk formation with the Cambridge Greensand member frequently present at the bottom and the Gault Clay. Lastly, the Lower Greensand formation which was only confirmed by 2 boreholes for this area. In proximity to the River Cam, Alluvium overlying River Terrace deposits as expected were confirmed to be present by the continuation of the ground investigation. The summary of geological strata can be found in Table 4.1.

Additionally, some differences regarding the strength parameters such as unconfined compressive strength (UCS) and undrained shear strength (c_u) were observed for the Gault Clay between the areas of the existing WWTW and proposed WWTW as explained in Section 4.9.

4.2.3 Final Effluent and Outfall Structure

The Final Effluent alignment is presented in Figure 7.4 and in Section A of Figure 7.5 in Appendix A.2 starting from the River Cam and the proposed outfall structure are shown on the left (West) side of the long-section and the proposed WWTP and the proposed shaft (FPS) on the right (East) side of the section. Some uncertainty is expected regarding the surfacing geology and especially the extents of the Alluvium and River Terrace Deposits that were modelled according to borehole data in combination with the BGS geological map [R25.]

The encountered strata from surface to maximum exploratory depth included: In proximity to the River Cam, Alluvium and RTDs were encountered. The Weathered West Melbury Chalk, the West Melbury Chalk formation with the Cambridge Greensand member frequently present at the bottom and the Gault Clay. The summary of geological strata can be found in Table 4.1.

It should be noted that the Final Effluent route changed several times since the planning of the ground investigation resulting in the exploratory holes and the alignment presented in this report being approximately 70m from the latest shared alignment. Specifically, from the River Cam to trial pit TP_FE_004 the distance is 45m, increasing to around 110m between BH_FE_004 and BH_STW_003.

4.2.4 Ground Profile Summary

The following subsections highlight major differences between the divided areas and note limitations. The following Table 4.1 summarizes the strata encountered by exploratory holes in each area which are highlighted in the layout of Figure 7.4: GI works layout showing the Ground Model distinctive areas

Table 4.1: Summary of geological strata

Location	Strata	Top of Formation range (mbgl)	Top of Formation Range (mAOD)	Depth to base range (mbgl)	Encountered thickness in exploratory holes (m)
Existing WWTP and Tunnel route West of River Cam	Topsoil (TS)	0	3.9 -7.3	0.1 – 0.6	0 – 0.6
	Made Ground (MG)	0 – 0.1	6.4 – 9.2	0.7 – 4.0	0.7 – 4.0
	Alluvium (AL)	0.15 – 0.3	3.7 – 4.4	1.1 – 5.5	0.8 – 4.2
	River Terrace Deposits (RTD)	0.3 – 5.5	3.9 – 6.9	1.2 – 8.5	0.9 – 5.1
	Gault Clay (GC)	1.2 – 8.5	1.0 – 4.7	32.9 – 38.8[3]	28.7 – 32.3[3]
	Lower Greensand (LG)	32.9 – 38.8	-25.9 – -29.7	Not Confirmed [3]	Not Confirmed [3]
Tunnel route East of River Cam and proposed WWTP	Topsoil (TS)	0	4.3 – 11.8	0.1 – 0.6	0.1 – 0.6
	Made Ground (MG) [1]	0	8.1 – 11	0.3 – 0.5	0.3 – 0.5
	River Terrace Deposits (RTD)	Not encountered			
	Weathered Chalk (WWMC)	0 – 0.5	6.1 – 11.3	0.4 – 3.2	0.1 – 2.2
	West Melbury Chalk (WMC) [2]	0.3 – 2.4	4.7 – 11.4	4 – 14.2	3.3 – 13.4
	Gault Clay (GC)	4.2 – 14.3	2.4 – 4.2	40.9 – 47.6	34 – 36.7
	Lower Greensand (LG)	40.9 – 47.6	-34.3 – -39.1	Not Confirmed	Not Confirmed
Final Effluent route and Outfall Structure	Topsoil (TS)	0	3.8 – 10.25	0.2 – 0.5	0 – 0.5
	Made Ground (MG) [1]	0 – 0.3	6.5 – 9.6	0.3 – 1.8	0.3 – 1.5
	Alluvium (AL)	0.3 – 0.5	3.5 - 3.8	1 – 2.5	0.7 – 2.2
	River Terrace Deposits (RTD)	1 – 2.5	1.4 – 3.9	2 – 3.9	0.1 – 2.9
	Weathered Chalk (WWMC)	0.2 – 0.4	3.6 – 9.9	0.6 – 1.2	0.3 – 1
	West Melbury Chalk (WMC) [2]	0.3 – 1.8[4]	4.8 – 9.6	2.8 – 1.2[4]	2.5 – 10.5
	Gault Clay (GL)	2 – 11	2.6 – -2	Not Confirmed	Not Confirmed

[1]: *Made ground* was found sparsely localised in the Proposed WWTW and along the Final Effluent alignment.
[2]: The *Cambridge Greensand* was encountered as the lowest member of the *West Melbury Chalk Formation* in the majority of the boreholes with a thickness ranging from 0.08m to 0.6m
[3]: Maximum depth and thickness of the Gault Clay, as well as top of Lower Greensand within the existing WWTW is confirmed in two locations by BH_TUN_001 and BH_TUN_006.
[4]: Weathered chalk underlying the river deposits was encountered at 3.8mbgl with a thickness of about 1m in BH_OUT_001B. Potentially to be underlying portion of the river deposits in proximity to the River Cam, locally and mainly in the southern part.

4.3 Topsoil (TS) and Made Ground (MG)

Topsoil (TS) was encountered from ground level in the majority of the exploratory holes formed across the site to a maximum depth of 0.60m. This generally comprised dark brown slightly sandy, slightly gravelly clay, where the gravel mostly consisted of flint covering the whole range of angularity and size grain. Sand was generally fine to coarse. In several cases occasional rootlets were present.

Made Ground (MG) was encountered in varied composition by the boreholes drilled at the existing WWTW along the sewer tunnel alignment and in a few localised cases at the area of the proposed WWTW and along the Final Effluent Route. A general description when encountered in the existing WWTW was either a sandy gravelly clay or sandy gravel with gravel sized fragments of brick, concrete, glass, mudstone, porcelain, and flint. When found elsewhere it generally comprised of brown sandy gravelly clay, similar to the description of TS, together with brick fragments.

Specifically in the location of IP_TUN_006, the location of the stockpile at the Eastern Part of the existing WWTW, the material was found to be low density dark brown sandy, slightly gravelly clay, very likely to be allogenic material.

4.3.1 Moisture Content and Atterberg Limits

The Moisture Content and Atterberg Limits of TS and MG are presented below, in Table 4.2 and Table 4.3 respectively.

Table 4.2: Moisture Content and Atterberg Limits Results for TS

Test		Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
No. of Tests		26	8		
Results	**Min.**	3.6	25	15	9
	Max.	66	95	43	60
	Avg.	19.7	48	23	26

Table 4.3: Moisture Content and Atterberg Limits Results for MG

Test		Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
No. of Tests		20	10*		
Results	**Min.**	3	22	10	10
	Max.	37	54	35	23
	Avg.	16	37	22	16
*Note: A total of 3 No. of samples from Made Ground showed non plastic nature.					

Natural Moisture Content results are presented in Figure 7.23, Atterberg Limits in Figure 7.24, and the Plasticity Chart (A-Line Plot) in Figure 7.25, all in Appendix A.3.2.

4.3.2 Particle Size Distribution (PSD)

PSD determination was carried out on one TS sample collected from two trial pits within the site of the Proposed WWTP. The PSD grading curve indicated that the TS comprises sand and silt with small amount of gravel and clay. The percentage of the fines content (materials passing a 63micron sieve) ranged between 38.5% and 49.4%. The results are shown in Table 4.4, while the grading curve is presented in Figure 7.14 in Appendix A.3.1.

Table 4.4: PSD of TS

No. of Tests	Fine content (clay and silt) (%)	Clay content (%)	Silt content (%)	Sand content (%)	Gravel content (%)	Cobbles content (%)
2	38.5- 49.4	8.6- 16.1	29.9 - 33.3	47.8- 52.0	2.9- 9.5	0.0

A total of 8 no. PSD tests were undertaken on MG samples collected at the alignment of either the Sewer Tunnel Route or the Final Effluent Pipeline. MG generally comprises sand, gravel and silt with clay. The percentage of fine particle content varies between 12.8% and 66.8%, with an average of 36.7% with the exception of the coarser material found in the existing STW. Based on the test results, the MG along the Final Effluent Pipeline is rather cohesive, slightly clayey sandy silt with small amount of gravel, while along the Sewer Tunnel alignment it is generally gravelly sand with some fine particle content. The test results from all tests are summarised in Table 4.5 and the PSD curves are shown in Figure 7.15 in Appendix A.3.1.

Table 4.5: PSD of MG

No. of Tests	Category	Fine content (clay and silt) (%)	Clay content (%)	Silt content (%)	Sand content (%)	Gravel content (%)	Cobbles content (%)
8	Min.	11.5	3.3	7.4	12.8	1.7	0.0
	Max.	66.8	31.3	49.8	49.6	70.2	3.1
	Avg.	33.5	11.6	22.0	35.4	30.7	N/A*
*Cobbles only encountered in one occasion in BH_TUN_003 in the existing STW. Not applicable to derive an average.							

4.3.3 Density

A total of 2 no. of bulk and dry density results of the Topsoil were obtained from triaxial tests that showed an average bulk density of 1.64Mg/m^3 , ranging from 1.52Mg/m^3 to 1.75Mg/m^3, and an average dry density of 1.37Mg/m^3, ranging from 1.25 Mg/m^3 to 1.49Mg/m^3.

A total of 7 no. of Bulk and dry density results of the MG were obtained from triaxial tests that showed an average bulk density of 1.69 Mg/m^3, ranging from 1.47 Mg/m^3 to 1.97 Mg/m^3 and an average dry density of 1.21 Mg/m^3, ranging from 0.96 Mg/m^3 to 1.55 Mg/m^3.

4.3.4 Undrained Shear Strength

A total of 12 no. of in-situ hand vane tests were undertaken within TS. The results showed that the undrained shear strength is between 33kPa and 88kPa, with an average of 53kPa, while the residual undrained shear strength is in the range of 7kPa and 35kPa, with an average value of 14kPa. The plot of undrained shear strength against depth is presented in Figure 7.32 in Appendix A.3.4.

Considering MG, a total of 6 no. of hand vane tests were done on site indicating undrained shear strength in range of 34kPa and 93kPa, with an average of 69kPa. The residual undrained shear strength varied between 8kPa and 45kPa, with an average of 26kPa. Triaxial tests were carried out on 3 no. samples collected from the MG in order to determine the undrained shear strength of the material. The tests indicated that the undrained shear strength varies between 60kPa and 92kPa, while the average value is 71kPa. The plot of undrained shear strength against depth is presented in Figure 7.33 in Appendix A.3.4.

4.3.5 Organic Content and Loss on Ignition

A total of 16 no. of samples from TS were tested for Organic Content from trial pits in the proposed WWTP area and along the Final Effluent alignment. The organic matter of TS ranged between 0.4% and 12.2%, with an average of 2.77%. Based upon Table 3 in BS EN ISO 14688-2:2018 [R4.] , which provides guidance on classification of soil with organic constituents, the TS is classified as having a low organic content.

A total of 7 no. of Loss on Ignition tests were carried out on samples recovered within TS in depths between 0.1m and 0.4m. The results showed a mass lost by Ignition ranging between 2.9 and 8.4% with an average of 4.6%.

A total of 8 no. of samples from MG were tested for organic content for inspection pits of boreholes in the existing WWTP along the Tunnel Route. MG was found to be of variable organic content but generally low organic content. Specifically organic content varied from 2.2% to 4.8% with the exception of BH_TUN_001A where at 0.20m the sample showed high organic content (C_{OM}= 48%).

Additionally, the MG related to the Stockpile located in BH_TUN_006 was found of organic content ranging from 9.7% to 12.6% and is classified as medium organic content according to Table 3 in BS EN ISO 14688-2:2018 [R4.] .

Such a variability is not a surprise in MG horizons, the organic content of which is highly dependent on anthropogenic activities.

4.4 Alluvium (AL)

Alluvium (AL) was encountered at the westernmost part of the Final Effluent Route and along the Tunnel alignment circumambient to the banks of River Cam. It was mainly described as soft light or dark general brown or grey mottled slightly sandy slightly gravely clay with frequent shell fragments and occasional lenses or pockets of peat. Peat content was described as black pseudo fibrous. At the proposed outfall structure, the two hand dug pits encountered a higher portion of gravel and cobbles within the AL deposits with coarse subrounded to subangular gravel of chert, flint, and chalk.

4.4.1 Moisture Content and Atterberg Limits

Table 4.6: Moisture Content and Atterberg Limits Results for the AL

Test		Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
No. of Tests		34	18		
Results	Min.	8	36	14	19
	Max.	207	210	117	96
	Avg.	53	88	42	46
	μ, (μ-1/2σ)	37, (14) μ+1/2σ = 60	84, (60)	39, (26)	38, (26)

4.4.2 Particle Size Distribution (PSD)

A total of 20 no. PSD tests were undertaken on the AL. Based on the test results, it generally comprised mixed amounts of fines content and sand and high gravel content. The fine content varies between 4.3% to 92.8%% with an average of 41.2%. Gravel ranges from 0.4% to 61.4% with an average of 26.6%. Cobbles were encountered in 2 of the samples at a percentage ranging between 0.4% and 0.8% and in one sample with about 40% cobble content located in greatest proximity to the River Cam. The PSD test results are summarised in Table 4.7: , and the grading curves can be found in Figure 7.16 Appendix A.3.1.

Table 4.7: PSD of the AL

No. of Tests	Category	Fine content (clay and silt) (%)	Clay content (%)	Silt content (%)	Sand content (%)	Gravel content (%)	Cobbles content (%)
20	Min.	4.3	2.7	1.6	6.8	0.4	0.0
	Max.	92.8	46.2	53.1	68.4	61.4	40.5
	Avg.	41.2	18.9	22.3	30.0	26.6	N/A*
*Cobbles only encountered in very specific occasions along the FE alignment and values vary in wide ranges. Not applicable to derive an average.							

Natural Moisture Content results are presented in Figure 7.23, Atterberg Limits in Figure 7.24, and the Plasticity Chart (A-Line Plot) in Figure 7.25, all in Appendix A.3.2.

4.4.3 Density

A total of 2 no. of bulk and dry density results of the AL encountered in trial pits along the Final Effluent alignment were that showed an average bulk density of 1.34 Mg/m^3, ranging from 1.30 Mg/m^3 to 1.38 Mg/m^3 and an average dry density of 0.62 Mg/m^3, ranging from 0.56 Mg/m^3 to 0.68 Mg/m^3.

4.4.4 Effective strength

According to BS8004, in absence of reliable test results the angle of friction of soils can be derived from a correlation based on the PI. Based on this, the effective angle of friction for AL is assumed to be 21^o, accounting for the average PI of 46%.

4.4.5 Undrained shear strength

Based on the PI and a total of 1No. of SPT results, after table 8, Clayton (1995), which showed an N value of 2, at depth of 1.70mbgl at the outfall structure it is recommended that the undrained shear strength of the AL should be in the range of 10kPa. This is also supported by the borehole log descriptions where AL is described as very soft or soft.

4.4.6 Permeability

The 2 no. of soakaway tests in trial pits along the Final Effluent alignment within AL showed an infiltration rate of 9.4E-05 m/s and 5.5E-05 m/s.

4.5 River Terrace Deposits (RTD)

River Terrace Deposits (RTD) were confirmed in boreholes along the tunnel and Final Effluent alignments and along the sewer tunnel corridor near the ground surface. The deposit consisted of variable mixtures of coarse and fine soils, such as brown slightly clayey slightly silty gravelly fine to coarse sand, firm and friable brownish grey sandy slightly gravelly clay, light brown slightly fine to coarse sand and gravel. The gravel component in the above soils was subangular to rounded fine to coarse flint, chalk, quartzite and subangular calcareous gravel.

4.5.1 Moisture Content and Atterberg Limits

Table 4.8: Moisture Content and Atterberg Limits Results for the RTD

Test		Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
No. of Tests		11	6*		
Results	**Min.**	3.5	22	16	14
	Max.	45	66	25	59
	Avg.	22.3	39.3	20.4	26
* Note: 1 No. of samples from RTDs showed non plastic nature.					

The results suggest that the clayey portion of the RTD comprises a variable (low to very high) plasticity clay. The results of very variable clayey horizons within the RTD are somewhat expected, more results are needed to conclude with confidence regarding this variability.

Natural Moisture Content results are presented in Figure 7.23, Atterberg Limits in Figure 7.24, and the Plasticity Chart (A-Line Plot) in Figure 7.25, all in Appendix A.3.2.

4.5.2 Particle Size Distribution (PSD)

A total of 9 no. PSD test results from samples collected from the RTD along the alignment of the Sewer Tunnel Route and the Final Effluent showed that the RTD generally comprises sand and gravel with small amount of clay and silt. However, one of the samples indicated that it is a cohesive material with very high fine content (see Section 4.5.1). Thus, the fine content varies within a large range, between 1.2% and 94.7%, with an average of 33.7%. The results and the grading curves are presented in Table 4.9 and in Figure 7.17 in Appendix A.3.1.

Table 4.9: PSD of RTD

No. of Tests	Category	Fine content (clay and silt) (%)	Clay content (%)	Silt content (%)	Sand content (%)	Gravel content (%)	Cobbles content (%)
9	Min.	1.2	1.2	1.6	5.3	0.0	0.0
	Max.	94.7	44.0	50.7	54.6	80.3	0.0
	Avg.	33.7	20.7	21.8	28.9	37.4	0.0

4.5.3 Density

A total of 2 no. of bulk and dry density results of the RTD encountered in boreholes along the Tunnel alignment in the existing WWTP area, were obtained from laboratory permeability tests that showed an average bulk density of 2.02 Mg/m^3, ranging from 1.92 Mg/m^3 to 2.12 Mg/m^3 and an average dry density of 1.77 Mg/m^3, ranging from 1.70 Mg/m^3 to 1.83 Mg/m^3.

4.5.4 Organic Content

One sample from the RTD was tested for organic content from inspection pits of boreholes in the existing WWTP along the Tunnel Route. The results are in alignment with the expected results of organic content of 0.8% is equal to the average of the results in the RTD from the historical GI [415458/10 | A]. [R12.]

4.5.5 Permeability

Permeability tests were carried out on site within boreholes and in laboratory on samples of RTD collected from boreholes along the Sewer Tunnel alignment in the existing WWTW and the Final Effluent alignment in proximity to the River Cam.

A total of 2 No. insitu falling head tests were undertaken within boreholes indicating 9.6E-06 m/s and 1.7E-06 m/s of permeability along the tunnel alignment and the test along the Final Effluent showed a permeability of 1.2E-05m/s.

Considering laboratory permeability tests, a total of 4 No. constant head permeability tests and a total of 3 No. permeability test in triaxial cell were done on samples collected from RTD.

The laboratory constant head permeability tests showed a values ranging from 5E-5 to 2E-2 m/s. These results are generally in line with the description of the material, however PSD was not provided for the tested samples.

The permeability tests in triaxial cell showed a significantly lower permeability value in the range of 1E-11m/s. Note that these results are significantly deviating from the expected ranges based on the material description. Since no PSD is available of the tested samples to increase confidence in the result, therefore the values are to be treated with caution.

Based on the above, the permeability of the RTD should be selected within the range of 1E-6 to 5E-4 The permeability test results for the RTD are shown in Figure 7.59 in Appendix A.3.10.

4.6 Weathered West Melbury Chalk (WWMC)

The Weathered West Melbury Chalk (WWMC) was encountered in the eastern end of the site, where the proposed WWTW and eastern half of the Final Effluent alignment are planned to be situated. It could be considered as heavily weathered, reworked material of the underlying WMC Formation. It was generally described as firm to very stiff light brown or light grey, sandy slightly gravelly clay with gravel of flint of varying grading and angularity, and occasionally quartz. In many places it was described as slightly silty, gravelly sand.

4.6.1 Natural Moisture Content, Atterberg Limits and Saturation Moisture Content

The Moisture Content and Atterberg Limit test results of WWMC are presented below in Table 4.10.

Table 4.10: Moisture Content and Atterberg Limits Results for the WWMC

Test		Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
No. of Tests		51	15*		
Results	**Min.**	2.5	26	12	13
	Max.	34	66	25	41
	Avg.	12.7	33.3	16	18.8
	μ, (μ-1/2σ)	12, (9)	30, (25)	16, (14)	17, (13)
*Note: A total of 3 No. of samples showed non plastic nature.					

Liquidity index of the WWMC ranged from -0.31 to 0.36 with an average of 0.1.

The results suggest that the WWMC comprises a low to intermediate plasticity clay.

A total of 11 No. of Saturation Moisture Content and Laboratory Density tests scheduled within bulk samples mainly from trial pits were restricted as insufficient suitable/intact material, indication of the non-intact nature of the surfacing WWMC.

Natural Moisture Content results are presented in Figure 7.23, Atterberg Limits in Figure 7.24, and the Plasticity Chart (A-Line Plot) in Figure 7.25, all in Appendix A.3.2.

4.6.2 Particle Size Distribution (PSD)

A total of 14 No. PSD test results from samples within the WWMC showed that the WWMC generally comprises sand, gravel and silt with small amount of clay. The fine content varies between 20.6% and 86.3%, with an average of 49.1%. The particle size distribution test results are summarised in Table 4.11, and the grading curves can be found in Appendix A.3.1 (Figure 7.18).

Table 4.11: PSD of WWMC

No. of Tests	Category	Fine content (clay and silt) (%)	Clay content (%)	Silt content (%)	Sand content (%)	Gravel content (%)	Cobbles content (%)
14	Min.	20.6	3.7	16.9	12.4	1.3	0.0
	Max.	86.3	29.8	56.5	55.9	30.4	0.0
	Avg.	49.1	16.2	32.9	40.9	10.0	0.0

4.6.3 Density

A total No. of 6 of bulk and dry density results of the WWMC were obtained from a laboratory permeability and triaxial tests that showed a bulk density ranging from 1.81 Mg/m^3 to 2.20 Mg/m^3 with an average of 2.06 Mg/m^3, and a dry density ranging from 1.34 Mg/m^3 to 1.94 Mg/m^3 with an average of 1.70 Mg/m^3.

4.6.4 Organic Content and Loss on Ignition

A total of 19 No. test results for organic content on samples within the WWMC from trial pits in the proposed WWTP showed that the organic matter ranged between 0.3% and 3.9%, with an average of 1.26%. Based upon Table 3 in BS EN ISO 14688-2:2018 [R4.] , which provides guidance on classification of soil with organic constituents, the WWMC is classified as having generally a low organic content.

A total of 7 No. of Loss on Ignition tests were carried out on samples recovered within the WWMC. The results showed a mass lost by Ignition ranging between 0.9 and 3.6% with an average of 2.4%.

4.6.5 Carbonate Content

A total of 12 No. of results of carbonate content were available from the WWMC. The results show a range of 17% to 28% with an average value of 23.5%. The range is significantly lower than the one for the underlying West Melbury Chalk and is somewhat expected as the decomposition of the Chalk resulted in a decrease of it carbonate content.

4.6.6 Frost Susceptibility

A total No. of 2 Frost Heave tests according to BS 812-124 were carried out on an amalgamation of large bulk samples taken from the bottom of selected trial pits to obtain abundant material to test the WWMC in terms of Frost Susceptibility. Mean frost heave ranged from 26.8mm to 30mm in 96hrs. The results of these tests have confirmed the material to be classified as frost susceptible in accordance with SHW Series 800 Clause 801.15, according to which the material shall be classified as non-frost-susceptible if the mean heave is 15mm or less when tested in accordance with BS 812-124.

4.6.7 In-situ California Bearing Ratio (CBR)

A total of 16 No. of in-situ CBR test results from tests carried out on samples from trial pits at depths of 0.50m within the WWMC to inform the road design within the proposed WWTP showed that CBR values ranged from 2.7% to 14% with an average CBR value of 8%. Moisture content of the material tested ranged from 6% to 16% with an average of 10%

Tests have not been conducted at locations for external roads.

4.6.8 Effective Shear Strength Parameters

Since the WWMC is overlying the WMC in a very limited thickness, immediately at ground surface, appropriate undisturbed samples could not be collected to carry out a laboratory testing to derive its effective shear strength. Since the significance of the in-situ WWMC is very limited, as it is proposed to be scraped off the ground surface, indirect correlations were found to be appropriate do derive the effective shear strength. Based on Carbonate Content/ ϕ^o relationship by Clayton, 1977, CIRIA C574 [R40.] figure 4.13 and table 2 of BS 8002:2015 [R7.] based on the plasticity index assuming the material behaves as a soil, an effective angle of friction of 29^o can be assumed.

4.6.9 Undrained Shear Strength

The undrained shear strength of the clayey lumps of WWMC was tested by in-situ hand vane tests in trial pits. A total No. of 17 tests showed that the undrained shear strength is between 17kPa and 120kPa, with an average of 70kPa. Considering residual shear strength, the results varied between 6kPa and 28kPa, while the average value is 15kPa. The results of the in-situ hand vane tests are presented in Figure 7.34 in Appendix A.3.4.

4.6.10 Permeability

A total of 7 No. of soakaway tests were done at the alignment of the Final Effluent Pipeline and proposed WWTP area in order to determine the hydraulic conductivity of WWMC. The tests could not be completed due to an infiltration rate that 25% water height could not be reached during the day and the test had to be aborted in order to backfill the trial pit in due time, indicating a low mass permeability.

A total of 1 No. of permeability test results in triaxial cell indicated permeability of 6.7E-9m/s.

4.7 West Melbury Chalk (WMC)

The West Melbury Chalk (WMC) Formation was present in all boreholes drilled in the eastern end of the site, east of the River Cam. It was found from surface to a max depth of 14.25m.

The material comprised either calcareous clay, siltstone or mudstone. Classified using the C574 CIRIA Guide [R40.] , WMC within the area was predominately found to be structureless at the top (Grade Dm), overlying most commonly Grade B3 and B4. However, in several cases the structureless chalk on top consisted of distinct layers of clast supported (i.e., Grade Dc) and the underlying layers with structured Chalk of various CIRIA grades from A to C. The inconsistency and questionable integrity of core logging does not allow confidence in suggesting distinct layers of different CIRIA Grades within the WMC Formation. Additionally, no significant correlation of geotechnical parameters with CIRIA Grades was applicable.

It is worth mentioning that no flint bands were encountered during this ground investigation in the WMC. Also, CIRIA C574 [R40.] indicates no major flint occurrences in the Lower Chalk mentioning that flints are more common in White chalks.

At the base of the WMC the Gault Clay Formation was encountered most regularly with the presence of the Cambridge Greensand Member described in the following Section 4.8.

4.7.1 Natural Moisture Content, Saturation Moisture Content and Atterberg Limits

The Natural and Saturation Moisture Content results as well as the Atterberg Limits of WMC are summarised in Table 4.12.

Table 4.12: Moisture Content and Atterberg Limits Results for WMC

Test		Natural Moisture Content (%)	Saturation Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
No. of Tests		237	73	116		
Results	**Min.**	4	5	24	12	9
	Max.	64	37	49	24	29
	Avg.	19	18	36.5	18.8	17.7

A total of 237 No. of results of Natural Moisture Content for the WMC ranged from 4% to 45%.

The above results suggest that the WMC plots equivalent to a clay of low to intermediate plasticity. This is in accordance with CIRIA 574 [R40.] that suggests that Chalks with a lower carbonate content contains a higher proportion of clay minerals and are expected to have a plasticity index corresponding to low to intermediate clay.

Saturation Moisture Content of Chalk results are presented in Figure 7.22, Natural Moisture Content in Figure 7.23, Atterberg Limits in Figure 7.24, and the Plasticity Chart (A-Line Plot) in Figure 7.25, all in Appendix A.3.2.

4.7.2 Particle Size Distribution (PSD)

A total of 80 No. of PSD tests were carried out on samples collected from the WMC. It generally comprises silt and clay with sand and gravel. Cobbles were also encountered within the Formation. The percentage of the fine particle content varies between 11.9% and 94.3% with an average of 70.4%. The PSD of the WMC is quite uniform in terms of spatial variability within the investigated area. Along the Sewer Tunnel Route, it is a bit less sandy, while within the site of the Proposed WWTP it is less gravelly compared to other areas. However, the difference is not significant. The tests results are presented in Table 4.13 and the grading curves are shown in Figure 7.19 in Appendix A.3.1.

Table 4.13: PSD of WMC

No. of Tests	Category	Fine content (clay and silt) (%)	Clay content (%)	Silt content (%)	Sand content (%)	Gravel content (%)	Cobbles content (%)
56	Min.	11.9	3.1	8.8	2.5	0.0	0.0
	Max.	94.3	44.4	61.4	53.4	59.1	28.2
	Avg.	70.4	24.9	44.4	18.4	10.3	1.0

Note: In some cases, only the total amount of clay and silt has been provided.

4.7.3 Density and Porosity

A total No. of 186 of bulk and dry density results of the WMC were obtained from laboratory density tests, consolidation, shear box and triaxial tests that showed a bulk density ranging from 1.70Mg/m^3 to 2.74 Mg/m^3 with an average of 2.08Mg/m^3 and a dry density ranging from 1.34Mg/m^3 to 2.40Mg/m^3 with an average of 1.76 Mg/m^3. The results show a scatter from with the WMC generally plotting as a medium to high density Chalk.

According to the Intact Dry Density that ranged from 1.73 Mg/m^3 to 2.4 Mg/m^3 with an average of 1.94 Mg/m^3. The WMC is classified as high to very high density according to table 3.2 of CIRIA C574 [R40.] .

The Porosity of the WMC was measured during the measurement of the Intact Dry Density, and it ranged from 11% to 50% with an average porosity of 33%. Porosity was also calculated from Void Ratio measured in Oedometer tests and a total number of 32 results showed a porosity ranging from 31% to 45% with an average of 39%. These results show a substantial difference in the porosity of the intact and matrix dominated portion of the WMC, specifically the tested intact lumps show about 30% lower porosity.

Density results of the WMC are presented Figure 7.26 of Appendix A.3.2, and Porosity Results in Figure 7.27 in Appendix A.3.2.

A total of 72 no. of Saturation Moisture Content and Laboratory Density tests scheduled within bulk samples mainly from trial pits were restricted as insufficient suitable/intact material, indication of the non-intact nature of the surfacing Chalk.

4.7.4 Organic Content and Loss on Ignition

A total of 10 No. of samples from the WMC were tested for organic content, during geotechnical and environmental testing, from inspection pits and boreholes, mainly in the proposed WWTP area. The organic matter of the WMC ranged between 0.3% and 2.5%, with an average of 0.8%. Based upon Table 3 in BS EN ISO 14688-2:2018 [R4.] , which provides guidance on classification of soil with organic constituents, the WMC is classified as having a low organic content.

4.7.5 Voids Ratio

A total of 34 No. of results of Voids Ratio of the WMC were measured during Oedometer tests. The results show Voids Ratio ranging from 0.46 to 0.82 with an average of 0.64.

4.7.6 Dispersibility

A total of 7 dispersibility tests were carried out on samples obtained from the WMC. Dispersibility tests using the crumb, pinhole and double hydrometer methods were performed. The results are summarised in Table 4.14.Table 4.14: Dispersibility Results of WMC

Table 4.14: Dispersibility Results of WMC

Test Method	No. of Tests	Dispersibility Classification
Crumb	1	Non Dispersive (Grade 1)
Pinhole	4	Non Di spersive (ND1 – ND2)
Double Hydrometer	2	Slightly to Highly Dispersive (23%-77%)

Whilst the crumb and pinhole tests suggest non-dispersive material, the double hydrometer tests show a wide range. The crumb and pinhole tests are very simple but are known to be reliable. It is therefore suggested that the double hydrometer tests may not be representative of the nature of the material. Additionally, the historical GI works included a total No. of 3 dispersibility tests, one per each testing method, showing that the WMC was non-dispersive.

From all the above, it is likely that the WMC can be categorised as a non-dispersive clay.

4.7.7 Carbonate Content

A total of 59 No. of results of carbonate content were available from the WMC. The results generally range from 20% to 36% with an average value of 30%. The range is significantly lower than the one indicated by CIRIA C574 [R40.] for the Lower Cenomanian Chalks where the lower bound is 45%. Although this result is particularly low for Chalk it is mentioned that Marly Chalks can be of 20%-30% carbonate content. Testing during phase B revealed possible horizons of significantly lower than 20% carbonate content from in an area bounded by BH_TUN_012 to BH_TUH_014 where the carbonate content of the samples average was found about 16%.

4.7.8 Chalk Crushing Value (CCV)

A total of 31 No. CCV test results were available from samples mainly taken from trial pits and some deeper horizons in boreholes. The results showed CCV ranging between 2.0 and 3.4 with an average of 2.7. The results are presented in Figure 7.57, in Appendix A.3.8. Figure 7.57a shows the SMC against CCV.

4.7.9 In-situ California Bearing Ratio (CBR)

A total of 6 No. of in-situ CBR tests were carried out in trial pits at depths of 0.50m within the WMC at depths of 0.50m, to inform the internal road design within the proposed WWTP. CBR values ranged from 12% to 41% with an average CBR value of 23%. Moisture content of the material tested ranged from 7% to 14% with an average of 11%.

Tests have not been conducted at locations for external roads.

4.7.10 Effective Shear Strength Parameters

A total of 12 No. of triaxial test results from tests carried out on samples collected from the WMC indicated friction angle ranging between 20° and 41°.

A total of 8 No. of small shear box tests were undertaken on undisturbed specimens to determine the strength parameters of the WMC. Based on the tests results, the peak angle of friction is in the range of 29° and 59°. Excluding 4 No. of outstanding results from shear box tests (>45°) the average value is 32°.

A total of 13 No. of pressuremeter tests were done on site. Those tests indicated that the friction angle in shear at constant volume of the WMC is between 27° and 32° with an average value of

30°. The peak angle of friction derived from pressuremeter tests is between 28° and 38° with an average value of 33°.

Based on all of the above presented results, the in-situ and laboratory tests results indicated that the peak friction angle of the WMC is in the range of 27° and 59°. Taking out 4 No. of outlier results from shear box tests (>45°) the average is 33°. This is in good agreement with the C574 CIRIA Guide [R40.] , which indicated friction angle of 29°-34°. Based on CIRIA 574 the effective angle of friction of 'Grey Chalk' is not less than 31°.

Considering the above, the value of 29° has been chosen for shear in constant volume and 33° for peak value.

From 12 No. of triaxial tests the cohesion of WMC is indicated to be 2kPa and 240kPa. From the 7 No. of shear box tests the cohesion is in the range of 4kPa and 210kPa with an average of 67kPa. The cohesion derived from pressuremeter tests is in the range of 5kPa and 117kPa, with the average is 36kPa.

Based on all of the above presented results, the cohesion is between 2kPa and 240kPa with an average value of 54kPa. Based on the observation the that the material behaves as drained in the CU tests, therefore it has no undrained shear strength, and the observation that the 3m trial pits were stable in a vertical wall without showing any sign of failure, it is reasonable to assume a value for effective cohesion. Since the data shows a large scatter, the value of 20kPa has been chosen. This large scatter is consistent with the scatter shown in case of other test types and the reason is believed to be the inherent large variability of the WMC. It is worth to note here that this variability is significantly reduced when remoulding the samples, as the shear box tests in remoulded conditions show a much more consistent pattern than the undisturbed samples.

The effective strength parameters of the WMC Formation are presented in Appendix A.3.3 in Figure 7.28 and Figure 7.29.

4.7.11 Undrained Shear Strength

Based on the more detailed evaluation of the results of the Consolidated-Undrained Triaxial (CUT) tests, specifically the development of pore pressure during the shearing stage, the behaviour of the WMC can be assessed as drained, as the change in pore water pressure in the sample is negligible compared to the change in the deviator stress. Therefore, undrained shear strength for the material cannot be determined.

4.7.12 Unconfined Compressive Strength (UCS)

UCS tests were carried out on 18 No. samples of the WMC. The test results indicated UCS between 0.09MPa and 4.14MPa, with an average of 1.22MPa. Most of the samples are in the range of 0.09MPa and 0.43MPa with an average of 0.16MPa, but there are some results (8 No. out of the total 18 No.), which showed higher UCS (1.27MPa-4.14MPa, with an average of 2.55MPa). These higher values do not show any correlation with depth or location in terms of spatial distribution. This is evidence that there is a large variation in the strength of the WMC, and that this variation, i.e. the presence of harder bands cannot be clearly defined in space. The plot of UCS against elevation is presented in Figure 7.37 in Appendix A.3.5.

4.7.13 Overconsolidation Ratio (OCR) and K0 profile

Based on [R18.] and [R19.] an indirect derivation from pressuremeter test data was used to determine the OCR, using the calculated failure pressure. Based on this data the OCR of the WMC Formation is between 1.4 - 4.9 with an average value of 3.1. Based on these values an average value of 180 kPa preconsolidation pressure is calculated. Based on this, the layer is classified as lightly overconsolidated. Due to the indirect method of derivation, the resulting small margin and the natural variability of the WMC, it is recommended that the layer is treated as normally consolidated.

The value of K0 is between 0.63 - 1.57 with an average of 1.1 showing a pattern decreasing with depth.

The plots for OCR and K0 of the WMC Formation are shown in Figure 7.39.

4.7.14 Compressibility and Consolidation

For WMC the following tests were conducted to derive its compressibility, with summary figures provided in Figure 7.41 Figure 7.42 and Figure 7.43.

4.7.14.1 In-situ Testing

Pressuremeter Testing

Pressuremeter tests measure the horizontal stiffness of the ground, however no stiffness anisotropy is considered for the Chalk, therefore the vertical stiffness assumed to be equal to the horizontal stiffness. The results at 1% strain were plotted in comparison with other laboratory and in-situ (plate load) tests.

Plate Load Testing

The test was carried out at close to surface elevations, mainly 1-2mbgl using a 600mm sized plate, therefore the load affects the Chalk layer in a maximum depth of about 2m. Since other tests show no significant change in the stiffness with depth, it could be considered representative for the whole layer.

4.7.14.2 Laboratory Testing

Deformability in UCS Testing & Oedometer Testing

The Chalk shows a large variability in both UCS and oedometer testing. Deformability results from UCS tests show a large scatter, but this scatter is consistent with the results for strength derived from the same tests. It is believed that this scatter is a result of an existing variability in the Chalk material and not due to sample disturbance. The oedometer tests are showing similar results as the lower bound of the UCS tests, however in these tests the scatter is missing, therefore the significantly higher values are absent from the pattern, except for a single test. The reason for this is not fully understood, it may be the result of sample preparation, considering the structure of the material is more matrix-like rather than homogeneous, therefore cutting the sample into the oedometer may include disturbance to its structure.

4.7.14.3 Indirect correlations and literature reference

Standard Penetration Testing (SPT)

A correlation was developed by Stroud [R27.] to determine a lower bound stiffness value for white chalks based on SPT results, which correlates the drained Young’s modulus E’ = 5N. An average value derived from all SPT tests is shown in the graph, noting that its direct applicability is not confirmed for Cenomanian/Grey (formerly Lower) Chalks.

4.7.14.4 WMC design line selection process

A significant scatter is observed in the results of all the test types which shows that regardless of the type of test carried out, there is a large variability in the stiffness of Chalk. This variability becomes more pronounced in the laboratory tests, where only a very small piece of sample is tested, and less, but still significant scatter is observed in the in-situ tests, where the response of a larger volume of the ground is measured, therefore the differences may be evened out by a mass response.

The outstanding points cannot be separated as different stratigraphic units as the values are scatted around depth, location in plan and even chalk grades. Therefore, a single parameter set is derived for the entire layer and parameters are derived based on an averaging approach, rather than trying to determine a characteristic value based on a statistical analysis. To consider that there is significant difference between the number of laboratory tests and the number of in-situ tests, first a single average is determined for all the different types of tests. Then, to derive the design value, these average values corresponding to each test types are averaged so that the pressuremeter test average is considered with more weight as the test is considered to be representative for a larger mass of ground. Two design lines are presented in Appendix A.3.7 in Figure 7.41 and Figure 7.42 , for loading and for unloading respectively.

4.7.14.5 Degradation of stiffness with strain

The recommended design line presented in this section is based on the expected stiffness at large strains of around 1%. Based on the actual engineering application, different strains are induced in the ground, e.g., as shown in Figure 52.18 of the Manual for Geotechnical Engineering [R37.] . It is suggested that the typical strain range for shallow foundations is between 0.1%-0.4%, and for single piles is between 0.05%-0.2%. Conventional laboratory testing carried out within the frames of the current GI derives the large-strain stiffness of the ground, while in-situ pressuremeter testing derives the stiffness of the ground in between 0.01% and 1% strain. It is recognised in many sources that stiffness of Chalk is also strain dependent, however there is little literature reference whether the standard frameworks applied to describe stiffness degradation behaviour of soils are applicable for the WMC. Therefore, recommended design values are presented for 1% strain.

Figure 7.43 in Appendix A.3.7 shows the data processed from pressuremeter testing in case of strain levels 0.1% and 0.01% with average values, however it is the designer’s responsibility to assess the limitations and applicability considering the specific engineering problem. It is recommended that further work is conducted at later Design Stages.

4.7.14.6 Consolidation

No excess pore water pressure was encountered during geotechnical testing and therefore it is not expected that WMC will undergo consolidation settlement during the timeframe of construction. Creep behaviour of WMCK is addressed in Section 4.7.14.7.

4.7.14.7 Maximum bearing pressure, yield stress and creep

The risk of creep settlement increases above negligible when the yield stress of chalk is exceeded. In case of 1 no. of plate load test the yield stress of 278 kPa was determined, while in case of 4 no. of tests no yield was observed up to loading to 500 kPa. The expected range for Grade D chalk based on CIRIA PR 11 is 250-500kPa. Therefore, the yield stress of WMC Formation can be assumed 278kPa.

Secondary settlement or creep follows a time dependant behaviour, which varies during different stages of foundation loading. The methodology for assessment of creep has been taken from Powell (1990), as presented in CIRIA C574 [R40.] . Based on that, creep is indicated to be approximately 3-10mm depending on the ratio of applied stress and ultimate bearing capacity. However, the majority of the secondary settlement is projected to occur within one day following application of maximum load. This is therefore likely to only be considered during the construction or hydro-testing phase.

4.7.15 Permeability

Packer and falling head tests were carried out in order to define the permeability of the WMC.

A total of 7 No. of Packer tests were proposed, but since the material was found to be unsuitable for that type of testing (see Section 3.3.7.6), 6 of the tests failed or were cancelled due to being unable to maintain the required pressures due to leakage/bypass from either top or bottom packer. However, one of the tests was successful resulting permeability of 9.9E-06 m/s.

A total of 13 No. of falling head tests and a total of 14 rising head tests were carried out within boreholes. The falling head tests showed that the permeability is in the range of 3.7E-05 m/s and 1.0E-07 m/s. Based on the results of the rising head tests the hydraulic conductivity is in the range of 1.8E-05 m/s and 9.6E-09 m/s.

In summary, the test results of the current ground investigation indicated that the permeability of the WMC is in the range of 3.7E-05 m/s and 9.6E-09 m/s. The permeability test results for WMC are depicted in a graph in Figure 7.60 in Appendix A.3.10.

4.7.16 Rock Structure

A total of 334 No. Total Core Recovery (TCR), Solid Core Recovery (SCR) and Rock Quality Designation (RQD) records were recorded in the cores recovered from the WMC.

The results for TCR, SCR and RQD generally ranged from 0 to 100% with the averages summarised below and represented in Figure 7.64, Figure 7.63 and Figure 7.62 of Appendix A.3.11 respectively:

- TCR average value of 93%
- SCR average value of 60%
- RQD average value of 49%

Specifically, for RQD, in cases where both SCR and RQD values were 0% were considered unrepresentative and a summary of a statistical analysis of the RQD as a classification index can be found below:

- About 28% of the core was found to be Very poor (RQD ranging from 0 to 25%)
- About 18% of the core was found to be Poor (RQD ranging from 25% to 50%)
- About 26% of the core was found to be Fair (RQD ranging from 50% to 75%)
- About 16% of the core was found to be Good (RQD ranging from 75% to 90%)
- About 8% of the core was found to be Excellent (RQD ranging from 90% to 100%)

Considering all the above, in accordance with Deere, 1988, the WMC, in terms of RQD, can be classified as very poor to fair.

4.7.16.1 Fracturing

A total of 158 No. fracture index values were recorded within the cores from the WMC. The results show spacing of discontinuities ranging from 10mm to 1320mm. The results are summarised below and the mode average spacing is represented in Figure 7.65 of Appendix A.3.11.

- Average of minimum fracture spacing of 119mm
- Average of maximum fracture spacing 340mm
- Mode average of mean fracture spacing 206mm

According to BS EN ISO 14689:2018 (table 8) [R5.] , the above data would classify the chalk as having close to medium spaced fractures, generally close.

4.8 Cambridge Greensand (CG)

The Cambridge Greensand (CG) Member was encountered at the base of the West Melbury Chalk Formation in most of the boreholes formed at the eastern part of the site. It generally comprised dark greenish grey slightly sandy slightly gravelly clay, where the gravel portion consisted of coprolite nodules. Its significance is negligible in engineering applications, as no significant difference to the WMC was observed in its key physical properties such as compressibility, strength and permeability.

4.8.1 Classification Testing

The limited thickness of the CG made it difficult to be logged separately from the WMC and be sampled. A few samples from this horizon were specifically requested in order to schedule classification testing, specifically to contrast data from the overlying WMC. The results are presented in Table 4.15 below.

Table 4.15: Classification Test Results of CG

Test		Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
No. of Tests		6	2		
Results	**Min.**	17	49	19	30
	Max.	28.5	79	30	49
	Avg.	21.5	64	24.5	39.5

The Atterberg Limits tests results suggest that the clayey portion of the CG comprises an intermediate to high plasticity clay.

Natural Moisture Content results are presented in Figure 7.23, Atterberg Limits in Figure 7.24, and the Plasticity Chart (A-Line Plot) in Figure 7.25, all in Appendix A.3.2.

4.8.2 Particle Size Distribution

A total of 4 No. of PSD tests were carried out on samples collected from the CGS. It generally comprises silt and clay with sand and occasionally gravel. The percentage of the fine particle content varies between 53.6 and 98% with an average of 84.9%.

Table 4.16: PSD of CGS

No. of Tests	Category	Fine content (clay and silt) (%)	Clay content (%)	Silt content (%)	Sand content (%)	Gravel content (%)	Cobbles content (%)
4	Min.	53.6	19.4	34.2	1.2	0.0	0.0
	Max.	98.0	56.9	45.4	17.0	29.4	0.0
	Avg.	84.9	43.9	41.0	7.7	N/A*	0.0
*Cobbles only encountered in specific occasions. Not applicable to derive an average.							

4.9 Gault Clay Formation (GC)

The Gault Clay (GC) Formation was encountered in the majority of the boreholes across the site. Shallowest encounter was at about 2.00mbgl from surface at the western part of the Final Effluent and at about 1.2mbgl at the west of the River Cam along the Tunnel route. Either directly underlying the West Melbury Chalk Formation at the east or superficial deposits at the West of the site, its maximum depth was 47.60m where the interface with the Lower Greensand was encountered at the proposed WWTW area.

A general description of the GC showed a stiff to very stiff thinly laminated dark grey clay with occasional phosphatic and/or siltstone nodules. Generally, GC was unweathered, but occasionally was classified as partially weathered with stained fissures present.

4.9.1 Natural Moisture Content and Atterberg Limits

The Natural Moisture Content and the Atterberg Limit test results are summarised in Table 4.17.

Table 4.17: Classification Test Results of GC

Test		Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
No. of Tests		190	108		
Results	**Min.**	12	23	17	15
	Max.	42	83	36	55
	Avg.	27	68	27	42

The Liquidity Index of the GC ranged from –0.05 to 0.2 with an average of 0.01.

The results suggest that the GC, except a few outlier results along the Tunnel and Final Effluent alignment, generally comprises a high to very high plasticity clay.

Natural Moisture Content results are presented in Figure 7.23, Atterberg Limits in Figure 7.24, and the Plasticity Chart (A-Line Plot) in Figure 7.25 all in Appendix A.3.2.

4.9.2 Particle Size Distribution (PSD)

A total of 99 No. of PSD tests were undertaken on GC samples. Based on the test results, GC generally comprises clay and silt with small amount of sand and gravel. The percentage of the fine particle content varies between 69.5% and 99.6%, with an average of 95.5%. The results are very similar except two, which indicated much smaller fine content and correspondingly higher sand and gravel content. That sample was collected from the alignment of the Final

Effluent Pipeline. However, the other 10 tests undertaken on samples collected from around the same area are in good agreement with the rest of the test results. The results and the particle size distribution curves are presented in Table 4.18 below and in Figure 7.20 in Appendix A.3.1 respectively.

Table 4.18: PSD of GC

No. of Tests	Category	Fine content (clay and silt) (%)	Clay content (%)	Silt content (%)	Sand content (%)	Gravel content (%)	Cobbles content (%)
99	Min.	69.5	18.2	27.1	0.3	0.0	0.0
	Max.	99.6	71.0	78.3	25.8	23.3	0.0
	Avg.	95.5	53.4	42.0	3.7	0.8	0.0

4.9.3 Density

A total No. of 166 bulk and dry density results of the GC were obtained from laboratory density tests, consolidation, shear box and triaxial tests that showed a bulk density ranging from 1.72Mg/m^3 to 2.65 Mg/m^3 with an average of 1.98Mg/m^3 and a dry density ranging from 1.23 Mg/m^3 to 2.06Mg/m^3 with an average of 1.56 Mg/m^3. The results show good consistency and negligible change with depth.

4.9.4 Voids Ratio

A total of 64 No. of results of voids ratio of the GC were measured during oedometer tests. The results show voids ratio ranging from 0.29 to 0.95 with an average of 0.73.

4.9.5 Shrinkage Potential

A total of 12 No. of linear shrinkage tests were undertaken on GC. The Linear Shrinkage generally ranged from 12% to 16% in all 11 samples along the tunnel alignment except 1 sample near surface along the Final Effluent that showed a Linear Shrinkage of 7%. Generally, the results show a medium shrinkage potential.

4.9.6 Dispersibility

A total of 29 No. of dispersibility test results from samples obtained from the GC, using the crumb, pinhole and double hydrometer methods are summarised in Table 4.19 below.

Table 4.19: Dispersibility Results of GC

Test Method	No. of Tests	Dispersibility Classification
Crumb	15	Non Dispersive (Grade 1)
Pinhole	13	Non Dispersive (ND1 – ND2)
Double Hydrometer	1	Non Dispersive (8%)

The above results are consistent and suggest that GC is classified as a non-dispersive clay in this area.

4.9.7 Effective Shear Strength Parameters

The 29 No. of CU triaxial tests and 19 No. of small shear box tests show a considerable scatter in the results for the effective angle of friction. The shear box tests give a range between 11-29° with an average of 22°, the triaxial tests range between 12-29.5° with an average of 23.4°. These values exclude a total of 4 No. of outlier results.

Based on BS8004 [R8.] the effective angle of friction of clays correlates with their plasticity index, which gives a value of 22° for angle of friction in shear at constant volume. Considering the significant scatter in the results, it is proposed that both peak and constant volume effective angle of friction is limited to 22°. The values for effective angle of friction are shown in Figure 7.30 in Appendix A.3.3.

The same tests, mentioned above, show an effective cohesion in between 8kPa and 180kPa with an average of 52kPa. Based on database from [R26.] , the arithmetic mean of the effective cohesion from sites that are located closest to the Cambridge area is c'=35°. Recognising that both the tests and literature data suggests that there may be an effective cohesion of the GC, potentially because of the bond provided by its calcite content. However due to the large scatter of the data, the reason for which is not fully understood, it is still recommended to assume no effective cohesion for the layer. The values for effective angle of friction are shown in Figure 7.31 in Appendix A.3.3.

4.9.8 Undrained Shear Strength

The following tests were carried out to assess the undrained shear strength of GC:

4.9.8.1 In-situ tests

Pressuremeter Testing

Based on [R15.] the undrained shear strength was determined by pressuremeter tests using different methods, either on the expansion part (Gibson & Anderson) or the contraction part (Jefferies), these results showed a very close agreement, the 14 No. of tests show a value in between 112-395 kPa and a pattern increasing with depth.

4.9.8.2 Laboratory Testing

Unconsolidated Undrained multistage triaxial testing (UU)

A total of 18 No. of test results from UU triaxial tests show a variation in undrained shear strength between 55-500kPa, and it shows a less pronounced increase with depth, potentially because of the unconsolidated nature of the tests. Some outlier points at depth are potentially because of the presence of harder bands. Majority of the results is in between 50-150kPa.

Consolidated Undrained multistage triaxial tests (CU)

A total of 20 No. of CU tests were assessed. The tests were isotropically consolidated before the shearing stages, the consolidation stresses were chosen as the in-situ vertical effective stress and half and double of that. Based on the results obtained for K0 value, the true in-situ consolidation stress is anisotropic with the average effective normal stress between $1\times\sigma'v$ and $2\times\sigma'v$. Therefore, these two data sets were assessed in the summary of results. The results show a more pronounced increase with depth and the values recorded in this test are generally lower than the values derived from in-situ pressuremeter testing.

Laboratory shear vane tests

A total of 43 No. of undrained shear strength results from laboratory vane tests show a value between 79-189kPa with no clear pattern of increase with depth. Note that just as the UU tests, the laboratory vane tests are testing the sample without reconsolidating it to its in-situ effective stress level.

4.9.8.3 Indirect correlations and literature reference

Standard Penetration Test (SPT)

The undrained shear strength was determined based on SPT blow counts (160 no.) that are correlated with undrained shear strength of clays depending on their plasticity index [R38.] . This correlation shows a value in between 65-250kPa showing a clear increase with depth. Note that in 46 No. of cases SPT=50 (refusal) was reached, these numbers are not considered in the assessment. Most of the refusals occurred at the proposed site area, the first refusal being encountered between 20-24mbgl. Along the tunnel alignment refusals occurred only in BH_TUN_012B.

Literature Reference

The results of the ground investigation in terms of undrained shear strength were compared with the available literature on the subject [R35.] . The literature presents the results of Hollow Cylinder Apparatus (HCA) tests carried out on four UK stiff clays, including the GC Formation. The HCA tests summarise the shear strength of the clays in terms of direction of major principal stress from 0-90 degrees. These results are compared with tests from other types of tests such as triaxial compression and extension tests and direct shear tests. The results are summarised in terms of average effective consolidation stress, based on which the ‘Literature’ design line was plotted, one for triaxial compression and one for the minimum value with respect to the direction of loading derived from HCA tests. The literature reference is generally within the range of the results derived from in-situ or laboratory testing.

4.9.8.4 Recommendations

Summarising the above, all in-situ and consolidated laboratory tests show an increase in strength with depth, from these tests the pressuremeter test results show the highest values, followed by the indirect derivation from SPT count, then Consolidated-Undrained Triaxial (CUT) consolidated to 2×σ’v then the same tests consolidated to 1×σ’v. The Unconsolidated-Undrained (UU) Triaxial and the Laboratory Vane tests do not show a clear increase of strength with depth, the vane tests are above the average at shallow, and below the average at higher depth, while the UU tests are rather at the middle-lower bound of the pattern. The literature line for triaxial and HCA tests shows a reasonable fit to the data pattern, the triaxial tests being more on the lower bound while HCA tests are closer to the average.

The data for the main site and the Sewer Tunnel / Final Effluent sites were assessed separately as some difference was observed in the pattern of the data and the difference in stratigraphy, i.e., the proposed main site the GC is overlain by the WMC, while in case of the other two areas, the GC is overlain mainly by the RTD, suggests that possibly the different areas underwent slightly different geological processes throughout the after deposition history.

Based on these observations two different undrained shear strength profiles were chosen for the proposed main site Sewer Tunnel / Final Effluent sites.

Due to the limited amount of data at more significant depth below the proposed main site, the increase of strength with depth should be limited to 30mbgl. Below this level confidence levels are reduced therefore it is recommended to limit the strength increase with depth at this depth level.

In case of the Sewer Tunnel / Final Effluent site the increase in strength is recommended to be limited below 20mbgl due to a large scatter and the lesser amount of data and a constant value is recommended.

The undrained shear strength results are presented in Figure 7.35 for the proposed main site and Figure 7.36 for the Tunnel and Final Effluent sites, both in Appendix A.3.4.

4.9.9 Unconfined Compressive Strength (UCS)

UCS tests were undertaken on 25 No. samples collected from the GC. The results were assessed separately for the existing WRC-Final Effluent and the proposed main site. At the main site the UCS shows an increase with depth from a minimum value of 50kPa with a similar gradient that is suggested by the increase in undrained shear strength (12 kPa/m, approximately double of the gradient suggested for the increase in undrained shear strength, which is chosen as 7 kPa/m). Data below -15mAOD at the proposed main site suggests that below this level there are harder bands of material, the maximum value of UCS encountered below -15mAOD is 0.95MPa. In case of the Sewer Tunnel and Final Effluent site there are not enough UCS tests carried out on samples at more significant depths to draw a similar conclusion, but the results for the undrained shear strength tests (UU) suggest that these occasional harder bands exist at these sites as well. The UCS against elevation plot is shown in Figure 7.38 of Appendix A.3.5.

4.9.10 Overconsolidation Ratio (OCR) and K0 profile

Based on [R15.] an indirect derivation method from pressuremeter test data was used to derive OCR using the undrained shear strength of the formation (Wroth 1984). The data showed that the OCR of the GC is between 3.7 – 7.7 with an average value of 5.5. Based on these values an average value of 970kPa preconsolidation pressure is calculated. Based on these, the layer is classified as heavily overconsolidated. Based on oedometer tests the onset of the virgin compression curve cannot be identified.

The value of K0 is between 0.94 – 2.0 with an average of 1.44 showing an increase with depth.

The plots for OCR and K0 of the GC are presented in Figure 7.40 in Appendix A.3.6.

4.9.11 Compressibility and consolidation

The following tests were carried out to assess the compressibility and consolidation properties of GC:

4.9.11.1 In-situ testing

Pressuremeter Tests

Pressuremeter tests measure the horizontal stiffness of the ground, and stiffness anisotropy of GC is recognised in literature references, [R28.] . The direct use of the pressuremeter data is not recommended to derive vertical stiffness of the ground. There is published data on the expected relationship between vertical and horizontal stiffness in GC [R28.] , based on this reference E'_h/E'_v = 3.12. Therefore, all drained stiffness values from pressuremeter tests were approximated to be divided by 3 to derive the vertical drained stiffness. The data at 1% strain shows a vertically increasing pattern with little amount of scatter. The results are presented in Figure 7.44, Figure 7.45, Figure 7.46.

4.9.11.2 Laboratory testing

Deformability in UCS testing

Deformability measured in UCS testing shows a reasonable agreement with the vertical stiffness derived from pressuremeter data.

Oedometer testing

The plot of oedometer test results (e vs. log stress) form a straight line on the loading path, shows that pre-consolidation pressure is not reached during the loading process. This is expected to be the case for over-consolidated clays subject to ancient Glacial loading, therefore, the soil compressibility is expected to follow its recompression curve. Based on [R29.] [R30.] and [R31.] it is not possible to derive the in-situ recompression curve for stiff clays from the loading path due to sample disturbance, instead, it is proposed that the Recompression Index (C_r) is determined from the first reloading and second unloading sequence. Because this investigated unload-reload loop is recommended to start at the in-situ vertical effective stress level and include a re-load step that is comparable with the anticipated loads, some of the tests carried out in Phase A were discounted, that had a deviating value of effective stress level or stress increment on their unload-reload curve. The tests considered in deriving the design line are showing a very similar range to the results of other types of tests.

4.9.11.3 Indirect correlations and literature reference

Interpolation from Undrained shear strength (c_u)

The undrained vertical stiffness E^u_v of GC was determined using the undrained shear strength. Based on [R32.] and using the Plasticity Index and the OCR of the clay the correlation $E^u = 200 \times c_u$ has been chosen. The chart shows E_v' derived from E^u_v. The derived values are in good agreement with the results from other tests.

Standard Penetration Testing (SPT)

Stroud [R27.] developed a correlation between N_{60} and E' for over-consolidated clays, taking into account the Plasticity index and the degree of loading, based on which the correlation $E' = 0.75 \times N_{60}$ has been chosen for larger strain applications, i.e. $q_{net}/q_{ult}>0.1$. The derived values are in good agreement with the results from other tests, being slightly on the upper end of the pattern.

Literature

Literature reference [R28.] provides an overview of the stiffness characteristics of selected UK stiff clays, including GC, which provides reference values for E^u_v in case of different strain ranges: 1%, 0.1%, 0.01% and 0.001% at different effective stress levels. To compare with the lab testing data and other correlations, the value at 1% strain was plotted as literature reference assuming p' based on average $K_0 = 1.5$ derived from pressuremeter testing. The literature line derived this way is a very good match to the pattern of results, and almost an exact match with a trendline for the pressuremeter data (considering $E'_h/E'_v = 3$ anisotropy).

4.9.11.4 Recommendations

The deformability from UCS tests matches well with the pressuremeter test considering stiffness anisotropy, the expected range is confirmed by other indirect sources such as derivation from undrained shear strength, SPT and literature reference. Since the results from the pressuremeter tests almost perfectly fit the literature data and it could also be considered as a cautious estimate for the whole of the data set, therefore, the design line is chosen as the trend line for the pressuremeter data (considering $E'_h/E'_v = 3$ anisotropy). Based on the oedometer tests, OCR values and supported by literature reference as well, the virgin compression curve is not expected to be reached in 'reasonable' engineering scenarios. Therefore, only one value is presented for vertical loading in Figure 7.44 in Appendix A.3.7 which is applicable for loading and reloading conditions as well, being representative for the recompression curve.

4.9.11.5 Coefficient of consolidation (c_v)

The rate of consolidation was assessed for the available number of tests, the data shows a value of c_v between 0.9-14.0m^2/yr with an average of 3.12^2/yr. These numbers are within the expected range based on [R26.]

4.9.11.6 Secondary compression index (C_α)

The rate of secondary compression (C_α) values ranged from 0.00034 to 0.0028 with an average of 0.0013. These numbers are within the expected range based on [R26.]

4.9.11.7 Degradation of stiffness with strain

The recommended design line presented in this Section is based on the stiffness at strains around 1%. Based on the actual engineering application, different strains are induced in the ground, as shown in Figure 52.18 of the Manual for Geotechnical Engineering [R37.] . It is suggested that the typical strain range for shallow foundations is between 0.1%-0.4%, and for single piles is between 0.05%-0.2%. Conventional laboratory testing carried out within the frames of the current GI derives a the large-strain stiffness of the ground, while in-situ pressuremeter testing derives the stiffness of the ground in between 0.01% and 1% strain. Based on pressuremeter tests, the stiffness of the ground at 0.01% and 0.1% strain are presented in Figure 7.46 in Appendix A.3.7, so that it is possible to choose a stiffness value different from the recommended design line, however it is the designer's responsibility to assess the appropriate strain level for the particular design situation which is expected to be relevant at later Design Stages.

4.9.11.8 Horizontal stiffness

The horizontal drained stiffness of the GC is determined by the trend line of the pressuremeter test data, shown in Figure 7.45 in Appendix A.3.7.

4.9.12 Swelling Potential

A total of 51 No. of results were made available from Swelling Pressure tests and measurement of swelling pressures in an Oedometer. The results show Swelling Pressures ranging from 13kPa to 220kPa with an average of 72.5kPa. The swelling pressures within the GC show a rising tendency with depth that is more evident at -12mAoD, and slight rise with decrease of moisture content.

Comparing the results with available databases in literature, the swelling data presented in [R21.] shows a range of swelling pressures between 350-1100kPa, however it is based on samples in a more significant depth (depth of swelling data is between 27.4-88.0mbgl), also the Liquid Limit of the material is different from the one encountered at the site (between 64-86%, average of 75%). Also, some of the results are from remoulded or from block samples, and the same source suggests that breaking the bonds of the undisturbed material, either by a sample disturbance or a remoulding, it will increase swelling potential as the 'natural' in-situ bonds act to reduce swelling. There is only one rotary cored sample in between the results, and it shows the lowest swelling pressure of all (320kPa), however it is not detailed whether the sample is classified as Class I. This phenomenon is confirmed within the current GI, as the 2 highest values (>200kPa) obtained from tests carried out on specimens form bulk samples (e.g., BH_TUN_012B and BH_OUT_001B).

The database for swelling pressures presented in [R26.] is based on very limited data, however it is worth to mention that that initial swelling pressures measured in oedometer testing were in the range of 41-114kPa for Arlesey and 106-244kPa for Klondyke Farm, suggesting that lower values in GC are also plausible.

Noting the results from literature reference, the swelling pressure tests carried out suggest that the swelling pressures at the project site are potentially at the lower end of the typical range for the layer. This is also supported by mineralogical information (X-Ray Diffraction results).

Swelling Pressure results for GC are presented in Figure 7.58 of Appendix A.3.9.

4.9.13 X-Ray Diffraction results (XRD) and Mineralogy

A total of 14 No. of XRD results were available from the scheduled tests. The aim of this test is to identify the smectite minerals which are associated with the swelling potential of GC and could be present in certain horizons and pyrite which is associated with the risk of ground aggressivity. The previous ground investigation included 6 No. of tests within the GC with results being largely in line with literature as explained below.

Percentage by weight	Calcite (%)	Quartz (%)	Muscovite (%)	Other micas (%)	K-feldspars (%)	Other Clay minerals (%)	Garnets (%)
Minimum	14.6	29.6	2.1	0	0	0.9	0.5
Average	31.8	50.4	10.3	0.4	0.4	4.8	2.3
Maximum	57.8	73.3	21.3	7.6	3.3	19.1	5.7

The results above show no significant smectite mineral concentration which confirms the lower swelling pressures in the above section. No pyrite was detected in the selected samples.

According to the results the *garnets* traced in the samples included mainly almandine occasionally pyrope and rarely andradite. *Micas* included mainly muscovite and rarely traces of biotite and phengite. The *K-feldspars* occasionally identified in the samples were orthoclase and microcline. Other clay minerals include kaolinite and nacrite. Hematite and magnetite weight was traced less than 0.1%.

The results are generally in line with the 2 results available from the previous ground investigation in proximity to the site, with low smectite content and with some differences in the proportion of clay minerals traced within the samples. Noteworthy from the previous ground investigation is the 0.6% weight percentage of pyrite traced in one of the two samples that were taken from this particular site.

According to literature and especially to the British Geological Survey (BGS) data report [R26.] , states that the major non-clay minerals are quartz and calcite, and the major clay minerals are predominantly kaolinite, illite and smectite along with other clay minerals that are present. The upper GC tends to be slightly more calcareous due to calcite attributed to shell fragments and micro fossils. Recrystallized calcite can act as cementing agent.

The report [R26.] also states that the upper part of the GC comprises a smectite-dominated zone, with the resulting implications of high plasticity, high swelling pressures and low angles of residual strength. However, geotechnical test results do not show a significant increase in plasticity or swelling pressures in the upper layers as seen in Figure 7.58 in Appendix A.3.9.

4.9.14 Permeability

Permeability tests were carried out on site within boreholes located along the Sewer Tunnel alignment in order to determine the hydraulic conductivity of GC.

A total of 2 No. of Packer tests were done, but the material was found to be unsuitable for that kind of test due it its low permeability.

A total of 1 No. of falling head test was carried out, of which result is 6.1E-07 m/s.

A total of 2 No. of rising head tests were undertaken, which indicated lower permeability than the falling head test. The results of the rising head tests are 8.8E-10 m/s and 5.1E-10 m/s.

The permeability tests results indicated that the permeability of the GC is in the range of 6.1E-07 m/s and 5.1E-10 m/s. The permeability test results for the GC Formation are shown in Figure 7.61 in Appendix A.3.10.

4.10 Lower Greensand Formation (LGS)

The Lower Greensand (LGS) Formation underlies the GC Formation throughout the site, and it was encountered by 5 designated boreholes, three along the Tunnel in proximity to the proposed shaft locations and two in the proposed WWTW. The LGS generally comprised dark greenish grey slightly sandy gravelly clay, where gravel consisted of rounded to subrounded flint, interbedded with dark greenish grey slightly gravelly clayey fine to medium sand. The base of the LGS Formation was not proven in this ground investigation; however, the LG is known to be unconformably underlain by the Kimmeridge Clay in the area.

4.10.1 Moisture Content and Atterberg Limits

The Natural Moisture Content and the Atterberg Limit test results of LG are presented in Table 4.20 below.

Table 4.20: Natural Moisture Content and Atterberg Limits of LG

Test		Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
No. of Tests		6	5*		
Results	**Min.**	16	31	13	14
	Max.	21	43	19	24
	Avg.	19	35.3	16.3	19
Note: A total of 1 No. of samples showed non plastic nature.					

The results suggest that the clayey portion of the LGS comprises a low to intermediate plasticity clay.

Natural Moisture Content results are presented in Figure 7.23, Atterberg Limits in Figure 7.24, and the Plasticity Chart (A-Line Plot) in Figure 7.25, all in Appendix A.3.2.

4.10.2 Particle Size Distribution

A total of 8 no. of PSD tests were undertaken on samples collected from the LGS. The results showed that the LGS comprises predominately sand with small amount of clay, silt and gravel. The percentage of fine content varies between 12.9% and 47.3%, with an average of 27%. Tests carried out on samples collected from the site of the Proposed WWTP indicated that the LGS is less sandy and more silty than the material encountered along the alignment of the

Sewer Tunnel Route. The results are summarised in Table 4.21, while the grading curves can be found in Figure 7.21 in Appendix A.3.1.

Table 4.21: Particle Size Distribution of LG

No. of Tests	Category	Fine content (clay and silt) (%)	Clay content (%)	Silt content (%)	Sand content (%)	Gravel content (%)	Cobbles content (%)
8	Min.	12.9	7.6	5.3	50.3	0.3	0.0
	Max.	47.3	23.5	26.8	81.2	20.4	0.0
	Avg.	27.0	13.7	13.3	64.9	8.1	0.0

4.10.3 Density

A total of 3 No. of bulk and dry density results of the LGS was obtained from Linear Measurement tests that showed an average bulk density of 2.07 Mg/m3 ranging from 2.05 Mg/m3 to 2.09 Mg/m3 and an average dry density of 1.73 Mg/m3, ranging from 1.70 Mg/m3 to 1.78 Mg/m3. For further information, published data [R13.] suggest a typical bulk density value of 2.19 Mg/m3 and typical dry density value of 1.89 Mg/m3 for this formation.

4.10.4 Organic Content

A total of 2 No. of samples from the LGS from boreholes were tested for organic content, during geotechnical testing. The organic content of the LG ranged between 1% and 1.4%, with an average of 1.2%. Based upon Table 3 in BS EN ISO 14688-2:2018 [R4.] , which provides guidance on classification of soil with organic constituents, the LGS is classified as having a low organic content.

4.10.5 Carbonate Content

A total of 2 No. of results of carbonate content were available from the LGS Formation. The results show a carbonate content of 2.8% and 2.6% and according to table 4 of BS EN ISO 14688:2-2018 [R4.] the LGS is classified as slightly calcareous.

4.11 Properties of remoulded materials

The remoulded properties of the below strata were investigated to assess reusability of excavated material, support earthworks specifications and design of earthworks.

4.11.1 Weathered West Melbury Chalk (WWMC) and West Melbury Chalk (WMC)

Correlation with classification properties such as carbonate content, plasticity and grading including colour of material observed in logs, laboratory descriptions and trial pit photographs was attempted in order to clearly differentiate the WMC by the overlaying surfacing WWMC. However, the scattering of the data due to the variability of the materials did not easily establish a clear separation of the materials based on their remoulded behaviour.

4.11.1.1 Maximum Dry Density and OMC

A total of 44 no. of samples from the WMC were tested in order to determine the relationship between the dry density and the moisture content, both using the 4.5kg rammer and the 2.5kg rammer method.

The tests carried out using the 2.5kg rammer method resulted in a maximum dry density between 1.66-1.95 Mg/m^3 with an average value of 1.78 Mg/m^3. The optimum moisture content varied between 8-21% with an average value of 16%.

The tests carried out using the 4.5kg rammer method resulted in a maximum dry density between 1.83-2.04 Mg/m^3 with an average value of 1.92 Mg/m^3. The optimum moisture content varied between 8-16% with an average value of 12%.

One test was made available on a sample produced by the amalgamation of material from 4 locations and depths between 1.20mbgl to 1.50mbgl, and the optimum moisture content was found 13.3% at maximum dry density of 1.76.

The compaction curves are presented in Figure 7.48 and Figure 7.49 in Appendix A.3.8.

4.11.1.2 California Bearing Ratio (CBR)

A total of 15 no. of California Bearing Ratio (CBR) tests were undertaken on WMC samples. The test was carried out together with the 2.5kg rammer compaction tests, where CBR of all 5 samples at different moisture content and dry density were tested.

Out of the 15 no of tests 12 no. were unsoaked, these showed a maximum CBR value is between 24.5-35% with an average of 30% considering moisture contents in between 8-16%, average of 11%. The maximum CBR value is recorded at a moisture content that is average 4% dry of OMC. At the moisture content ranges between 16-25% (average 21%) the CBR was recorded between 3-0.61% (average 1.5%). The minimum CBR value is at an average 6% wet of OMC.

The CBR value at OMC ranged from 3% to 28% with an average of 14% in range of OMC from 11% to 20% with an average of 15% for unsoaked CBR.

Generally, the peak CBR is at a moisture content lower than the OMC, however the CBR values at OMC show that the surface is still reasonably high for the majority of the tested samples. The critical moisture contents where the CBR values expected to drop significantly are between 15-20% with the exception for some outlier results. Therefore, it is recommended that the material is compacted slightly dry to the OMC.

In case of 4 no. of Proctor test series, all the samples prepared to determine the OMC were tested for CBR after soaking. 1 no. of test series shows no significant difference in CBR compared to the pattern of unsoaked CBR results, 1 no. of test series shows a very high sensitivity to the voids ratio at compaction, while 2 no. of test series show that the peak CBR is significantly degraded after soaking. Therefore, appropriate drainage systems shall be designed to keep moisture away from the constructed earthworks to avoid trafficability problems and degradation of the subgrade strength.

The CBR results for the WMC formation are presented in Figure 7.52 for unsoaked and Figure 7.53 for soaked tests in Appendix A.3.8.

4.11.1.3 Effective Strength

A total of 13 no. of small shear box tests were carried out, the required remoulding conditions for the shear box tests specified were 92% +/-2% of maximum dry density determined by 4.5 kg rammer. However, for Phase A tests, the remoulding conditions reported in the AGS file for most tests are 4.5Kg method compaction at as received MC and for some are 2.5Kg method at as received MC. In case of Phase B testing, the remoulding conditions are described as tamping to the required density. Since these conditions are not consistent, the results should be treated with caution. The values from shear box tests are in between 15° and 38°. The data set contains 2 outlier points (both at 15°) at shallow depths, the reason for that is not understood. The rest of the data shows consistency, the values scattered between 25° and 38 with the average of 30.

A total no of 3 no. of CU Triaxial tests were carried out on remoulded chalk material. The required remoulding conditions was a method compaction using a 2.5kg rammer at the selected moisture content which was in the range of OMC ± 1%. The results show that the internal angle of friction is between 31° and 34° with an average of 33°. Since the AGS data does not contain clear remoulding conditions for many of the tests, the results should be treated with caution.

Based on the above the recommended value for effective angle of friction for the remoulded chalk is 28° This shows consistency with the literature data, which suggests that chalk with a carbonate content between 20-40% should have a remoulded effective angle of friction of 29-30°.

The value of effective cohesion measured from shear box tests shows a consistent pattern, the value is between 2-17kPa with an average of 8kPa, showing no variation with depth. This is also in line with literature as Clayton (1977) has stated that reconstituted chalks can show a cohesion of up to 10kPa.

Based on 3 no. of CU Triaxial tests the effective cohesion of the remoulded chalk is between 1kPa to 8kPa.

Based on the above the recommended value for effective cohesion for the remoulded chalk material is 5 kPa.

The results are presented in Figure 7.28 and Figure 7.29.

4.11.1.4 Undrained Shear Strength

It was concluded in the previous sections that the undisturbed samples of the WMC show a drained behaviour when examining the results of the Consolidated Undrained Triaxial tests. However, 3 no. of CUT tests were undertaken for the remoulded material out of which 1 no. shows negligible increase and 2 no. show more significant pore pressure increase during the shearing stages. Considering the limited number of the tests and the uncertainty in remoulding conditions, the applicability and the design value of undrained shear strength shall be used with caution. It is recommended that the material is tested on site sampling from larger scales of the source material.

To determine the total strength parameters, 23 no. of unconsolidated undrained triaxial tests were carried out. The required remoulding conditions was a method compaction using a 2.5kg rammer at the selected moisture content which was in the range of OMC ± 2%. Since the AGS data does not contain clear remoulding conditions for many of the tests, the results should be treated with caution. The moisture content of the tested specimens is lying in between 14-24% with an average of 19%.

The results show that the clearly ‘off-white’ material (WMC) has an average of 63kPa while the ‘brown’ material (WWMC) has an average of 38kPa. Since at this point it cannot be clearly determined in what ratio the two materials will be mixed during earthworks construction, it is recommended that the value of 40 kPa is assumed. The applicability and the actual value shall be confirmed by quality testing of the source material after excavation.

4.11.2 Gault Clay (GC)

4.11.2.1 Maximum Dry Density and OMC

A total of 12 no. of tests on samples from GC were carried out in order to determine the relationship between the moisture content and the dry density.

A total of 9 no. of samples were compacted by a 2.5kg rammer and those results indicated that the maximum dry density is varying between 1.47Mg/m^3 and 1.67Mg/m^3, with an average of 1.54Mg/m^3. The maximum dry density was achieved if the moisture content was in the range of 14% and 27%, with an average of 22%. However, most of the samples (6 tests out of 9) showed that the maximum dry density is around 1.47-1.53Mg/m^3, while the moisture content is around 22-27%.

In addition, a total of 3 samples were tested after compacted by a 4.5kg rammer. Those tests showed that the maximum dry density is between 1.74Mg/m^3 and 1.76Mg/m^3, with an average value of 1.75Mg/m^3. The corresponding moisture content was in the range of 15% and 17%, with an average of 16%. The compaction curves are summarised in Figure 7.50 in Appendix A.3.8.

4.11.2.2 Moisture Condition Value (MCV)

A total of 4 no. of MCV tests were carried out on samples obtained from GC at the proposed WWTP and within the existing WWTP. The MCV ranged from a minimum of 3.8 to a maximum of 14.1 at moisture content of 41% and 29% respectively.

Based on the results, and according to TRL R273 [R34.] the high slopes in the MCV calibration lines are an indication of low sensitivity to moisture content changes, and the high intercepts of the lines indicate a high potential to retain moisture in a state of very low compaction.

MCV calibration lines are presented in Figure 7.55 in Appendix A.3.8 and calibration line slope versus intercept showing the sensitivity of the soil to moisture content changes in Figure 7.56 in Appendix A.3.8.

4.11.2.3 California Bearing Ratio (CBR)

A total of 4 no. of CBR tests were conducted on the GC. Except one sample, the samples were unsoaked and tested considering 5 different dry density values. A total of 3 no. of unsoaked test results showed that the CBR value is in the range of 2.4% and 31.0%. The one soaked CBR test indicated that the CBR is 0.4%.

The CBR value at OMC ranged from 12% to 24% with an average of 17% in range of OMC from 14% to 24% with an average of 21%. The CBR test results are presented in 7.53 in Appendix A.3.8.

4.11.2.4 Effective Strength

A total of 3 No of small shear box tests were carried out on the GC, all 3 of the tests were selected along the tunnel and final effluent from percussive boreholes. The required remoulding conditions for the shear box tests specified were 92% +/-2% of maximum dry density determined by 4.5 kg rammer. However, for Phase A tests, the remoulding conditions reported in the AGS file are 4.5Kg method compaction at as received MC. In case of Phase B testing, the remoulding conditions are described as tamping to the required density. Since these conditions are not consistent, the results should be treated with caution. The range of effective angle of friction is 20-22° with an average 21°.

1 no. of CU triaxial test was carried out on a bulk sample from the outfall borehole with a value of 26° for effective angle of friction. Since the remoulding conditions are not confirmed, the result is to be treated with caution.

Based on sources [R7.] and [R33.] the effective peak and constant volume angle of friction can be determined using the plasticity index for normally consolidated and remoulded material, which can be estimated to range between 21° and 25° respectively.

Based on the above the selected value for the angle of friction of remoulded GC material is 21°. It is recommended that zero effective cohesion is considered for remoulded GC.

4.11.2.5 Undrained Shear Strength

A total of 7 no. of Unconsolidated Undrained Multistage (UUM) tests were carried out on remoulded samples of GC, all of the tests show an increase in strength with confining pressure, therefore the value of cohesion derived from these tests has been assumed as undrained shear strength as a lower bound value under plausible confining stress conditions. In case of 2 no. of tests the moisture content was too high (33-34%) in relation with the OMC determined for the material (between 14-25%), these tests therefore provided an unrealistically low undrained shear strength, which were discounted in the derivation of this parameter. The remainder 3 no. of tests had a moisture content in the appropriate range (24-25%) therefore these tests were selected to derive the undrained shear strength of the material. Based on these tests the minimum value is 81kPa, the maximum value is 110kPa, and the average is 99kPa.The required remoulding conditions was a method compaction using a 2.5kg rammer at the selected moisture content which was in the range of OMC ± 2%. Since the AGS data does not contain clear remoulding conditions for many of the tests, the results should be treated with caution.

Based on the above the value of 75 kPa is recommended for the remoulded GC. The results are presented in Figure 7.36 of Appendix A.3.4.

4.11.3 Made Ground (MG) at existing WWTP site

The samples were collected from the stockpile located at the existing WWTP site at BH_TUN_006 (Shaft 3, just west of the railway), therefore the results presented here are only applicable to that stockpile of soil. MG at other areas of the site have not been tested for reusability for earthworks.

MG in this location has been described as sandy slightly gravelly clay, with the gravel being of variable angularity and size of mix lithologies of flint, sandstones quartzite and below 1.2mbgl coal ash and concrete.

4.11.3.1 Maximum Dry Density and OMC

A total of 5 no. of samples from the MG were tested using the 2.5kg to determine the relationship between the moisture content and the dry density. The test results showed that in both cases obtained from BH_TUN_006 the maximum dry density (1.29Mg/m^3 and 1.40Mg/m^3) was achieved if the moisture content was 26%. For the 2 samples obtained from IP_TUN_006 the results showed that the maximum dry density ranged from 1.01Mg/m^3 and 1.26Mg/m^3 and were achieved at OMC of 43% to 32% respectively. The compaction curves are presented in Figure 7.47 in Appendix A.3.8.

4.11.3.2 Moisture Condition Value (MCV)

A total of 4 no. of MCV tests were carried out on samples obtained from MG at the location of the stockpile within the existing WWTW (BH_TUN_006, IP_TUN_006). The MCV ranged from a minimum of 1.8 to a maximum of 14.8 at moisture content of 53% and 58% respectively.

Based on the results and according to TRL R273 101[R34.] the high slopes in the MCV calibration lines are an indication of low sensitivity to moisture content changes, and the high intercepts of the lines indicate a high potential to retain moisture in a state of very low compaction.

Moisture condition value calibration lines are presented in Figure 7.55 in Appendix A.3.8 and calibration line slope versus intercept showing the sensitivity of the soil to moisture content changes in Figure 7.56 in Appendix A.3.8.

4.11.3.3 California Bearing Ratio (CBR)

A total of 3 no. of California Bearing Ratio (CBR) tests were undertaken on MG samples obtained from inspection pit IP_TUN_006 associated with the stockpile in the existing WWTW. The test was carried out together with the 2.5kg rammer compaction tests, where CBR of all 5 samples at different moisture content and dry density were tested.

The testing showed a maximum CBR value is between 7.2-15.5% with an average of 11% considering moisture contents in between 23-34%, average of 28%. The minimum CBR values are 0.33% and 0.65% at moisture contents 52% and 40% respectively.

The CBR values at OMC were 1.5% to 2.9% with an average of 2.2% in range of OMC from 32% to 43% with an average of 37%. The results are presented in Figure 7.51 in Appendix A.3.8.

4.11.3.4 Effective Strength

A total of 2 no of test results of small shear box tests showed an effective angle of friction of 36 and 36.5^{o}, and effective cohesion of 7.3kPa and 12kPa.

The behaviour of MG being very variable allows no straight correlations. Only indicatively, the material was assessed as non-plastic in all 3 no. of cases, while in 1 case a Plasticity Index of 10 was determined and based on this plasticity index and [R7.] an effective angle of friction of 33° and an effective cohesion of c'=0 kPa could be assumed.

4.11.3.5 Undrained Shear Strength

A total of 1 no. of Unconsolidated Undrained Multistage test results on this type of MG, shows increasing strength with increasing confining pressure, the smallest value derived from the test is 61kPa. Reported cohesion of 41kPa and φ of 24^{o}. However, the test comes with no details of remoulding conditions and with different sample details and sampled depth in the AGS and factual report.

4.12 Ground Aggressivity

4.12.1 Concrete Aggressivity

Samples of the soils were tested in accordance with the requirements as set out in the BRE Special Digest 1 [R2.] for the assessment of soil aggressivity to buried concrete. The Design Sulphate Class and associated Aggressive Chemical Environment for Concrete (ACEC) class derived for all strata are presented in Table 4.22. The greenfield type was chosen for the proposed WWTW site due to the lack of historical development, and brownfield site for the existing WWTW. Mobile groundwater conditions were assumed for all strata except the Gault Clay. Static groundwater conditions were assumed for the Gault Clay due to its nature and permeability in accordance with section C3.1 of BRE SD1 [R2.] .

The results of the analysis have been used to determine the aggressive chemical environment for concrete and give a design sulphate class DS-1 and ACEC AC-1 for both WWMC and WMC with a design sulphate class of DS-4 and ACEC AC-3 for the GC. In case of open excavations, it is recommended that the water mobility assumption should be reassessed and possibly reconsidered for the GC.

The calculation of Total Potential Sulphate Content and the amount of Oxidisable Sulphides suggests that the probability of pyrite being present in the GC is high, as Oxidisable Sulphides were found >0.3% in the majority of the samples, with the exception of only 4 no. of results.

The results of Sulphates, pH and Total Sulphur for the proposed WWTW are presented in Table 4.22 below.

Table 4.22: Summary of buried concrete classification results for proposed WWTW

Stratum	No. of Tests	SO4 (g/l)	pH	TPS [2]	Design Sulphate Class	ACEC class
		Range ([1])	Range ([1])	%		
MG	11[3]	-	7.2 – 9.1 (N/A)	-	Insufficient information to be assessed	
WWMC	18	<0.01 – 0.08 (0.05)	7.8 – 9 (7.9)	0.06 – 0.09 (0.09)	DS - 1	AC - 1
WMC	10	0.05 – 0.5 (0.42)	8.1 – 8.7 (8.4)	0.06 – 0.48 (0.48)	DS - 1	AC - 1
GC	39	0.17 – 0.45 (0.4)	7.7 – 8.9 (7.9)	1.13	DS - 4	AC - 3s

[1] Characteristic Values calculated according to BRE SD:1, [R2.]
[2] Total Potential Sulphate (Characteristic Value calculated according to BRE SD:1 [R2.])
[3] No. of tests applicable only for pH values

For the existing WWTW, the results of the analysis have been used to determine the aggressive chemical environment for concrete and give a design sulphate class DS-3 and ACEC AC-3 for MG considering the highest value of TPS. For the GC design sulphate class was determined as DS-3 and ACEC AC-2. Design sulphate class was not determined for the RTD as only 1 no. of results were available. All results of Sulphates, pH and Total Sulphur, for the existing WWTW are presented in Table 4.22 below.

Table 4.23: Summary of buried concrete classification results for existing WWTW

Stratum	No. of Tests	SO4 (g/l)	pH	TPS [2]	Design Sulphate Class	ACEC class
		Range ([1])	Range ([1])	%		
MG	6 [3]	<0.01 – 0.17 (N/A)	8.5 – 9.1 (N/A)	0.03 – 0.9 (N/A)	DS - 3	AC - 3
RTD	2	0.11- 0.45	8.0	0.18-019	Insufficient information to be assessed	
GC	9	0.2 – 0.45 (0.45)	8.0 – 8.7 (8.0)	0.86	DS - 3	AC - 2s

Stratum	No. of Tests	SO4 (g/l)	pH	TPS [2]	Design Sulphate Class	ACEC class
		Range ([1])	Range ([1])	%		
[1] Characteristic Values calculated according to BRE SD:1, [R2.] [2] Total Potential Sulphate (Characteristic Value calculated according to BRE SD:1 [R2.]) [3] No. of tests applicable only for pH values. 4 no. of tests available for Sulphates and Sulphur.						

4.12.2 Steel Corrosivity

A total of 41 no. of redox potential tests were carried out on samples obtained from the GC. The results show a redox potential ranging from 95mV to 410mV with an average of 157mV.

According to the results, the GC has a redox potential that does not indicate the potential for corrosion of buried steel or iron components in accordance with AWWA C105/A21.5-10 [R36.] .

The pH results for the GC ranged from 7.7 to 8.9 with an average of 8.4 suggesting minimum corrosive potential to ductile iron according to AWWA C105/A21.5-19 [R36.] .

However, according to the same standards, and ASTM, 2012 table 2, soil resistivity and corrosivity effects resistivity and presence of sulphides as well as moisture content and soil description must be considered to fully assess the potential corrosivity of the ground. Based on the ERT results summarised in Section 4.14 and the presence of sulphides in the GC, described in Section 4.12.1 above, this presents moderate potential to corrode steel or iron components. Therefore, it is suggested that some degree of corrosion protection may be required.

4.13 Groundwater Conditions

Groundwater strikes were encountered across all sites, and they are presented in Table 4.24. The groundwater Monitoring is detailed in Section 4.13.2 and a summary of the Pumping test in 4.13.3.

4.13.1 Groundwater Strikes

During the current ground investigations, the groundwater strike levels and the levels after 20mins were measured in the boreholes as summarised in the Table 4.24 below, for each area of interest.

The groundwater strikes were encountered between +6.25mAOD and -28.09mAOD during the current ground investigation from July to October 2021. During the second phase of the ground investigations water strikes were encountered, during April 2022, only within BH_OUT_001B and two hand dug pits associated with the proposed outfall location. In case of boreholes not presented within the tables no water strike was encountered.

As the boreholes were completed either at summertime or during autumn, groundwater levels could be modified by seasonal fluctuations, rainfall or changing river level. Therefore, it is not recommended to draw conclusions other than statistical average of these measurements.

Table 4.24: Groundwater Strikes

Borehole ID	Date of Measurement	Ground Level (mAOD)	Groundwater Strike (mbgl)	Groundwater Strike (mAOD)	After 20mins (mbgl)	After 20mins (mAOD)
Proposed WWT Works						
BH_STW_003A	2021/08/27	10.25	7.00	3.25	5.69	4.56

Borehole ID	Date of Measurement	Ground Level (mAOD)	Groundwater Strike (mbgl)	Groundwater Strike (mAOD)	After 20mins (mbgl)	After 20mins (mAOD)
BH_STW_003B	2021/09/02	10.25	7.10	3.15	5.30	4.95
BH_STW_004	2021/08/06	10.46	6.50	3.96	4.49	5.97
BH_STW_005A	2021/09/21	9.30	6.40	2.90	4.62	4.68
BH_STW_005B	2021/09/06	9.31	6.20	3.11	4.80	4.51
BH_STW_007	2021/09/02	9.18	7.30	1.88	4.00	5.18
BH_STW_011A	2021/08/31	10.17	4.00	6.17	-	-
BH_STW_011B	2021/09/16	8.93	4.20	4.73	3.00	5.93
BH_STW_012B	2021/09/13	8.15	5.20	2.95	4.00	4.15
BH_STW_013A	2021/08/13	6.89	3.70	3.19	2.75	4.14
BH_STW_013B	2021/09/08	6.96	4.20	2.76	2.00	4.96
BH_STW_013C	2021/08/24	7.01	3.90	3.11	3.50	3.51
BH_STW_014	2021/09/23	10.60	6.40	4.20	4.52	6.08
BH_STW_015	2021/07/22	9.92	4.50	5.42	-	-
	2021/07/23	9.92	12.30	-2.38	-	-
BH_STW_016	2021/08/10	8.32	5.65	2.67	4.50	3.82
BH_STW_017	2021/08/04	7.38	5.50	1.88	2.70	4.68
BH_STW_018	2021/09/15	10.37	7.40	2.97	3.27	7.10
BH_STW_019B	2021/10/15	9.32	8.70	0.62	4.50	4.82
BH_STW_020	2021/09/06	8.13	5.40	2.73	-	-
BH_STW_024	2021/08/03	7.99	6.50	1.49	2.70	5.29
BH_STW_025	2021/07/27	6.43	5.00	1.43	2.40	4.03
BH_STW_031B	2021/10/12	11.60	8.00	3.60	6.40	5.20
TP_STW_017	2021/09/10	7.38	2.50	4.88	-	-
TP_STW_020	2021/09/13	8.27	2.80	5.47	-	-
Terminal Pumping Station (TPS) Shaft						
BH_TPS_002	2021/08/24	10.14	5.50	4.64	-	-
BH_TPS_004	2021/08/26	10.25	4.00	6.25	-	-
Final Effluent Pipeline						
BH_OUT_001B	2022/04/04	3.90	1.15	2.75	1.1	2.80
BH_FE_004B	2021/09/01	6.61	2.90	3.71	2.30	4.31
HDP_OUT_001	2022/04/06	4.04	0.90	3.14	-	-
			2.74	2.74	-	-
HDP_OUT_002	2022/04/06	4.00	2.70	2.70	-	-
TP_FE_001	2021/09/22	3.84	2.20	1.64	-	-

Borehole ID	Date of Measurement	Ground Level (mAOD)	Groundwater Strike (mbgl)	Groundwater Strike (mAOD)	After 20mins (mbgl)	After 20mins (mAOD)
TP_FE_002	2021/09/21	4.14	1.30	2.84	1.10	3.04
TP_FE_003	2021/08/24	6.23	2.00	4.23	-	-
TP_FE_004	2021/08/25	6.76	2.70	4.06	-	-
TP_FE_005	2021/08/26	7.00	3.00	4.00	-	-
Sewer Tunnel Route						
BH_TUN_001A	2021/09/09	6.91	35.00	-28.09	0.82	6.09
BH_TUN_001B	2021/09/28	6.99	1.70	5.29	1.60	5.39
	2021/09/30	6.99	33.30	-26.31	16.60	-9.61
BH_TUN_005B	2021/09/22	6.69	2.50	4.19	2.00	4.69
BH_TUN_006	2021/09/21	9.15	5.20	3.95	3.60	5.55
BH_TUN_011	2021/10/05	6.57	4.10	2.47	3.20	3.37
	2021/10/12	6.57	42.50	-35.93	-	-
BH_TUN_015	2021/09/29	11.61	7.80	3.81	4.60	7.01
BH_TUN_018	2021/09/20	10.28	6.20	4.08	4.91	5.37

4.13.2 Groundwater Monitoring

Ground water monitoring was carried out in selected locations following standpipe installation. The available ranges from 21 July 2021 to 18 October 2022, however this doesn't not mean a continuous monitoring in all boreholes within this period. The period of monitoring is listed in Table 4.25 for each location individually. The highlighted boreholes were designated for a minimum of 1 year long monitoring programme after their installation, other installations were operated only during the fieldwork period. In case of certain boreholes that were drilled close to the end of the programme this window is measured in weeks rather months. Installations details along with depth ranges of slotted pipes and corresponding strata are provided in Section 3.3.8.1 above. Regarding the second phase of the ground investigation, standpipe for groundwater monitoring was installed only in BH_TUN_014 with results provided between 11 April 2022 and 18 October 2022.

The results of the groundwater monitoring are shown in Table 4.25 below.

Table 4.25 Groundwater Monitoring results

Borehole ID	Monitoring Period	Ground Level (mAOD)	Recorded Groundwater Levels (mAOD)		Recorded Groundwater Levels (mbgl)	
			Minimum	Maximum	Minimum	Maximum
Proposed WWT Works						
BH_STW_001	21/07/2021 - 18/10/2022	9.51	0.85	9.51	0.00	8.66
BH_STW_005A	24/09/2021 - 15/10/2021	9.30	5.75	6.07	3.23	3.55
BH_STW_009	06/08/2021 - 18/10/2022	11.04	-0.62	8.79	2.25	11.66
BH_STW_010B	07/10/2021 - 15/10/2021	10.26	6.28	9.76	0.50	3.98
BH_STW_011B	24/09/2021 - 15/10/2021	8.93	5.66	5.81	3.12	3.27
BH_STW_013C	24/09/2021 - 15/11/2021	7.01	-	-	-	-
BH_STW_015	06/08/2021 - 30/08/2022	9.92	-1.07	8.12	1.80	10.99
BH_STW_018	24/09/2021 - 15/10/2021	10.37	6.72	7.00	3.37	3.65
BH_STW_022A	24/09/2021 - 15/11/2021	8.46	6.50	6.75	1.71	1.96
BH_STW_022B	12/10/2021	8.51	6.01	6.01	2.50	2.50
BH_STW_023	22/07/2021 - 18/10/2022	10.66	-3.14	9.21	1.45	13.80
BH_STW_024	03/08/2021 - 18/10/2022	7.99	-2.99	7.30	0.69	10.98
BH_STW_025	27/07/2021 - 18/10/2022	6.43	-2.06	5.50	0.93	8.49
BH_STW_026	29/07/2021 - 18/10/2022	7.08	-2.53	6.55	0.53	9.61
BH_STW_031B	14/10/2021 - 15/10/2021	11.60	-0.40	4.21	7.39	12.00
Terminal Pumping Station (TPS) Shaft						
BH_TPS_001	24/08/2021	10.14	7.04	7.04	3.10	3.10
BH_TPS_001b	08/10/2021	10.09	3.89	3.89	6.20	6.20
BH_TPS_002	25/08/2021	10.14	6.94	6.94	3.20	3.20
BH_TPS_002b	11/10/2021	10.21	5.11	5.11	5.10	5.10
BH_TPS_003	26/08/2021	10.28	6.98	6.98	3.30	3.30
BH_TPS_003b	12/10/2021	10.22	6.17	6.17	4.05	4.05
BH_TPS_004	27/08/2021	10.25	7.05	7.05	3.20	3.20
BH_TPS_004b	11/10/2021	10.14	6.29	6.29	3.85	3.85
Final Effluent Pipeline						

Borehole ID	Monitoring Period	Ground Level (mAOD)	Recorded Groundwater Levels (mAOD)		Recorded Groundwater Levels (mbgl)	
			Minimum	Maximum	Minimum	Maximum
BH_FE_001	20/08/2021 - 07/01/2022	4.08	0.26	3.82	0.26	3.82
BH_FE_002	03/09/2021 - 07/01/2022	6.54	1.99	4.22	2.32	4.55
Sewer Tunnel Route						
BH_TUN_001A	10/09/2021 - 03/11/2022	6.91	5.56	6.81	0.10	1.35
BH_TUN_001PM	15/09/2021 - 15/11/2021	7.13	5.84	6.23	0.90	1.29
BH_TUN_005B	28/09/2021 - 15/10/2021	6.69	2.24	4.78	1.91	4.45
BH_TUN_006	08/10/2021 - 07/01/2022	9.15	3.48	5.72	3.43	5.68
BH_TUN_011	19/10/2021 - 07/01/2022	6.57	2.15	4.81	1.76	4.42
BH_TUN_014	11/04/2022 - 18/10/2022	10.84	-1.08	6.18	4.66	11.92
BH_TUN_016	20/09/2021 - 15/10/2021	10.19	5.33	8.09	2.10	4.86
BH_TUN_018	29/09/2021 - 15/10/2021	10.28	6.24	9.48	0.80	4.04

The results of the groundwater monitoring programme can be summarised for the different sites as follows:

- Within the existing WWTW, groundwater levels ranged from 0.10mbgl to 13.8mbgl
- Along the tunnel route (excluding the existing WWTW) from about 1.8m to 11.9mbgl.
- Along the final effluent route groundwater levels varied from about 0.3mbgl to 4.5mbgl.

4.13.3 Hydrogeology – Pumping Test

The ground investigation included a Pumping Test, of which results are reported in the technical note ‘Pumping test analysis and shaft dewatering assessment’ carried out by Mott MacDonald Ltd. with reference 100381548BH02-MMD-00-TN-P-01 [R23.] . The report provides the interpretation of the results of test pumping undertaken after the development of the four test boreholes (BH_TPS_001b-004b) at the proposed location for the Terminal Pumping Station shaft (TPS). It includes an assessment of the aquifer properties, an estimate of the dewatering abstraction rates and the potential impact of dewatering on groundwater levels in the WMC.

Table 4.26 is extracted from the technical note mentioned above and summarizes the range of transmissivity and permeability for the dewatering assessment. It also provides useful additional information for the mass permeability and transmissivity of the chalk.

Table 4.26 Transmissivity and mass Permeability of Chalk

Values	Transmissivity (T)	Permeability (k)*	
	m²/d	m/d	m/s
Very low	2	0.3	3.4E-06
Low	20	3	3.4E-05
Mid-range	65	10	1.1E-04
High	100	15	1.7E-04
Highest	250	37	4.2E-04
*Based on saturated Chalk thickness of 6.8m at the time of testing			

4.14 Geophysics

4.14.1 Electrical Resistivity Tomography (ERT)

ERT has been completed within specific areas of the proposed WWTP location from surface to a depth in excess of 20m Below Ground Level (BGL).

The interpreted resistivity values assigned to each geological unit during the ERT survey are summarized by the geophysical report [R16.] and generally indicate resistivity ranges between 26Ωm to 35Ωm for the whole Chalk body and resistivity <20Ωm for the Gault Clay.

There have been no identifiable features such as cavities, voids or dissolution features noted within resistivity data interpretated from WMC.

Local areas of elevated and lower resistivity within the WMC have been identified and highlighted in 2D pseudo-sections of data (Figure 6A-V and Figure 7A-V) and which indicate compositional variations in the WMC structure. A zone of higher resistivity has been identified in the eastern field of the proposed WWTP survey area and is shown in 2m depth intervals across the site in Figure 9A-G. This may be considered as soils with higher void ratio than the WWMC or WMC soils, likely to be indicative of a significantly granular or degraded chalk matrix. A plan view of the site with the area of elevated resistivity shown in different shades of red to indicate different depths (darker shade for increased depth) is presented in Figure 10.

All figures mentioned above can be found in the geophysical report with reference 2190769-R01(00) [R16.] along with the rest of the results of the ERT survey.

4.14.2 Downhole Televiewer

A total of 3 no. *of downhole optical and acoustic televiewer* (OTV/ ATV) were carried out by a specialist subcontractor in 3 different locations, BH_STW_013, BH_STW_018 and BH_TUN_018, to obtain structural and visual information regarding the Chalk.

The OTV/ATV showed that the majority of the discontinuities can be classified as major fractures of fissures (open) and more commonly as minor fractures or fissures (thin or closed) The majority of the discontinuities show that their true dips range from 25º to 75º.

Additionally, to the fractures/fissures, a total of 10 features were classified as fabric discontinuities most probably corresponding to bedding or infilled fissures with authigenic material, as no major changes in travel time or gamma ray log is observed corresponding to these features.

In addition to the downhole televiewer survey described above, downhole geophysics tests were carried out in two of these boreholes (BH_STW_018 and BH_TUN_018). These tests comprised a 3-arm *calliper*, measuring three diameters of the borehole and *natural gamma log*.

The gamma ray log provides a very clear indicator of the transition from the Chalk to the Gault Clay as the Gamma Ray log spikes from about 25 GRAPI in the Chalk to a bit over 100GRAPI resting at about 60GRAPI in the Gault Clay.

No karstification was observed in these two locations and no extensive zones of washout or breakout along the boreholes' lining based on the calliper readings.

4.15 Summary of Ground Properties

The geotechnical properties of the encountered strata described in the previous sections are presented in Table 4.27 below.

Table 4.27: Preliminary summary of Characteristic Geotechnical parameters

	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	In-situ CBR (%)	UCS (kPa)	Undrained shear strength (c_u – kPa)		Effective Strength		Coefficient of lateral earth Pressure at rest (K_0)
							Ange of Friction (°)	Cohesion (kPa)	
Topsoil (TS)	Anticipated to be removed – ignored for design								
Made Ground (MG)	1.74	1.36	N/A	N/A	34kPa (Cu_{res}=8kPa) [3]		N/A	N/A	N/A
Alluvium (AL)	1.34	0.62	N/A	N/A	10[1]		21° [1]	No data	0.64
River Terrace Deposits (RTD)	2.02	1.77	Not tested	N/A	N/A		33° [5]	No data	0.46[5]
Weathered West Melbury Chalk (WWMC)	2.06	1.70	3-14 (Avg=8)	N/A	70kPa (Cu_{res} =15kPa) [3]		29° [4]	0	N/A
West Melbury Chalk (WMC)	2.08	1.76	12-41 (Avg=23)	90 - 2700[2]	N/A		φ_{peak}=33° φ_{cv}=29°	20	z>7: K_0 =1.6 7>z>-2: K_0=1.6-0.111*(7-z)
Cambridge Greensand (CS)	Not provided for design due to insignificant thickness								
Gault Clay (GC)	1.98	1.56	Not tested in situ	Proposed WWTW: 50-950 (harder bands observed below -15mAOD) Tunnel & FE 80-218	**For Proposed WWTW** z*<12: c_u=100 12<z*<25: c_u=100+7(z*-12) z*>25 $c_{u\,max}$=190	**For Existing WWTW & Tunnel Route & FE** z*<5: c_u=40kPa 20>z*>5: c_u=40+7(z*-5) z*>20: c_u=145	φ_{peak}=22° φ_{cv}=22°	0	z>2: K_0 =1.2 2>z>-24: K_0=1.2+0.031*(2-z) z<-24 K_0=1.2+0.031*(2-z)
Lower Greensand (LGS)	2.07	1.73	Not tested	Not tested					

Note: In red values determined from limited data, to be used cautiously.
z* is depth in mbgl, where z is elevation in mAOD.
[1]: For the AL C_u, after table 8 Clayton (1995), based on SPTs and borehole log descriptions. The ϕ° based on PI according to BS8004.
[2]: Range of a highly scattered dataset due to highly variable material.
[3]: Applicable only to cohesive material only, based on Hand Vane Tests carried out on suitable cohesive material in trial pits
[4]: Based on Carbonate Content/ ϕ° relationship (Clayton, 1977, CIRIA C574 figure 4.13) and table 2 of BS 8002:2015.
[5]: Angle of friction for RTDs assumed φ=33° based on log descriptions of density and SPTs according to CIRIA 143.

Table 4.28: Preliminary summary of Remoulded Ground parameters for Earthworks

	Strength				Compaction				
	Effective Angle of Friction (ϕ' °)	Effective Cohesion (c', kPa)	Undrained Shear Strength (kPa)	Chalk Crushing Value (CCV)	CBR (%) at OMC (OMC Average %)		Optimum Moisture Content % (Achieved max DD in Mg/m³)		Moisture Condition Value (at MC %)
					Soaked	Unsoaked	2.5kg rammer method	4.5kg rammer method	
Made Ground (MG) [6]	33° [2]	0	40 (cohesive only)	N/A	Not sufficient data		26 [1] (1.29 – 1.40)	Not tested	Low sensitivity to MC 1.8 – 14.8 (53-58) [1]
Weathered West Melbury Chalk (WWMC) & West Melbury Chalk (WMC)	28° [3]	5	40[4]	2.0-3.4	High sensitivity to soaking	3–28 [5], Avg=14 (15)	8-21, Avg=16 [5] (1.66 - 1.95, Avg=1.78)	8-16, Avg=12 [5] (1.83 – 2.04, Avg=1.92)	N/A
Gault Clay (GC)	21°	0	75	N/A	0.4	12–14, Avg=17 (21)	22-27% (1.47 - 1.53)	16% (1.75)	Low sensitivity to MC 3.8 – 14.1(41 and 29)

Note: In red parameters are derived from limited data and/or low confidence, to be used cautiously.
[1]: Tested only in location TUN-006 associated with the stockpile
[2]: Based on PI, BS 8002:2015 Code of practice for earth retaining structures
[3]: From shear box and CUT testing, confirmed by carbonate content/ ϕ° relationship (Clayton, 1977, CIRIA C574 figure 4.13)
[4]: Undrained shear strength shows a significant variability when considering weathered (brown) or unweathered (off-white) material. Value for earthworks will be dependent on the ratio of weathered and unweathered material mixed to the source. The actual value shall be confirmed by quality testing of the source material.
[5]: Scattering of data available to date did not allow a clear differentiation between the West Melbury Chalk and the Weathered Chalk.
[6]: Made ground is not recommended to be used for earthworks, due to high organic content results, strength and compaction parameters presented indicatively.

Table 4.29: Preliminary summary of Ground Stiffness

	Vertical Stiffness (MPa)				Horizontal Stiffness (MPa)			
	Loading			Unload/ Reload	Loading			Unload/ Reload
	$E'_{v\ 0.01\%\ Strain}$	$E'_{v\ 0.1\%\ Strain}$	$E'_{v1\%\ Strain}$	$E'_{v\ ur}$	$E'_{h\ 0.01\%\ Strain}$	$E'_{h\ 0.1\%\ Strain}$	$E'_{h\ 1\%\ Strain}$	$E'_{h\ ur}$
West Melbury Chalk (WMC)	335	145	65	195	335	145	65	195
Gault Clay (GC)	$E'v_{0.01\%}$= 75 - 4z	$E'v_{0.1\%}$=25 - 2.22z	$E'v_{1\%}$=14 - 0.61z	N/A	3 x $E'v_{0.01\%}$	3 x $E'v_{0.1\%}$	3 x $E'v_{1\%}$	N/A

Note: Low confidence as based on stiffness degradation from engineering applications on soils without confirmed reference for applicability of Chalk [R32.]. To be used with clear understanding of stress/strain considerations.

Note: z is elevation in mAOD

5 Geotechnical Risk

5.1 Geohazards

Potential geohazards as may impact upon the proposed development identified at **desk study** stage include:

- Gault Clay-Base heave
- Gault Clay-Low strength bands
- Gault Clay-Pyrite oxidation
- Lower Greensand-Aquifer contamination
- Groundwater-Confined water pressure
- Groundwater-Interference with private abstractions
- Gault Clay-Dispersibility
- Gault Clay-Wetting / drying / shrink swell potential
- Gault Clay- Lower Greensand Transition-Mixed Face-Instability
- Gault Clay- Lower Greensand Transition-Confined groundwater
- Creep settlement of Chalk
- Uncertainty in extent of Chalk layer

5.2 Geotechnical Design Related Risk

In addition to the above, the following risks related to geotechnical design were identified:

- Spatial limitations of existing ground investigations
- Uncertainty in extent of chalk layer, risk of weak formation layers
- Underground cavities in chalk due to dissolution, manmade voids, frost shatter (glacial)
- Presence of different grades of chalk on site, difference in strength or compressibility of founding materials
- Creep settlement of chalk
- Highly jointed/ fractured chalk
- Weak planes or slickensides in chalk
- Hard-to-excavate material (High density chalk)
- Flint bands in chalk
- Uncertainty the Gault Clay/Lower Greensand interface
- Mudstone bands in Gault Clay
- High locked-in horizontal stress in Gault Clay
- Shrinkage/swelling potential of Gault Clay
- Aggressive ground
- Confined water/ artesian pressures in Lower Greensand
- Fluctuation of groundwater level due to seasonal changes
- Suitability of soils for reuse as earthworks
- Uncertainty in the physical properties of locally sourced remoulded materials used for earthworks
- Frost susceptible subgrade soils and earthworks from chalk
- Trafficability problems during construction
- Soft/unacceptable subgrade soils for roads

- Unexploded Ordnance
- Presence of Made Ground
- Presence of soft alluvial soils, presence of peat or organic matter within alluvial deposits near to River Cam
- Presence of highly permeable soils (e.g.,terrace gravels) near excavations
- Soft bands/horizons or pockets of soft clay within Gault Clay, presence of water bearing layers/veins within clay

Other associated risks (to be addressed by others and are out of the scope of this document) include:

- Contaminated land
- Hydrogeological risks, aquifer vulnerability
- Construction works nearby river
- Construction activities cause damage to existing buildings and infrastructure

To manage and mitigate risks a robust geotechnical management strategy is required to be implemented. The above-mentioned risks and control strategies / mitigations are summarised in the risk register in the following section.

5.3 Geotechnical Risk Register

A geotechnical risk register is prepared to identify key risks and their anticipated impact, along with their proposed mitigation measures. The risk register (presented in Appendix B) should be read in context with Table 5.1 and Table 5.2.

Table 5.1: Hazard impact table

Impact			**Likelihood**		
1	Very Low	Negligible	**1**	Negligible / Improbable	< 1%
2	Low	Significant	**2**	Unlikely / Remote	> 1%
3	Medium	Serious	**3**	Likely / Possible	> 10%
4	High	Threat to future work and Client relations	**4**	Probable	> 50%
5	Very High	Threat to business survival and credibility	**5**	Very Likely / Almost Certain	> 90%

Table 5.2: Assigned levels of risk

		Impact				
		1	2	3	4	5
Likelihood	1	N	N	N	N	A
	2	N	N	A	A	H
	3	N	A	A	H	S
	4	N	A	H	S	S
	5	A	H	S	S	S

Note: N=Negligible, A=Acceptable, H=High, S=Severe

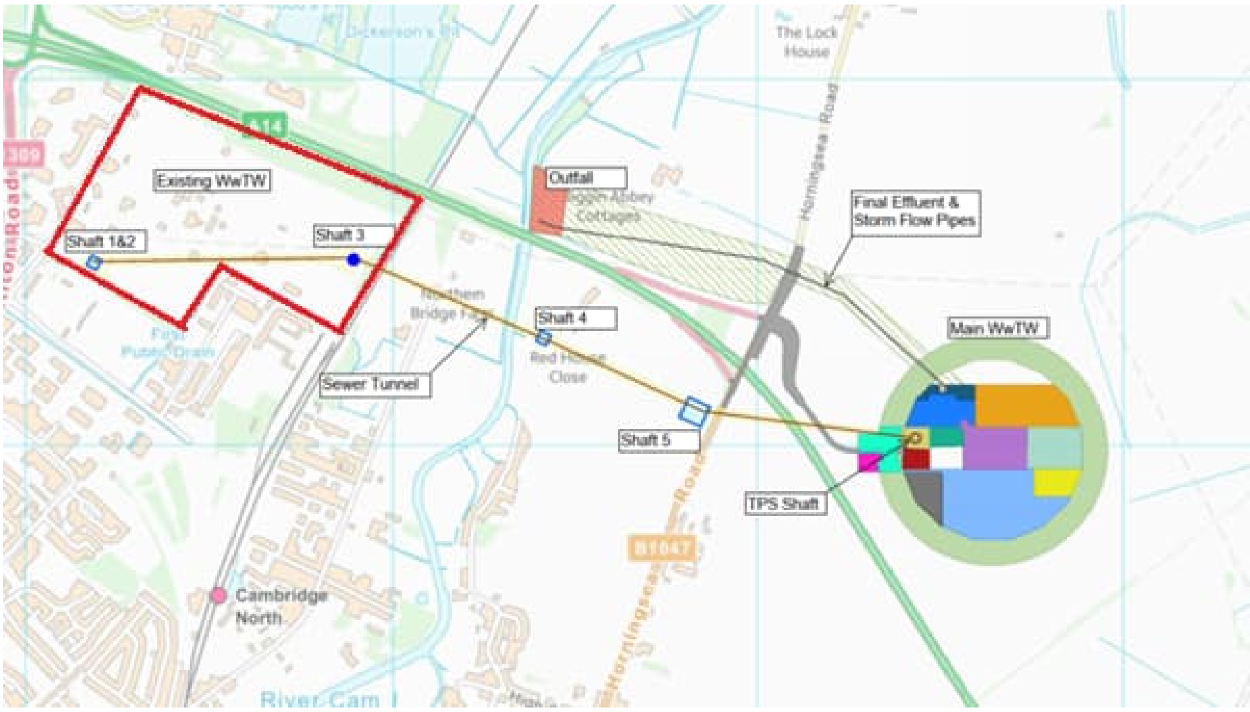
6 Engineering Design Considerations

6.1 Introduction

The Section of the report focuses on the geotechnical engineering aspects for construction. It will review the relevant parts of the overall Project and provide context to the key risks which should be considered and compliment the Project Geotechnical Risk Register.

For the purposes of this section, the main works will be split in accordance with the current layout of the WWTP proposal and is included in Figure 6.1.

Figure 6.1: Indicative Layout Plan of proposed Works



Key sections associated with the proposed design can be summarised as follows:

- Existing WwTW Section 6.3
- Sewer Tunnel Section 6.4
- Shafts Section 6.5
- Main WWTP Foundations Section 6.6
- Final Effluent & Strom Water Tunnel Section 6.7
- Outfall Structure Section 6.8

Advice on other significant items is provided from Section 6.9.

6.2 Related studies

This section will primarily concentrate on the ground engineering aspects and recommendations associated, however there are several other related studies which focus on other in-ground risk. These are summarised as follows:

Hydrogeological study: 100381548BH02-MMD-00-TN-P-01 [R23.]
Contaminated land studies: 100102041-MML-XX-ZZ-RP-LQ-010100X_P02_11-05 [R66.]
Supplementary ground investigation works: 421008|04|A [R65.]

Tunnel easement methodology: 421008-002-C [R67.]
For detailed further studies and references related to the project, refer to the list of sources (Table 2.1) or the references (Section 7) of this report.

6.3 Existing WwTW

The existing WwTW site is as indicated previously in Figure 2.1. It is anticipated to be decommissioned once the proposed relocated WWTP is operational. This existing site is proposed to be redeveloped as part of a mixed use commercial and residential development; this specific details of this are presented under a separate commission and will not be discussed further in this report.

Ground conditions for this location are presented in Figure 7.7 and Figure 7.8 of Appendix A.2 with a summary of the encountered conditions presented in Table 4.1.

6.3.1 Construction Proposals

Development of this site, in accordance with the Scope of Works defined by the Project, is limited to construction of one permanent (Shaft 1) and one temporary shaft (Shaft 2) to the west of the site and forms the reception/drive pits associated with the proposed sewer tunnel. There is also one further temporary shaft (Shaft 3) at the east of the site. Further information and considerations on shaft construction are presented in Section 6.5 below.

6.3.2 Surface works

Areas at surface will be required for temporary works such as site establishment and worksites for shaft and tunnel construction and materials excavated from both shaft and tunnel construction.

Worksites will require several key elements to determine their size:

- The size of shaft and area for its construction
- Area for storage of pipes, segments and pumping equipment
- Slurry separation plant or excavated material handling storage area
- Areas for cranes, handling and manoeuvring of support plant and materials
- Power supply and distribution facility

It is anticipated that the existing WwTW site will have some degree of flexibility for the size of work areas for each of the shaft locations and subsequent tunnelling efforts. However, it is expected that the existing site will remain in operation for the entire construction period and consideration of interfaces between construction and WwTW operations needs to be carefully managed.

Relatively thin deposits of Made ground are encountered at surface throughout this area and is prone to rutting caused by crossing of heavy plant and machinery. Temporary traffic routes are likely to be required where trafficking is not completed on existing internal roadways.

The stockpile at the location of Shaft 3 does not appear to have sufficient strength to carry construction traffic, therefore material is recommended to be disposed before construction. The material was confirmed to be not appropriate for earthworks due to its organic content.

Siting of heavy temporary structures within the shaft/tunnel worksite, such as separation plant and cranes, will require careful planning to sit outside of the zone of influence of the tunnel alignment to avoid imposing any additional or unexpected load to the tunnel lining system. Furthermore, stockpiling of excavated material should not be located over the proposed tunnelling alignment nor should it be within the zone of influence of the proposed shafts as this is likely to increase horizontal earth pressures acting on the shaft walls and overstress the lining system. A separate advice note has been created for permanent loads from oversite development and is covered under “Cambridge Wastewater Plant Relocation – Tunnel Easement Technical Note”, dated 30th June 2021, reference 421008-002-C [R67.] .

6.4 Sewer Tunnel

The proposed route of the main transfer sewer from the existing WwTW to the proposed WWTP location is discussed in Section 2.2.2 and an indicative alignment plan is provided in Figure 2.2.

6.4.1 Tunnel proposal/alignment

The current proposals for the sewer tunnel are indicated to commence at Shaft 1 and 2 in the existing WwTW with invert level at around -10mOD and continue for approximately 2.3km to the east and terminate at the Terminal Pumping Station (TPS) Shaft in the proposed WWTP with invert level at around -13mOD. A total number of 6 shafts are proposed along the alignment and a terminal pumping station. 6.5 below is dedicated to shaft construction.

6.4.2 Geology

A geological long section is provided in Figure 7.6 Appendix A.2 in which the vertical elevation of the transfer sewer is annotated. This geological section indicates that the entire length of the transfer sewer will be within the Gault Clay. All the geotechnical data for the Gault Clay is contained within Section 4.9 of this report.

6.4.3 Methods

A range of methods may be utilised for the completion of the main tunnelling works; however, it is anticipated that the tunnel will be constructed using pipe jacking methods. A summary of the type of cutting heads that may be considered is provided below:

- Tunnel Boring Machine (TBM) – A shield having a rotating cutting head.
- Cutter Boom Shield – an open face shield which a cutter boom is mounted for excavation.
- Backacter Shield – an open face shield in which a mechanical backacter is mounted for excavation.
- Open face TBM – with cutter head
- Pressurised slurry machine – full-face tunnel boring machine in which excavated material is transported from the face in suspended slurry.
- Earth pressure Balance machine (EPBM) – a full-face tunnel boring machine in which excavated material is transported from the face by a balance of screw auger and conveyor.

The main tunnel alignment is anticipated to be entirely within the Gault Clay stratum and due to stiff to hard nature it is unlikely that Face Support will be required for using Cutter Boom or backacter methods. Pressurised slurry or EPBM methods have inbuilt systems which apply the necessary medium for mixing ground.

6.4.4 Ground Treatment/Face Support

If wet or soft ground is encountered, such as that found in borehole BH_TUN_006 near to the location of Shaft 3 then tunnel face support may be required. This can be included by the introduction of ground treatment such as through chemical stabilisation or grouting which will require to be completed prior to tunnel excavation. The Tunnelling Contractors programme would require considering this in their advance works programme.

Another solution to mitigate the risk of face collapse and water ingress is using a multi-mode TBM which can be operated open-face in case of competent and water-tight material and can be converted to slurry or EPB shield in case weak/soft/water bearing stratum is encountered. Since these TBMs require a more complex technical design, the additional cost of this option shall be understood and compared to the cost of other risk mitigation measures.

6.4.5 Jacking Lengths & Frictional Forces

For pipe jacks lengths being completed by machine operated above or below ground, distances between jacking points are expected to be around 500m in length (or more). Drive lengths should not exceed 1000m, with the distance from shaft 2-3 being the longest drive and will require the most substantial jacking system. Jacking reaction force will require to be provided in each of the drive shaft locations so that tunnel frictional forces are overcome. An appropriate lubricating medium for the annulus of the tunnel should be specified to overcome friction from Gault Clay with increasing frictional forces meaning that the jacking forces could become a governing load case when determining the lining thickness, and therefore would leave little room for optimisation.

In contrast of pipe jacking, in case of a segmental lining the erection of the segments occurs behind the shield and the shield is jacked from the last complete ring of segments, therefore the frictional forces don't increase by the length of the length of the drive.

The contact stresses between the sewer tunnel and the ground depend on the stability of the tunnel bore, the initial stresses in the ground and the stiffness of the soil. As the tunnel is primarily situated within Gault Clay, geotechnical properties indicate that this will be provide adequate stability and stiffness.

It is recommended that in the calculation of frictional forces the relaxation of the stresses in the ground due to the excavation process are considered.

6.4.6 Swelling

Swelling Pressure potential for Gault Clay has been presented in Section 4.9.12, while mineralogical composition is assessed in Section 4.9.13. The results suggest that the swelling pressures at the project site are potentially at the lower end of the expected range based on literature references. This is also supported by mineralogical information (X-Ray Diffraction results) in the form of the lesser amount of swelling minerals detected within the selected samples.

Tunnelling in soils with swelling potential, depend on the calibration of the tunnelling machine to the ground characteristics (temporary), but also on the ability of the tunnel lining to tolerate localised swelling pressures (permanent). To avoid the risk of damage to the tunnel lining this can lead to a thicker lining or increase in concrete class, furthermore compressible annular gap grout can be included. However, the deformability of a tunnel support after reaching a certain yielding load affects the distribution of the stresses and deformations around the tunnel and consequently determines the magnitude and build-up of the swelling pressure. Thus, the designer will require to develop a lining system i.e. material design and structural design, that ensures an optimal soil-structure interaction.

In the temporary condition slow tunnelling (i.e. unexpected stoppages) allow the generation of swelling pressures during the construction stage. If this occurs, then consequently higher pushing/jacking force will be required for the tunnel excavation machine, which in turn would require to be considered at the point of jacking design. Reference should be made to Section 6.4.3 for alternate tunnelling methods.

It should be noted that in case of mixing of the GC occurs with any material, e.g. slurry or conditioning agent, it is recommended that specialist advice is sought in case of the use of these materials in order to avoid/minimise swelling of the Clay during excavation.

6.4.7 Abrasion and mechanical wear

The importance of the effect of ground abrasivity on the performance of tunnel excavation equipment is important to understand the degree of mechanical wear and estimate constraints on the programme.

There was no specific testing conducted for abrasion during the ground investigation as the tunnel alignment was within GC, which is expected to be generally low wearing on cutting tools. However, during the investigation there were instances of hard bands encountered within the GC which are indicative of a low strength mudstone, which may increase the level of wear experienced by excavation equipment.

It is recommended to investigate further the instances of hard bands within the GC to support mechanical wear estimating.

6.4.8 Dispersibility

Dispersion describes the behaviour of clay particles separating from one and other in a moist soil. Dispersion can cause soil to breakdown and the dispersed clay to clog soil pores leading to erosion and the potential for structural damage due to soil displacement. This is important to understand as tendency towards dispersible soils may influence the design of structures located within the GC. This is a particular risk during construction where water is used or ponding, and during the operational phase where structures are water retaining and may leak.

The primary risks to the transfer tunnel are understood to be during excavation of the tunnel face, where waterborne fluids (slurry) will be used and may induce localised pockets of collapsed ground. Furthermore, damage to the sewer tunnel, during operational lifecycle, may cause cracking and allow the flow of water into the GC which over time may subside and affect the hydraulic gradient.

The results of dispersibility of GC are summarized in section 4.9.6 of this document. The results for dispersibility testing conducted have indicated that GC is generally non-dispersible. It is therefore, not considered that any additional measures would be required to ensure water does not meet the GC such as secondary lining.

6.4.9 Faulting

It has not been identified during the investigation if any historically locked in stresses are found within the GC, such as those caused by faulting. The BGS survey maps [R25.] do not indicate the presence of faulting along the route of the transfer sewer.

Faulting tends to lead to the generation of abnormally high locked in stresses within stratum that has sufficient compressive strength to resist the ground movement. However, this effect from faulting is unlikely to affect either the WMC or GC deposits. The more likely risk would be a sharp change in shear strength where the GC has deformed leading to a residual strength Clay. Localised changes in shear strength may affect tunnel horizontality whilst jacking, and so this risk should be considered. Investigation of the residual strength of the GC is recommended in later stages.

Noting that there is known literature reference describing faulting in Gault Clay [R21.] , based on the results of the GI presented in this report, it is not anticipated that faulting has occurred through the site.

6.4.10 Insitu Stress

It is primary importance for the tunnel designer to understand the magnitude of effective ground pressures acting on the liner in both vertical and horizontal direction, i.e., understanding of insitu-stress anisotropy is a key input to the tunnel liner design. The more the stress condition deviates from isotropic (K0=1) conditions, generally the more flexure occurs in a liner. Also, the total thrust in the liner is influenced by both vertical and horizontal stresses.

Vertical effective stress may be derived from the unit weight of the ground and the water pressure. In case of normally consolidated soils the formula $K0=1-\sin(\varphi)$ may be used to derive the horizontal effective stress, however in this particular case this is not appropriate due to the heavily overconsolidated nature of the GC. Therefore, to obtain the value of K0, the results of the pressuremeter testing are recommended.

Using the value of vertical effective stress, K0 and water pressure as applied loads, the designer can determine the structural forces by:

- a closed-form calculation, assuming in-situ stresses acting at the ground-tunnel interface
- modified closed form calculations that consider the arching effect in the soil due to the construction activities
- bedded beam-spring or shell-spring models (FEA) considering either in-situ or modified ground stresses
- geotechnical SSI modelling (FEA) to derive ground stresses, coupled with bedded beam-spring or shell-spring models (FEA)

In case of closed form or bedded beam models, it may be appropriate to use a different K value for design in cases when it is expected that the value of K0 has been altered by other activities such as nearby shaft sinking, deep excavations, raising of embankments or surcharges of various types. Each particular design section shall be evaluated separately by the designer and an appropriate K value shall be chosen for design may it be K0 or a bespoke value reflecting a location-specific situation. The advantage of geotechnical SSI modelling is that only the value of K0 is required and the load acting on the tunnel liner is derived directly from these models, incorporating all potential modification factors.

6.4.11 Oversite development

It is understood that by installing the tunnel there is a risk that future development at ground level may induce additional vertical stresses within the ground. Therefore, the development of appropriate over site development loading criteria should be incorporated within the tunnel lining design (also with shafts).

As discussed in section 6.4.5, if pipejacking method is progressed then the tunnel lining design will require to be sized appropriately to mitigate for jacking forces for long drives. This may in turn increase lining thickness or concrete class which would provide additional support to the tunnel from over site development.

In any case reference should be made to the Tunnel easement methodology 421008-002-C [R67.] for understanding of appropriate oversite development to mitigate tunnel deformation risk.

6.4.12 Crossings

The following surface crossings are expected for the current route of the sewer tunnel alignment, from west to east:

- Railway line which connects Cambridge North with Waterbeach
- Fen Road
- The River Cam
- Horning Sea Road (B1047)
- A14 Main Road

Crossings of public infrastructure, either surface or subsurface, will require engagement and discussion with the relevant operating authorities to ensure that the method of tunnel excavation is developed to ensure performance of the assets is maintained.

For the River Cam, GC deposits are anticipated to provide sufficient cover to the tunnel excavation to avoid the need for significant water ingress measures though, further work may be needed depending on the final tunnel alignment.

6.4.13 Tunnelling Contractual Risk

A geotechnical baseline report (GBR) is a contract document containing measurable contractual descriptions of the subsurface conditions anticipated, or to be assumed to be anticipated, during construction. It facilitates the allocation of ground-related risk and commercial responsibility between employer and contractor. Guidance on the use of GBRs can be found in CIRIA C807.

6.5 Shafts

A total of 6 shafts are proposed to be constructed along the proposed route of the transfer sewer with inner diameters from 9.5m internal diameter for shafts 1 and 2 to a depth of around 18mBGL, 12.5m internal diameter for shafts 3 and 5 with a depth of around 20mBGL, with the remaining shaft 4 to be 9m internal diameter with a depth of 18mBGL. There will also be a Terminal Pumping Station shaft which will be formed at the proposed Main Site and will be in the range of 30m internal diameter and a depth of 30mBGL.

The primary objective of these shafts is two-fold, initially these will be used to facilitate tunnel drive/reception areas during the construction work, whilst in the operational phase, the permanent shafts will be used as water storage for incoming wastewater and allow access to the main tunnel system feeding the treatment works.

It should be noted that at the time of writing this report, shaft depth and sizes may be subject to variation however, the details provided in this section can be used for initial design purposes.

6.5.1 Geology

A summary of the ground conditions encountered during the ground investigation works at each of the proposed shaft locations, is provided in Table 6.1 below.

Table 6.1: Anticipated ground conditions at Shaft locations

Top of strata (mAOD) [1]	Shaft 1	Shaft 2	Shaft 3	Shaft 4	Shaft 5	TPS
Topsoil (TS) / Made Ground (MG)	6.8 (MG)		9.1 (TS)	6.6 (TS)	10.8 (TS)	10.3 (TS)
Alluvium	-		-	-	-	-
RTD	6.1		5.2	-	-	-
Weathered WMC	-		-	6.4	10.5	10.0
WMC				5.8	9.7	9.1
Cambridge Greensand	-		-	-	-0.6	-0.8
Gault Clay	2.7		2.7	2.4	-1.3	-1.0
Lower Greensand	-26.0		-29.7	-34.3	-36.4	-36.4
Groundwater Level [2]	6.8		5.7	4.8	6.18	9.5

[1]: It should be noted that the ground geology is only indicative and specific ground conditions will vary depending on the final location of each shaft.
[2]: Groundwater levels are indicative and reference should be made to section 4.13 of this report.

The geology for each shaft location is presented in the following cross sections of Appendix A.2:

- Shafts 1 & 2 Figure 7.9
- Shaft 3 Figure 7.10
- Shaft 4 Figure 7.11
- Shaft 5 Figure 7.12
- TPS Shaft Figure 7.13

Near to proposed Shaft 3, depths of soft-firm GC were encountered during drilling. See Section 4.2.1 for written descriptions and Figure 7.6 of Appendix A.2 for the geological long section. A programme of Ground Investigation has been proposed to address this specific area and has been referenced in Section 4.2.1.

6.5.2 Methods

Construction of shafts are likely to be completed using one of the following or a mixture of the methods provided below:

- Sheet Piles (only for shallow excavations)
- Secant/contiguous bored pile wall
- Underpinned segmental wall
- Diaphragm wall
- Mixture of methods utilising Sprayed Concrete when within stiff clay horizons, such as GC

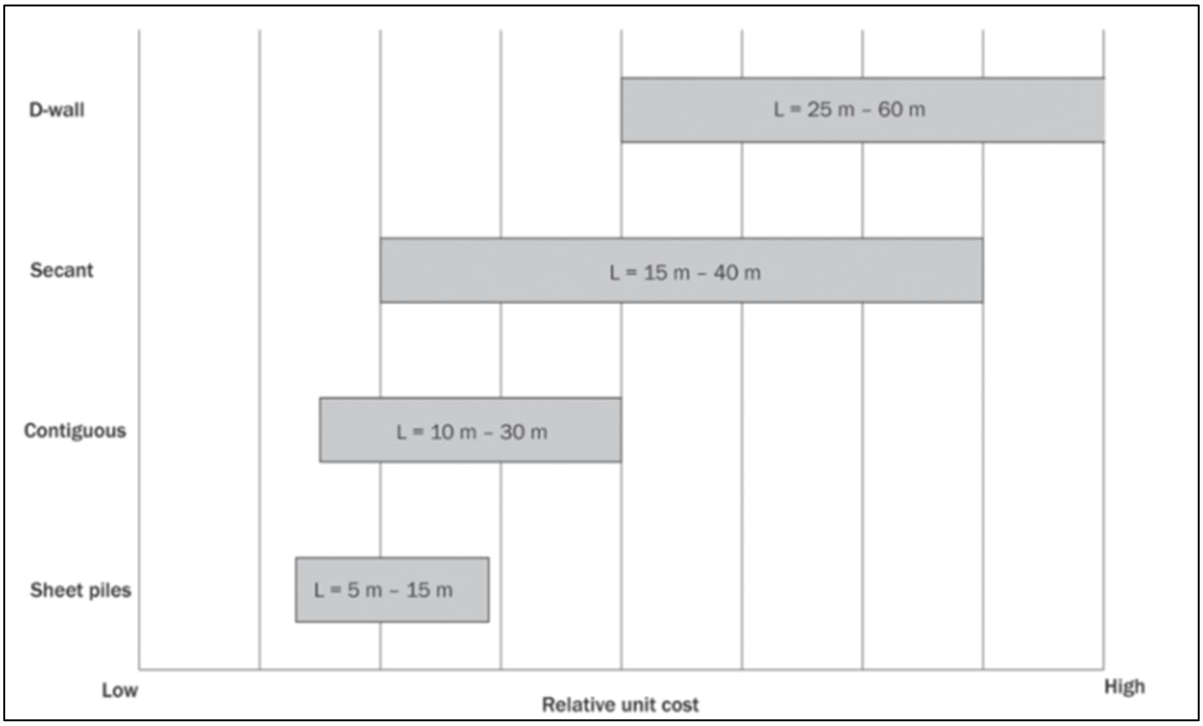
Open cut methods have been excluded due to anticipated depth of shafts and the land take which would be required for excavation.

Method of construction may include 'top-down' where the permanent structure is constructed as the excavation for the shaft progresses. Top-down methods would require the inclusion of a sufficiently stiff shaft wall to resist earth pressures in the temporary case until the bottom slab is constructed or consider the inclusion of intermediate floors to support. It is generally considered that 'top-down' construction would be uneconomical as there is no requirement for a superstructure and ground movements are unlikely to affect significantly nearby buildings/infrastructure. Therefore, for the rest of this section we will consider bottom-up construction.

Bottom-up construction is where the shaft walls are installed, material is then excavated with support to the walls provided by temporary works (propping) from invert level. This is followed by permanent construction rising from the base slab to the top of the shaft.

The method used for construction will be primarily driven by two factors, the depth of the shaft and the overall costs for constructing. The following Figure 6.2 has been extracted from Ciria C760 and provides an indication on the relative costs of each bottom-up method and the typical installation depths.

Figure 6.2: Relative cost of different wall types with reference to typical wall depths



6.5.3 Propping Systems

Consideration of an appropriate temporary propping system will be required for all bottom-up methods until the permanent structure has gained full strength to resist the applied earth pressures. The amount of temporary propping required will be driven by the stiffness of the shaft walls in relation to the ground conditions.

An alternative means of achieving a bottom-up construction sequence is by means of a circular cofferdam that relies on hoop compression to resist the external soil and water loads without the need for internal propping. The compression member can either be the retaining wall (e.g. a diaphragm or secant piled wall) or ring beams at suitable levels as the excavation progresses.

Propping systems may or may not be required depending on the method of construction.

6.5.4 Hydraulic Uplift

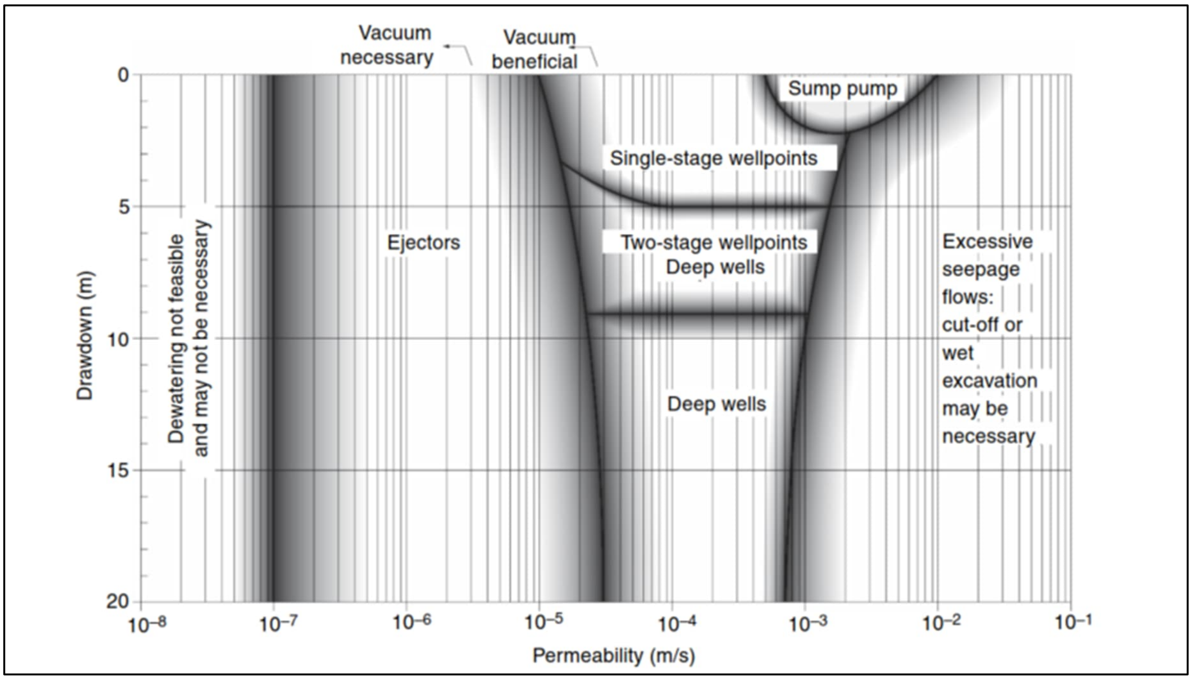
6.5.4.1 Temporary Shafts

Groundwater will require to be controlled during the construction phase for all shafts, if the contractor progresses with a top-down construction sequence. In the UK the majority of construction projects manage groundwater through the use of the following techniques:

- Sump pumping
- Wellpoints
- Deep wells
- Ejector wells

The following Figure 6.3 is extracted from CIRIA C750 Groundwater control – design and practice [R68.] , which provides advice on a range of pumped well groundwater control techniques with varying depth of excavation and soil permeability.

Figure 6.3: Range of application of pumped well groundwater control techniques



Based on the results from in situ permeability testing the following measure for dewatering are anticipated to be required during the construction of shafts:

- RTD (present in shafts 1,2 & 3): Ejectors for shallow layers
- WMC (present in Shafts 4,5 & TPS: Deep wells or Ejector wells
- GC: no dewatering measures are anticipated

Details of the encountered groundwater conditions are contained within Section 4.13. Permeability for RTDs is contained in Section 4.5.5, for WWMC is contained in Section 4.6.10 with permeability for WMC contained in Section 4.7.15.

If the construction sequence follows a bottom-up approach then it is expected that groundwater cut off will be achieved using either secant or diaphragm walls, with the base of the shaft terminating within the GC layer which is not anticipated to require dewatering.

6.5.4.2 Permanent Shafts

Groundwater levels are indicated to be near surface and uplift pressures will be exerted on the base of all shafts. It is considered that shafts will have uplift forces which may exceed the total dead weight of the structure. To resist uplift forces, there are several options which may be considered:

- Additional dead weight to shaft. This involves adding additional concrete, primarily to the base, to form a plug.
- Shear keys. Addition of a shear key which will utilise the weight of soil and resisting shear forces from the soil interface bond.
- Tension piles. The inclusion of tension piles installed at the base of the shaft which will provide additional shaft friction.

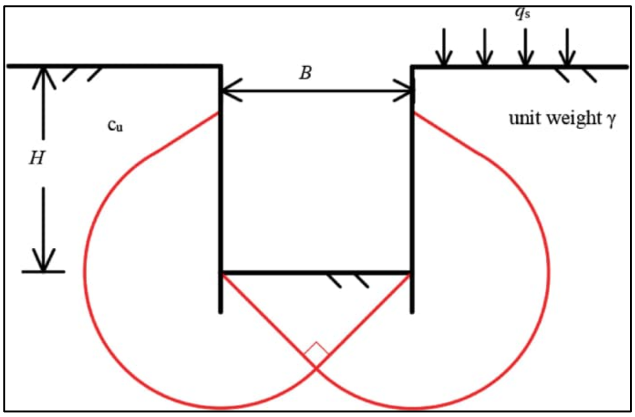
The LGS and the WMC are designated by the Environment Agency as principal aquifers. It is therefore important not only to control water pressures for the purposes of shaft construction, but also to consider the potential impacts of such de-watering on the aquifers as water resources. Further information on this is provided under a separate document, Cambridge WWTP Relocation Hydrogeological Impact Assessment 415458 | 08 | C[R11.] Furthermore, estimates on dewatering have also been provided for the Terminal Pumping Station Shaft in the document 'Pumping test analysis and shaft dewatering assessment, Cambridge Waste Water Treatment Project Relocation', 100381548BH02-MMD-00-TN-P-01 Rev A [R23.]

Shaft construction is expected to avoid penetration into the LGS formation, with the base of all shafts having several metres of GC covering the LGS. However, a confined water pressure (noted in BHs BH_TUN_001, BH_TUN_006, BH_TUN_011, BH_TUN_018, BH_STW_022, BH_STW_013, BH_STW_022) exists within the LGS which, if disturbed, may increase the degree of uplift being exerted on the structure. Pathways into the LGS should be avoided i.e., deep piles, D-Wall construction, or further ground investigation.

6.5.5 Basal Heave

Basal-heave failure in a braced excavation in clay (GC) may be induced by insufficient shear strength, which supports the weight of soil within the critical zone around the excavation. During an excavation, soil outside the excavation zone moves downward and inward because of its own weight and surcharge; this tends to cause soil inside the excavation zone to heave up. Collapse of the bracing system may occur if the amount of basal-heave movement is excessive. See Figure 6.4 below for an illustrative view of this

Figure 6.4: Heaving-failure mode of soil under the bottom of excavation



It is anticipated that the Factor of Safety (FS) against basal heave is sufficiently high due to the relatively high strength GC and narrow shaft construction. For the TPS, where the shaft excavation is largest, the overlying WMC layer is expected to provide resistance to mitigate surface loads effects. Care should be taken with sighting heavy loads/cranes within the immediate surrounding of all open shaft excavations as this will reduce the FS.

It is recommended for further investigation around the location of Shaft 3, due to the presence of softer bands within the GC, which will lower the FS.

6.5.6 Connecting Shafts 1 and 2

It is understood that Shafts 1 and 2 will be near each other. Methods of construction will require to consider the appropriate method of connecting both shafts through thorough review of the sequencing of construction, pipe jacking/ramming or multicellular shaft construction to combine Shafts 1 and 2. Ground movements in this area are expected to be higher than elsewhere and temporary support through the inclusion of ground treatment to avoid excessive ground movements affecting the existing WWTW site.

6.5.7 Soft Gault Clay at Shaft 3

Near to the proposed Shaft 3, depths of soft GC were encountered, See Section 4.2.1 for written descriptions and also Figure 7.6 of Appendix A.2 for the geological long section. A programme of Ground Investigation has been proposed to address this specific area and has been referenced in Section 4.2.1.

Should soft GC be proven to exist then measure to increase the strength of the ground (such as jet grouting/soil mixing etc) or increase the thickness of walls or inclusion of more robust temporary propping systems should be considered.

6.5.8 Backfilling Temporary Shafts

Shafts 2,3 and 5 are proposed to be temporary to help facilitate the driving on the main sewer tunnel. These shafts are likely only required for a period of less than 1 year. Upon completion of the temporary shaft’s usable working life, it is anticipated that these are to be decommissioned by backfilling. The type of backfill should be determined based on the geotechnical properties of the surround ground and provide sufficient earth pressure support to avoid ground movement at surface (visible depression) and at depth lateral collapse of side walls.

6.6 CWwTP Main Site Structures

6.6.1 Foundation Design

Foundation types for any infrastructure are primarily dependent on the load of structures, ground conditions and tolerable settlements. Generally, pad and /or spread foundations are appropriate for relatively lightly loaded structures or structures resting on competent ground, whilst raft foundations are considered appropriate in consideration of distributing loads over a large area.

Proposed structures will have specific criteria which will drive the requirements for foundation design. In general, the main function expected will be to provide an allowable bearing capacity, however this is not considered to be the main criteria for performance of the structures. Structures will be mostly affected by the following items which will determine the more appropriate type of foundation system:

1. Allowable total/differential settlement, post construction phase.
   The ground is expected to provide a total settlement profile which will consider immediate settlement, consolidation settlement and/or creep.

2. Geometry

Foundations with a smaller footprint will exhibit a shallow zone of influence underneath them, whilst large footprints will exhibit a deeper zone of influence.

3. At ground structure or buried structure
   Foundations located at surface will impose loads higher than the insitu stresses, for buried foundations there will be a net load (gross – weight of soil). Stress history is considered for development of the ground response.

4. Operational loads i.e. empty/filled with water during its lifecycle
   Most of the proposed structures will be water retaining and will be at alternate levels of capacity during its operation. This cycle of capacity will significantly impact the load being applied to the ground and thus affect the ground response.

5. Ratio between immediate and consolidation settlement, rate of consolidation.
   Settlements occurring before fitting of pipework can be managed during construction.

6.6.1.1 Shallow and ground bearing foundations

Selection criteria for foundations will require an understanding of the degree of displacement foundations experience during its design life. Having a clear definition of what tolerance are available for the structural performance will determine whether the foundation is shallow or deep.

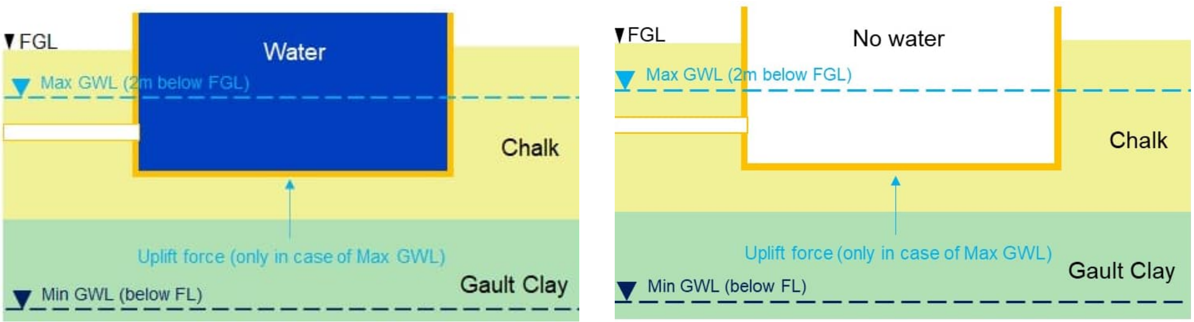
Foundation selection will then require considering the following items:

- Immediate settlement
- Consolidation settlement
- Creep
- Zone of Influence (depth)
- Zone of Influence of nearby structures (plan)
- Yield Stress of Chalk

As with water sector projects most structures will be water retaining. This leads to high live loads during the operational phase of structures. Typical construction stages are presented below:

- Initial condition (pre-site)
- Excavation (Construction and rebound of excavation/groundwater management)
- Installation of structure (Large empty structure)
- Filling with water (load at highest)
- Emptying of water (operational phase)

Figure 6.5: Operational phases of filling/emptying of structures



6.6.1.2 Buoyancy/Uplift

As indicated in Figure 6.5 above, there will a significant variance in the load being applied to buried structures during the filling and emptying of water bearing structures, which is present only after construction i.e., during the operational phase of the structure's lifecycle.

Details of the encountered groundwater conditions are contained within Section 4.13, with a summary of the findings in Section 4.13.2.

Uplift forces, due to high groundwater levels, are expected to increase significantly during the empty cycle for water retaining structures and measures will require to be put in place to resist buoyancy. These measures may include:

- Inclusion of mass concrete fill at the base of the structure, to increase the deadload.
- Inclusion of shear key to structures, to use the existing soil weight to provide additional deadload.
- Dewatering of the surrounding soils, to remove water and limit the effect of uplift
- Piles designed for tension, to distribute the uplift forces into deeper soils.

It is likely that a combination of mass concrete fill and inclusion of a shear key would be preferable as dewatering requires active management and piles may not be installed if they are not required for compressive load carrying.

6.6.1.3 Deep Foundations

It is anticipated that several heavily loaded or large geometry structures may require deep foundations to transmit the loads to a more competent bearing stratum in order to achieve the performance criteria. This is typically carried out using piling with the likely founding stratum to be within the high strength GC deposits.

Piling should be taken to a sufficient depth within the GC to avoid the softer upper surface and to generate sufficient skin friction on the pile perimeter to generate load carrying capacity.

Several methods of pile installation can be adopted within the prevailing ground conditions however, it is understood due to the size and load of the larger structures (such as the MABR) that rotary bored or continuous flight auger piles with medium to large diameters would be the preferred solution.

Pile designs are recommended to take account of the following:

- Piles are not expected to terminate within WMC deposits due to limited thickness and low generation of pile skin resistance needed for heavy structures.
- CIRIA C574 Engineering in Chalk, Section 8 recommends calculating the pile skin friction using an α=0.8 for rotary bored piles and, 0.45 for CFA piles.
- Tomlinson Pile design and Construction Practice, 5th Ed, ultimate loads in fine grained soils (GC) recommends using $Q_s = F\alpha_p C_u A_s$ for determining skin friction.
- Tomlinson Pile design and Construction Practice, 5th Ed, ultimate loads in fine grained soils (GC) recommends using $Q_b = N_c c_{ub} A_b$ for determining base resistance.

For the purposes of preliminary design, a single pile load capacity analysis has been conducted for both types of piles using the above methodology and results are provided in Table 6.2:

Table 6.2: Typical Single Pile Capacity

Pile Type	Diameter (mm)	Length (m)		
		15m	20m	25m
CFA	450	450	600	750
	600	600	800	1000
	900	1100	1300	1650
Bored	450	N/A	N/A	N/A
	600	800	1000	1250
	900	1500	1650	1950

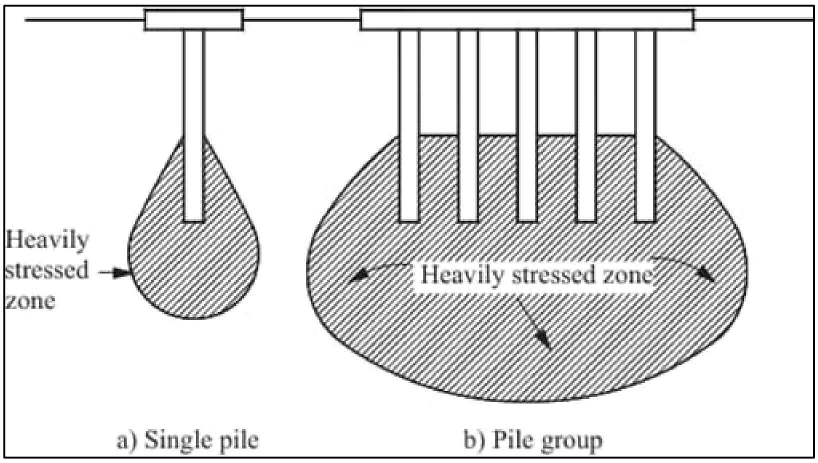
Notes:

1. Pile capacities are indicated from installation at ground surface.
2. Ground model used is 10m of WMC overlying GC to end of pile.
3. Loads provided are Safe Working Loads for FS=2.5
4. Loads provided are in **kN** and for vertical compression only.

6.6.1.4 Pile Group effect & non-linearity

Although a pile group strengthens the overall lateral load resistance, it can weaken the individual pile response in it because of the “group effect”. This happens because each pile in a pile group affects the soil resistance around other piles and overlapping stresses tend to increase the ZoI. See Figure 6.6 after Tomlinson (1994) [R69.] below.

Figure 6.6: Deeper ZOI for end bearing shaft group



At later stages of design, pile group effects will require to be considered to ensure understanding of loss of vertical load carrying capacity.

Furthermore, Table 6.2 does not consider the non-linearity of soil behaviour. As the forces distribute from the pile cap to pile tip, the amount of resistance from the soils will decrease and in turn reduce the degree of strain felt by the soils. As strain decreases, stiffness of the soil increases which can reduce the movement of the pile. Further studies on soil non-linearity may be conducted which would require using more advanced investigation techniques (such as downhole seismic or multi-channel analysis of shear wave velocity to determine G_0) and Finite Element Modelling (FEM) to determine the soil behaviour and aid a more efficient pile design.

6.6.2 Dissolution features in Chalk

Dissolution features (voids) are common in Chalk and case study has highlighted the prevalence in many large infrastructure contracts within the UK. These features have the potential to cause differential or collapse settlement of foundations, if undetected.

Dissolution pipes and cavities may be easily missed by conventional drilling methods and therefore a programme of geophysical testing in the form of Electrical Resistivity Tomography (ERT) was conducted in 2-Dimensional sections. This was targeted at locations near to the proposed locations of key assets associated with the proposed WWTP site. The results from this are summarised in Section 4.14.1, and do not indicate the occurrence of these features within the locations surveyed targeting the WMC.

Furthermore, dissolution features occur where surface water runoff, which is slightly acidic, has discharged into and dissolved the underlying chalk (calcium carbonate). Following this the dissolved zone becomes infilled with loose soils which, if inundated, will subside. Testing has indicated that the calcium carbonate content of the WMC is very low, which indicates that these features are also less likely to occur naturally.

6.6.3 Maximum Bearing Pressure, Yield Stress and Creep

Refer to Section 4.7.14.7 for limits on ground bearing pressures upon WMC and the estimation of creep.

6.6.4 Pipework

Pipework will connect all the major structures together and consistency of foundation performance where pipework connects into main structures will require to be developed at further design stages. The design of supporting thrust blocks should focus on maximum bearing pressure (for shallow foundations), lateral loads, tilting, sliding and differential settlement to ensure adequate performance.

Refer to Section 4.7.14.7 for more information.

6.7 Final Effluent & Storm Water

6.7.1 Geology

A geological long section along the Final Effluent (FE) and Storm Water (SW) pipeline alignment is provided in Figure 7.5 Appendix A.2. This geological section indicates that the final effluent will be within the surfacing WWMC and the underlying WMC with the exception of the westernmost part of the final effluent where RTD and AL deposits are also encountered. All the geotechnical data for these strata are contained within Section 4 of this report.

6.7.2 Methods

It is anticipated that both FE and SW pipelines will be constructed using a mixture of tunnelling and open cut methods.

6.7.2.1 Tunnelling

For more details on Tunnelling methods refer to Section 6.4.

6.7.2.2 Open Cut

Safe slope angles of 1V to 3H would generally be considered appropriate for excavation within AL and RTD deposits. Excavations in WWMC and WMC are able to be near vertical due to apparent chalk cohesion (in the temporary condition) however, for safety of workers it is recommend limiting excavations to 1V 2H to ensure that an adequate factor of safety is applied for a temporary case, provided that adequate dewatering measures are put in place, where necessary.

Tracking of earthmoving plant must be carefully reviewed, where required at the top of slope, so as to avoid adding surcharge loading and reduce slope angle FS.

More information can be found on earthworks construction in Chalk within Section 6.10 of this report.

6.7.3 Crossings

It is anticipated that FE and SW routes will pass underneath/through the local B1047 Horningsea Road. Methods to construct this will require involving the local roads authorities, with partial closures likely if open cut methods are adopted.

6.7.4 Temporary works

Refer to section to Section 916.7 for details on earth pressure design parameters.

6.8 Outfall Structure

This structure is associated with the dispersal of final effluent and storm water discharges into the River Cam and is anticipated to be located to the north of a bridge associated with the A14.

6.8.1 Geology

BGS records highlight that AL is present along the full length of the River Cam and may be soft and compressible in nature. Historical boreholes predict the presence of peat within the AL layer near the river, which was confirmed by the current GI. The ground conditions at the banks of the River Cam are provided in Section 4.2.3 and 4.2.4 of this report.

6.8.2 Construction

It is likely that foundation systems for the outfall structure will need to consider methods to mitigate the potential for settlements caused by AL. Settlement of this structure does not only impact foundation stability but may also cause unacceptable loading on the incoming FE and SW pipes and/or affect the hydraulic gradient (though less of an issue if the gradient is already steep). Furthermore, differential settlement in the structure may induce tilting which, again, may distribute loads onto the pipework further upstream.

As the thickness of the AL layer is expected to be limited to around the proposed foundation level, the recommended method to mitigate excessive settlement is to dig out and replace the AL layer,

6.9 Temporary and Permanent Embedded Walls

The type of support required is a function of a number of factors including stratum type, depth of excavation, groundwater level in the area of excavation, available space/imposed spatial restrictions and sequence of construction work.

Temporary supports are unlikely to be required for the Topsoil/Made Ground Soils due to the limitation of spatial occurrence and depth.

Excavations are likely to remain open and stable with Chalk in the temporary condition (Section 6.7.2.2). However, for deeper and permanent excavations, secant pile retaining walls or diaphragm walls may be required to retain the excavation. To limit the bending moments within the walls, lateral support, in the form of struts or pre-stressed anchors could be introduced to provide additional support at critical depths down the retaining structure.

Careful consideration in any temporary support design will need to be given to the earth pressure coefficients. Suggested static (k0), active (ka) and passive (kp) earth pressure coefficients, based on the Rankine state (after Rankine, 1857; reported by Barnes, 2000) are presented in Table 6.3 below.

Note that the Rankine coefficients assume a smooth surface to a vertical unrestrained retaining wall and also assume the retained ground surface to be horizontal, homogeneous and semi-infinite. If these assumptions are not appropriate, the earth pressure coefficients will need to be modified accordingly.

Table 6.3: Estimation of earth Pressure coefficients after Rankine

Rankine Earth pressure coefficients	Alluvium (AL)*	River Terrace Deposits (RTD)**	WWMC (Weathered West Melbury Chalk)	West Melbury Chalk (WMC)	Gault Clay (GC)
K_0	0.64	0.46	0.53	Section 4.7.13 & (Table 4.27)	Section 4.9.10 & (Table 4.27)
K_a	0.47	0.29	0.36	0.29	0.45
K_p	2.12	3.44	2.77	3.44	2.20

*Angle of friction assumed 21° based on PI according to BS8004.
**Angle of friction for RTDs assumed ϕ=33° based on log descriptions of density and SPTs according to CIRIA 143.
Note: Horizontal stress assumed to be acting isotropic

6.10 Earthworks & Excavation in Chalk

6.10.1 Introduction

The WMC is expected to be the most significant source fill obtained during construction of the proposed WWTP site, due to the significant number of buried structures and the large TPS shaft. Chalk is commonly used throughout the UK as a source of fill however, there are challenges faced during the earthworks process, stemming from geological and geomorphological factors combined with method of mechanical handling methods. The principal problem stems from instability causing slurry chalks in cuts, haul roads and surfaces of fills. This temporary instability leads to loss of traction, severe rutting and potentially halting of the work, normally during wet weather periods. Performance of partially completed fill can lead to sponginess or the potential for consolidation settlement or collapse with cracking or slope failure has occurring.

6.10.2 Excavation, Compaction and instability

The following Figure 6.7 is extracted from CIRIA C574 and highlights Chalk Earthworks classes with measures to avoid or minimise instability (Ingoldby and Parsons, 1977, TRL LR806) [R71.]

Figure 6.7: Chalk earthworks classes with measures to avoid or minimise instability

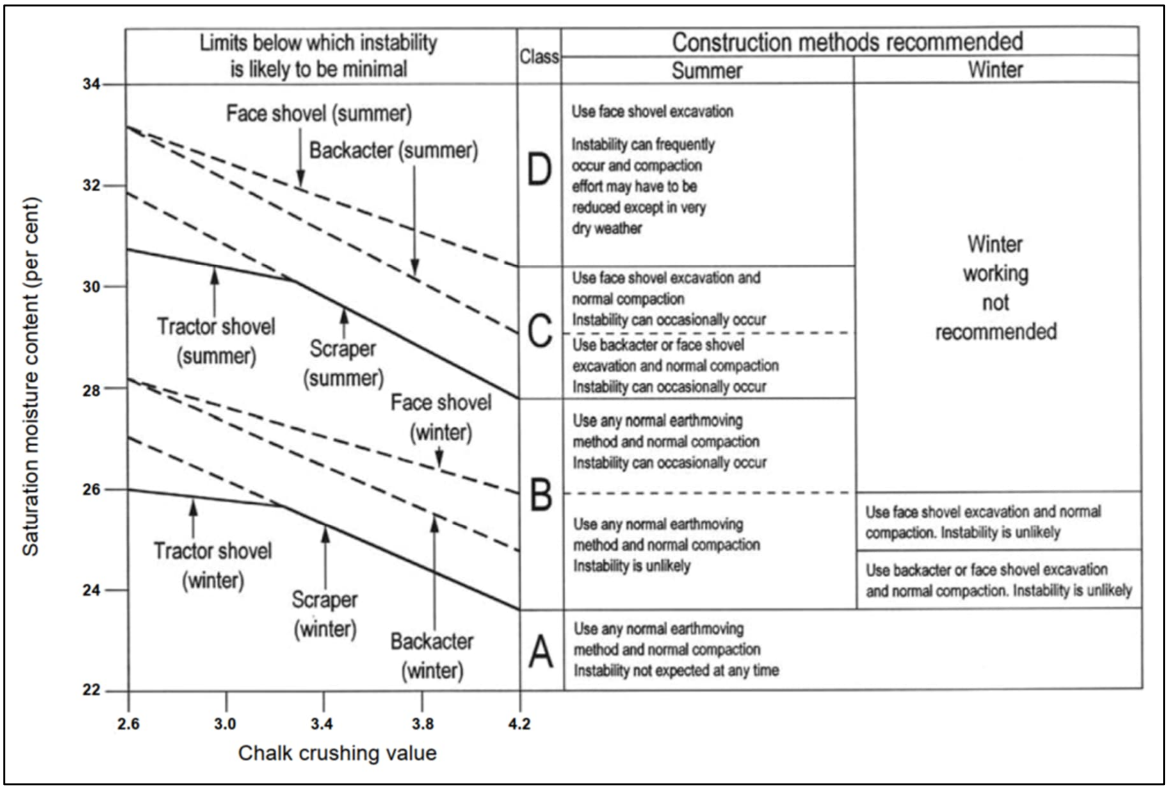


Figure 6.7 is used to link construction methods into chalk divisions using plotting saturation moisture content and chalk crushing value. As identified in Section 4.7.8 and Figure 9.51 of Appendix A3.8, all of the tests plotted correspond to Class A chalk which allow the use of normal earthmoving equipment and typical compaction methods, with instability in chalk unlikely to be encountered.

In relation to compaction of the material, comparing the average maximum dry density from the 4.5kg method compaction tests (1.91 Mg/m3) and the average dry density of the undisturbed samples (1.73 Mg/m3) a maximum of 10% loss of volume is suggested during earthworks construction.

6.10.3 Fill classification and Re-use

Understanding how the chalk material relates to the standard earthworks specification is critical to determine how to manage the material on site. The Specification of Highways Works (SHW) is the predominant standard for earthworks construction in the UK and this provides selection criteria on upper/lower bound geotechnical properties on sources of fill and how to compact them. Chalk is treated either as a granular material (Class 1), a cohesive material (Class 2) or under Class 3 (special material). Class 3 has been developed to take account of restrictions on the use of soft chalk and in particular working during winter months.

In order to determine an appropriate Class of fill for the reuse of site won chalk, the method as described by Greenwood (1993) has been used and this focusses on the Intact Dry Density (IDD) and the Natural Moisture Content (NMC) and is deemed suitable to obtain this information during a ground investigation campaign.

The following Figure 6.8 provides the method, based on Greenwoood, (1993) on which to classify the earthworks fill.

Figure 6.8: Information and workflow for chalk earthworks classification

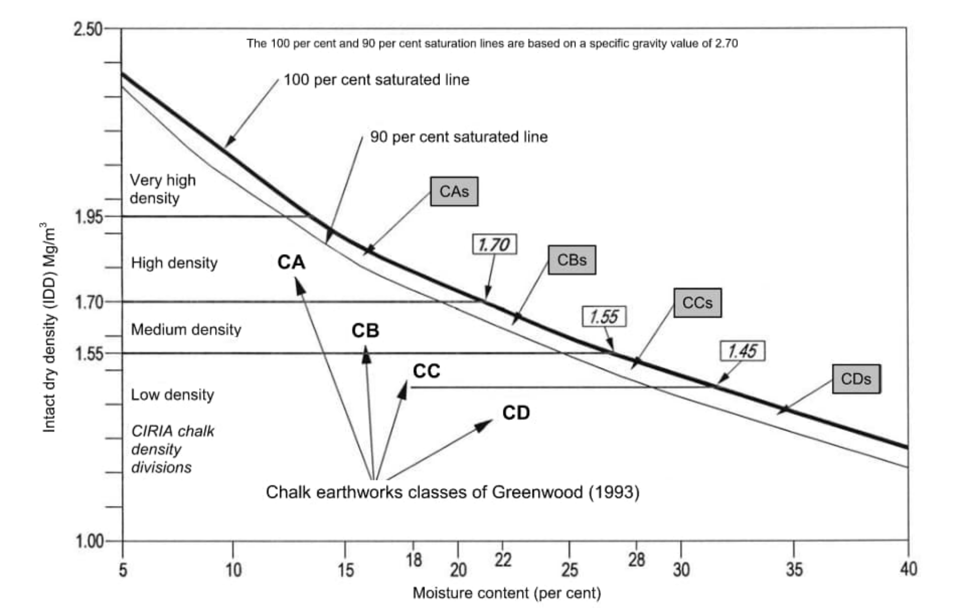
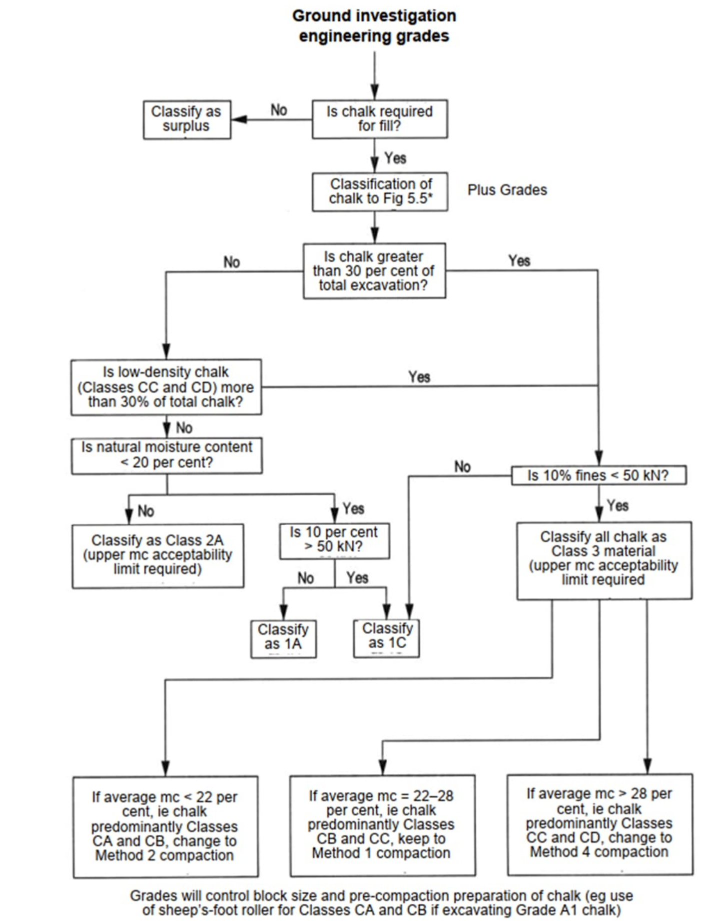


Figure 5.5 *Proposed chalk earthworks classification (after Greenwood, 1993)*

Table 5.3 *Proposed chalk classes and compaction methods (relating to Department of Transport Specification (after Greenwood, 1993))*

Class	Requirement	Compaction method *
1A	mc < 22 per cent	Method 2
1C	10 per cent fines > 50kN	Method 5
2A	mc ≥ 22 per cent	Method 1
3	Optional use (Clause 605 to apply)	Method 4 if mc > 28 per cent (CC/CD) Method 1 if mc = 22–28 per cent (CB/CC) Method 2 if mc < 22 per cent (CA/CB)

* See Table 5.4 for details of compaction methods



* *Figure number relates to this report*

Figure 5.6 *Revised flow diagram for classifying chalk for use as general fill (after Greenwood, 1993)*

The results from the ground investigation for IDD and NMC are presented in Sections 4.7.3 and 4.7.1 respectively. Based on this it is expected that the majority of the WMC site won material can be classified as Class 1 material in accordance with Series 600 of the SHW. To determine whether the material should be classed as Class 1A or 1C will require completion of 10% fines testing which, however it should be noted that based in the results of the current GI the 10% fines test could not be undertaken to the lack of appropriate sizes of intact lumps of Chalk in the samples. In case NMC exceeds 20%, Chalk would be reclassified as Class 2A material however, this is expected to be mitigated by mixing in quantities of material with <20% NMC fill.

It is important to note that based on the CBR tests the strength of the compacted material rapidly deteriorates by increasing moisture content, therefore compaction dry of OMC is recommended and the material shall be protected from excess moisture at all times to prevent the deterioration of the trafficable surface or loss of stability.

It is recommended to conduct a small-scale trial of the earthworks to determine the compaction and performance of embankments prior to creation of the final earthworks arrangement and to test the advice provided in this Section. The selection of such a trial embankment should be conducted in discussion with the earthworks designer.

6.10.4 Frost susceptibility of chalk

Frost susceptibility testing indicates the chalks potential to volume change in case the water in the pore space freezes. This volume change can induce frost shattering, degradation of the material by cyclic repetition of freezing and thawing.

Despite the low carbonate content and high IDD of the WMC, which may suggest that the material is less susceptible to frost damage, frost susceptibility testing confirmed the chalk sampled from the bottom of trial pits to be frost susceptible. The summary of frost susceptibility test results can be found in Section 4.6.6

Based on SHW Series 800 Clause 801.14, unless otherwise stated in the contract specific requirements, material shall not be frost susceptible if it is used within 450 mm of the designed final surface of a road or paved central reserve, or 350 mm if the Mean Annual Frost Index (MAFI) of the site is less than 50.

Since the results of the ground investigation confirmed that the chalk fill classified as frost-susceptible, other non-frost-susceptible material, potentially imported, shall be used as the capping layer for roads. The use of the material near the surface of the bunds shall be evaluated separately based on other proposed surface protection measures and structure-specific requirements. However, if a paved road is designed on the surface of the bund, the same rule shall be followed as above.

During earthworks operations care should be taken when working with Chalk during winter months and consideration over methods to protect areas of exposed chalk and in particular stockpiles of chalk earthworks which are to be used as fill. Ponding of water should be avoided in Chalk, an appropriate drainage system shall be designed for all structures composed of chalk to avoid potential frost damage.

6.11 Groundwater

Details of the encountered groundwater conditions are contained within Section 4.13, with a summary of the findings in Section 4.13.2.

The results for permeability indicated that WWMC layers tended to be significantly less permeable than the underlying WMC. This was evident through the inability for water escaping into the WWMC during soakaway tests. However, the WMC layer showed a significantly higher degree of permeability. This was particularly evident from the testing completed within the pumping test where conductivity in the rock mass was measured to be the highest, refer to Section 4.13.3.

Site wide drainage will require consideration of both WWMC and WMC permeability values and present a suitable solution for removal of surface runoff. Permeability for WWMC is contained in Section 4.6.10 with permeability for WMC contained in Section 4.7.15.

6.12 Roads & Pavements

Roads are required to be created in several locations and serve 2 separate purposes; these include:

- Internal Access Roads
- External Access Roads, which may be adopted by the local authority

The current geotechnical investigation works were only conducted for internal access roads. It should be noted that testing was conducted on samples taken from trial pits covering a grid of the area of the proposed WWTP as the alignments of the internal roads were not known when scoping the investigation.

It is anticipated that the road construction will take place within the upper Chalk layers of either WWMC or WMC. Results from CBR testing for WWMC are contained within Section 4.6.7 and for WMC in Section 4.7.9. Variation in WWMC would likely require the inclusion of a thin capping layer whilst results in WMC indicate that a capping layer may be excluded. It is not anticipated that geogrids would be required for typical road construction. CBR testing indicates a rapid loss of the strength of chalk beyond a certain moisture content value, therefore ponding of water should be avoided, appropriate drainage systems should be designed for the road subgrades.

In addition, soft spots and/or highly weathered zones encountered on the top of chalk are also recommended to be removed prior to the construction of the pavement.

Materials used for pavement construction should be compacted to at least 95% of the maximum dry density of the material or by using appropriate method compaction with a minimum number of passes of compaction equipment. Reference should be made to the SHW and the advice in Section 6.10.3 regarding inclusion of a Trial Embankment.

It is recommended that external access roads are investigated to determine road pavement construction.

6.13 Soil Aggressivity for buried structures

Ground aggressivity is detailed in Section 4.12 and a summary of buried concrete classification results is presented in Table 4.22 for the proposed and Table 4.23 for the existing WWTW, including Design Sulphate class (DS) and Aggressive Chemical Environment for Concrete (ACEC) for all strata. In summary, the Chalk presents minimum aggressivity for buried concrete whilst the DS and ACEC for Gault Clay were determined higher showing higher aggressivity potential to buried concrete. Requirement for higher quality cement and additional protective measures should be considered.

Steel corrosivity is summarized in section 4.12.2. Based on the results showing a moderate potential to corrode steel or iron components it is recommended that measures against corrosion should be considered. The choice of metal or use of barrier protection such as coating should be considered when corrosion rates are established to accomplish the desired design life.

6.14 Sustainable Design

This Section has been included within the report to highlight some areas where the geotechnical works can be used to understand potential future efficiencies in construction efforts.

- Continued Design Development
  It is understood that providing a more efficient or optimised design will provide savings on all aspects of the construction lifecycle including the quantity of materials used and the time to construct. Design costs are normally a fraction of the overall costs for construction and investing more effort at earlier stages of design development will provide greater efficiencies in the construction phase.

- Ground Investigation
  Whilst there has already been a robust approach to ground investigation there is more work that can be conducted to enable more efficient design:
  - Investigation of small strain stiffness. This will provide a non-linear approach to shallow foundation and pile design, which will improve theoretical foundation performance.
  - Deeper investigation into the Kimmeridge Clay to determine soil properties for exceptionally large ground bearing structures.
  - Investigation of soft clays at Shaft 3 to reduce the need for robust temporary and permanent structures.
  - Investigation of external roads, to inform the designer correctly, measures required for road construction.

- Pile Load Testing
  Pile design inherently incorporates a larger factor of safety than pile behaviour in the field, under load. It is recommended for preliminary pile testing to be conducted well in advance of the installation of working piles to optimize the size (length) of working piles, thus reducing concrete volumes.

- Trial Embankment
  There will be a significant amount of fill being produced on site which is intended to be used within the main WWTP construction site. To understand the degree or reusability of this material and the time & effort required to construct, the construction of a trial section should be completed. This will ensure that the amount of material gained from site can be incorporated within the fill areas to minimise waste and optimise the degree of compaction required.

6.15 Challenges of reporting

As detailed in Section 1.6, there have been challenges in data processing throughout the Revisions of this report due to not having a Final Report ready within the appropriate timeframes at each stage. After receipt of the latest report there were no significant changes made to the engineering considerations and recommendations. There are certain tests that were confirmed to have been restricted and in cease of certain tests specific conditions of testing have not been confirmed. However, it is expected that these missing pieces of information will not have a notable impact on the overall engineering recommendations presented in the above sections.

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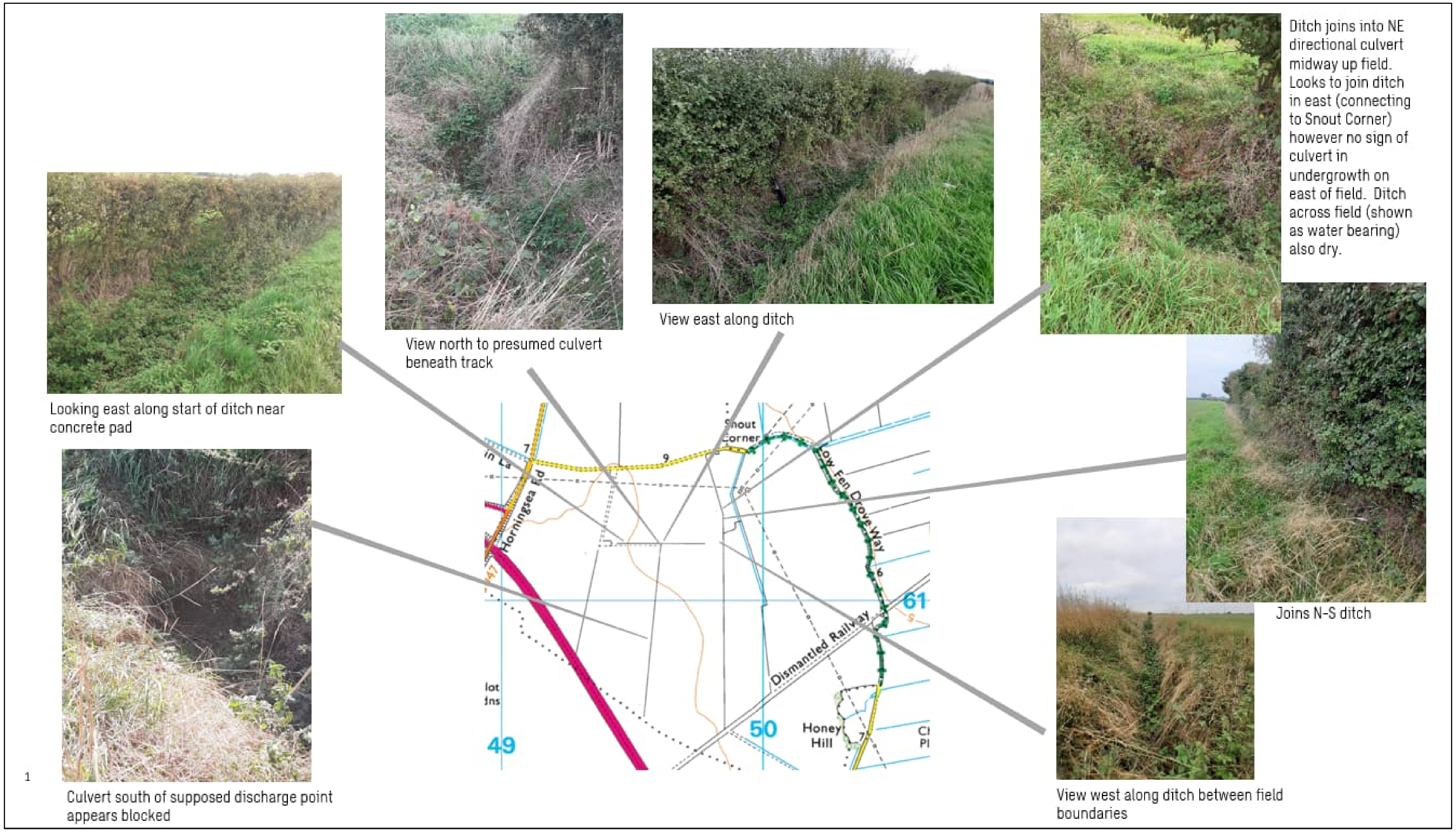
Appendices

A. Figures

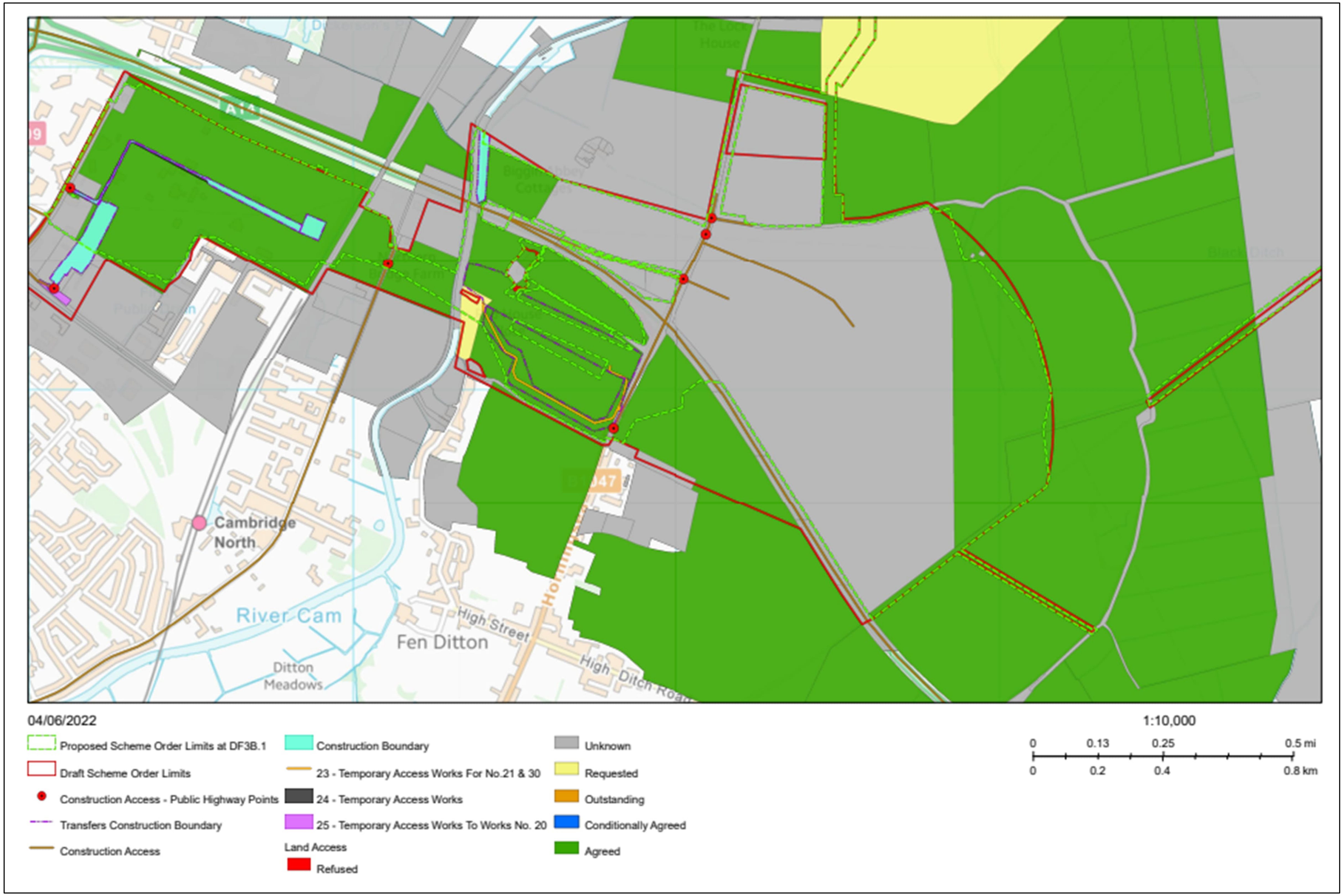
A.1 Maps and Layouts

Figure 7.1: Layout showing the main ditches present on site



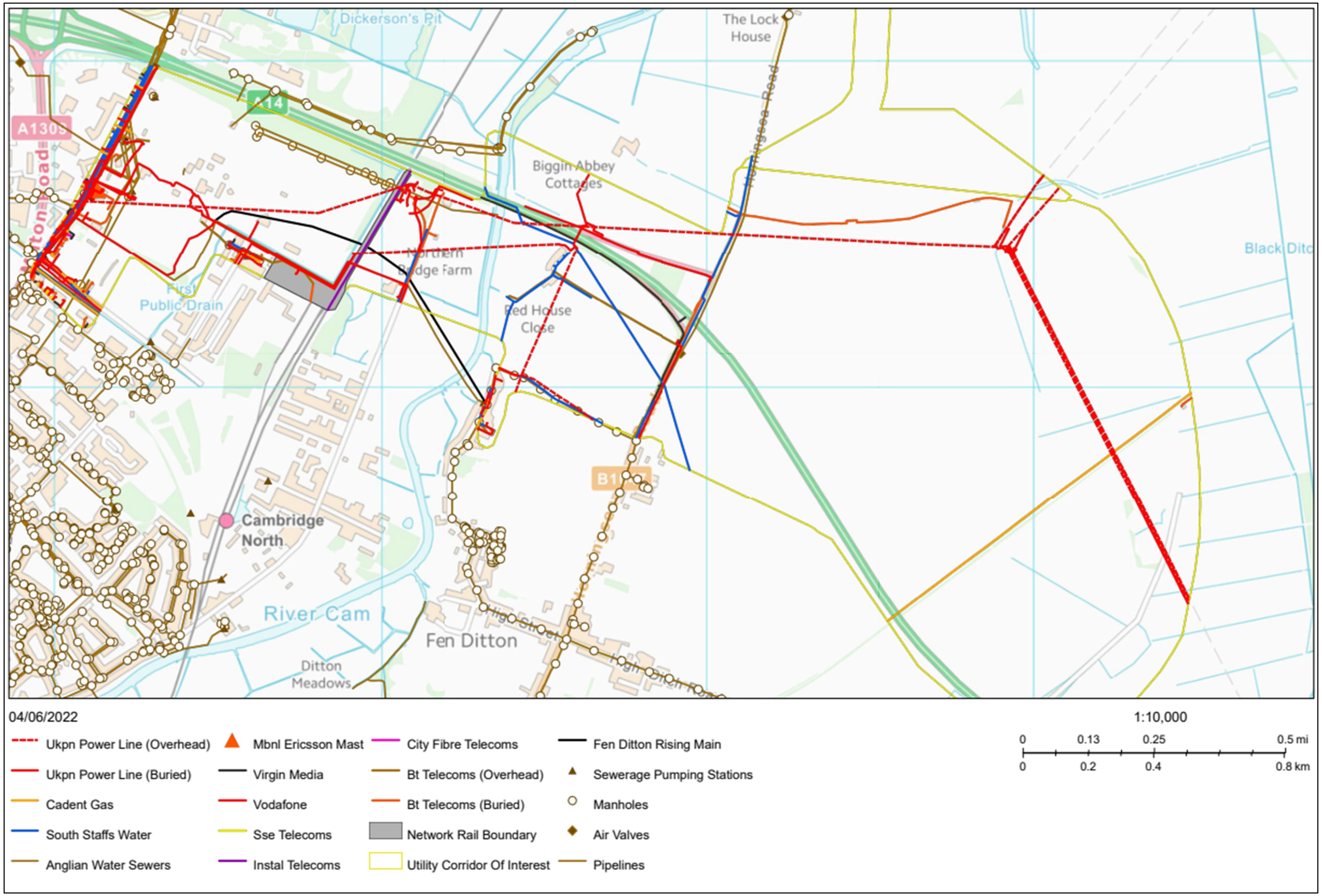
Source: Ground Investigation photographs and MOATA.

Figure 7.2: Layout presenting the access routes and points to the sites



Source: MOATA Anglian Water - CWWTPR (moata.com)

Figure 7.3: Layout presenting utilities information related to the sites



Source: MOATA Anglian Water - CWWTPR (moata.com)

Figure 7.4: GI works layout showing the Ground Model distinctive areas

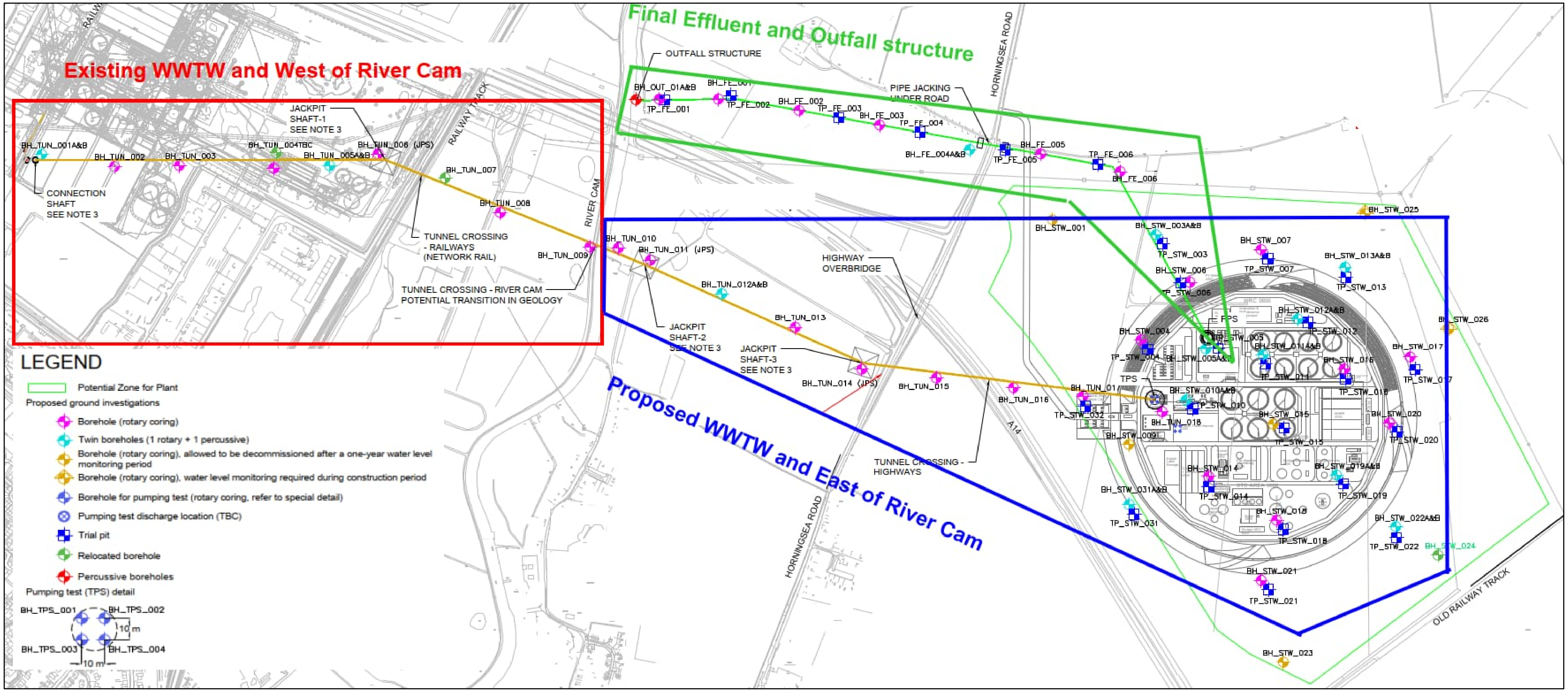


Table 7.1: Summary of rotary hole locations (extracted from the factual report)

Borehole ID	Scheduled Depth / (Depth Achieved) [m]	Variable Head Tests	Packer Testing	Downhole Televiewer / Geophysics Testing	Pressuremeter Testing
BH_FE_001	15 (15.90)	✓			
BH_FE_002	10 (10)				
BH_FE_003	10 (10)				
BH_FE_004A	15 (15)				
BH_FE_005	15 (15)				
BH_FE_006	10 (10)				
BH_OUT_001	20 (20)				
BH_STW_001	15 (15.40)				
BH_STW_003A	10 (10)	1 (2no. in Schedule2)	✓		
BH_STW_004	15 (15.10)				
BH_STW_005A	30 (30)				
BH_STW_006	15 (15)				✓
BH_STW_007	15 (15.10)				
BH_STW_009	30 (30)				
BH_STW_010A	30 (30.20)				
BH_STW_011A	30 (30.20)				✓
BH_STW_012A	30 (30.35)				✓
BH_STW_013A	50 (45)	✓		Geophysics Only	
BH_STW_013C	12 (13.10)		✓		
BH_STW_014	30 (30)				
BH_STW_015	30 (30.20)				
BH_STW_016	30 (30.20)				
BH_STW_017	15 (15)				
BH_STW_018	30 (30)	1 (2no. in Schedule2)		✓	
BH_STW_019A	30 (30)				✓
BH_STW_020	30 (30.20)				✓
BH_STW_021	15 (15)				✓
BH_STW_022A	50 (50)	✓	✓		
BH_STW_023	15 (15.30)				
BH_STW_024	15 (15)				
BH_STW_025	15 (15.05)				
BH_STW_026	15 (15)				
BH_STW_031A	15 (15)				
BH_TUN_001A	35 (35)	1 (2no. in Schedule2)	✓		
BH_TUN_001PM	(18)				✓
BH_TUN_002	30 (30)				
BH_TUN_003	30 (30)				
BH_TUN_004c	30 (30)				
BH_TUN_005Ab	30 (30)				
BH_TUN_006	40 (40)	1 (2no. in Schedule2)			
BH_TUN_006PM	(18)		✓		✓
BH_TUN_007	30 (30.20)				
BH_TUN_011	40 (42.50)				
BH_TUN_011PM	(24.5)				
BH_TUN_015	30 (30.20)				

Borehole ID	Scheduled Depth / (Depth Achieved) [m]	Variable Head Tests	Packer Testing	Downhole Televiewer / Geophysics Testing	Pressuremeter Testing
BH_TUN_016	30 (30.20)				
BH_TUN_017	30 (30.20)				
BH_TUN_018	50 (49.50)	1 (2no. in Schedule2)		✓	
BH_TUN_018PM	(27.50)				✓
BH_TPS_001	15 (15.10)				
BH_TPS_001b	13 (13.70)				
BH_TPS_002	15 (15.20)				
BH_TPS_002b	13 (13.20)				
BH_TPS_003	15 (15.20)				
BH_TPS_003b	13 (13.30)				
BH_TPS_004	15 (15.20)				
BH_TPS_004b	13 (13.30)				
		PHASE B			
BH_TUN_008	30 (30)				
BH_TUN_009	30 (30)				
BH_TUN_010	30 (30)				
BH_TUN_012A	30 (30)				
BH_TUN_013	30 (30)				
BH_TUN_014	30 (30)	✓			✓

Table 7.2: Summary of cable percussion hole locations (extracted from the factual report)

Borehole ID	Scheduled Depth / (Depth Achieved) [m]	Variable Head Tests (during borehole formation)	Standard Penetration Tests
BH_STW_003B	10 (10)		✓
BH_STW_005B	30 (30)	1 (2no. in Schedule2)	✓
BH_STW_010B	30 (30)		✓
BH_STW_011B	30 (30)		✓
BH_STW_012B	30 (30)		✓
BH_STW_013B	30 (30)	1 (2no. in Schedule2)	✓
BH_STW_019B	30 (11.20*)		✓
BH_STW_022B	30 (30)		✓
BH_STW_031B	15 (30)		✓
BH_TUN_001B	35 (35)		✓
BH_TUN_005B	30 (30)		✓
BH_FE_004B	15 (15)		✓
BH_TUN_006	Base of made ground		
	PHASE B		
BH_OUT_001B	20 (20)		✓
BH_TUN_012B	30 (30)		✓

Table 7.3: Summary of trial pit hole locations (extracted from the factual report)

Borehole ID	Scheduled Depth / (Depth Achieved) [m]	Soakaway Testing	Hand Vane Testing	California Bearing Ratio Tests	Plate Load Tests
TP_FE_001	3 (2.5)	✓	✓	✓	
TP_FE_002	3 (2.2)	✓	✓	✓	
TP_FE_003	3 (2.8)		✓	✓	
TP_FE_004	3 (3)		✓	✓	
TP_FE_005	3 (3)		✓	✓	
TP_FE_006	3(3)		✓	✓	
TP_STW_003	3 (3)	✓	✓	✓	
TP_STW_004	3 (3)		✓	✓	
BH_STW_005	3 (3)		✓	✓	✓
BH_STW_006	3 (3)		✓	✓	
TP_STW_007	3 (3)		✓	✓	
TP_STW_010	3 (3)		✓	✓	
TP_STW_011	3 (3)		✓	✓	
TP_STW_012	3 (3)		✓	✓	✓
TP_STW_013	3 (3)	✓	✓	✓	
TP_STW_014	3 (3)		✓	✓	✓
TP_STW_015	3 (3)		✓	✓	✓
TP_STW_016	3 (3.10)	✓	✓	✓	✓
TP_STW_017	3 (3)		✓	✓	
TP_STW_018	3 (3)	✓	✓	✓	✓
TP_STW_019	3 (3)		✓	✓	✓
TP_STW_020	3 (3)		✓	✓	
TP_STW_021	3 (3)		✓	✓	
TP_STW_022	3 (3)	✓	✓	✓	
TP_STW_031	3 (3)	✓	✓	✓	
TP_STW_032	3 (3)		✓	✓	
PHASE B					
HDP_OUT_001	1.30 (1.30)				
HDP_OUT_002	1.30 (1.30)				

A.2 Geological Cross-sections

Figure 7.5: Geological Long Section along Final Effluent Alignment

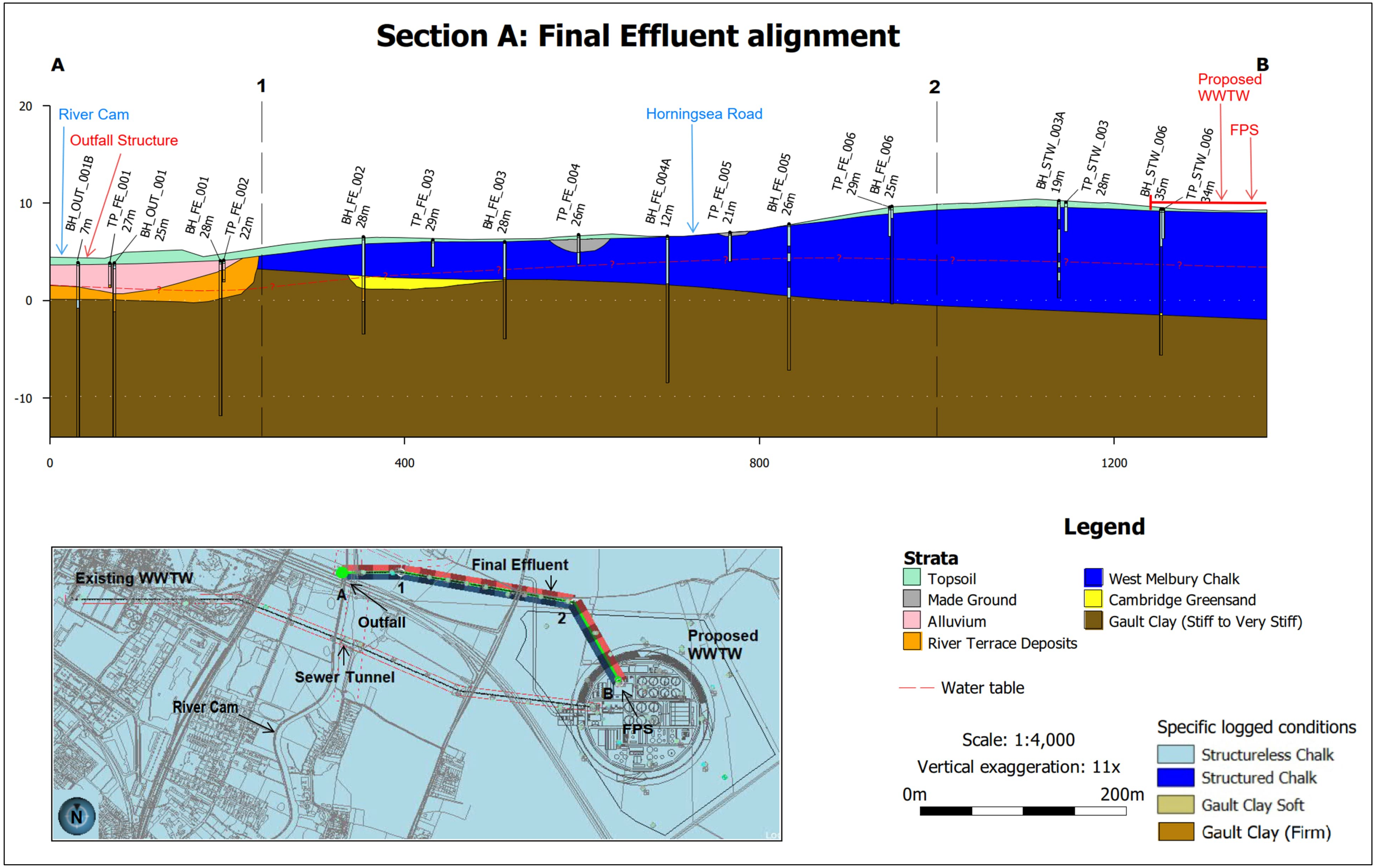


Figure 7.6: Geological Long Section along Sewer Tunnel Alignment

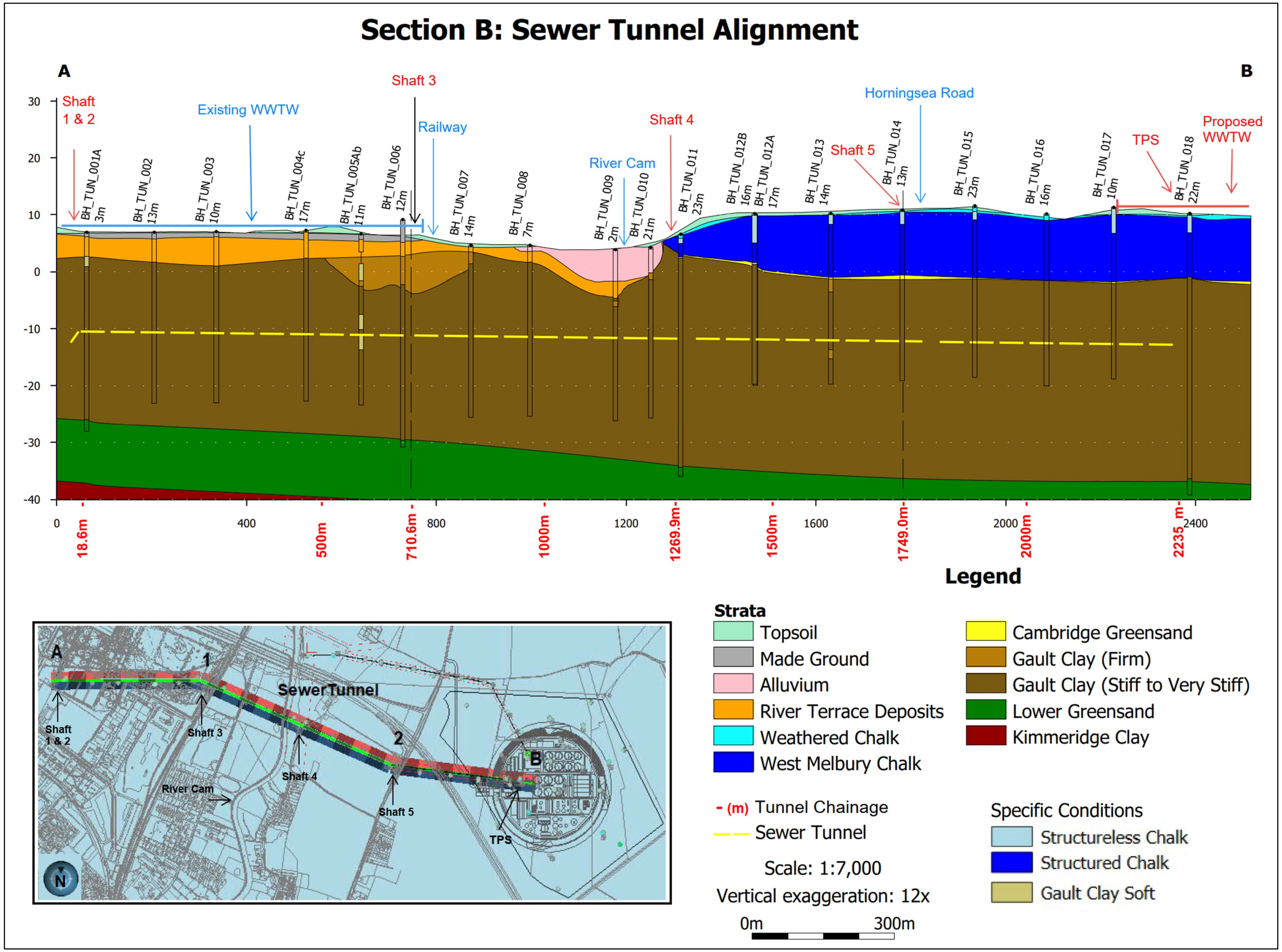


Figure 7.7: Geological Cross Section W-E in the proposed WWTW

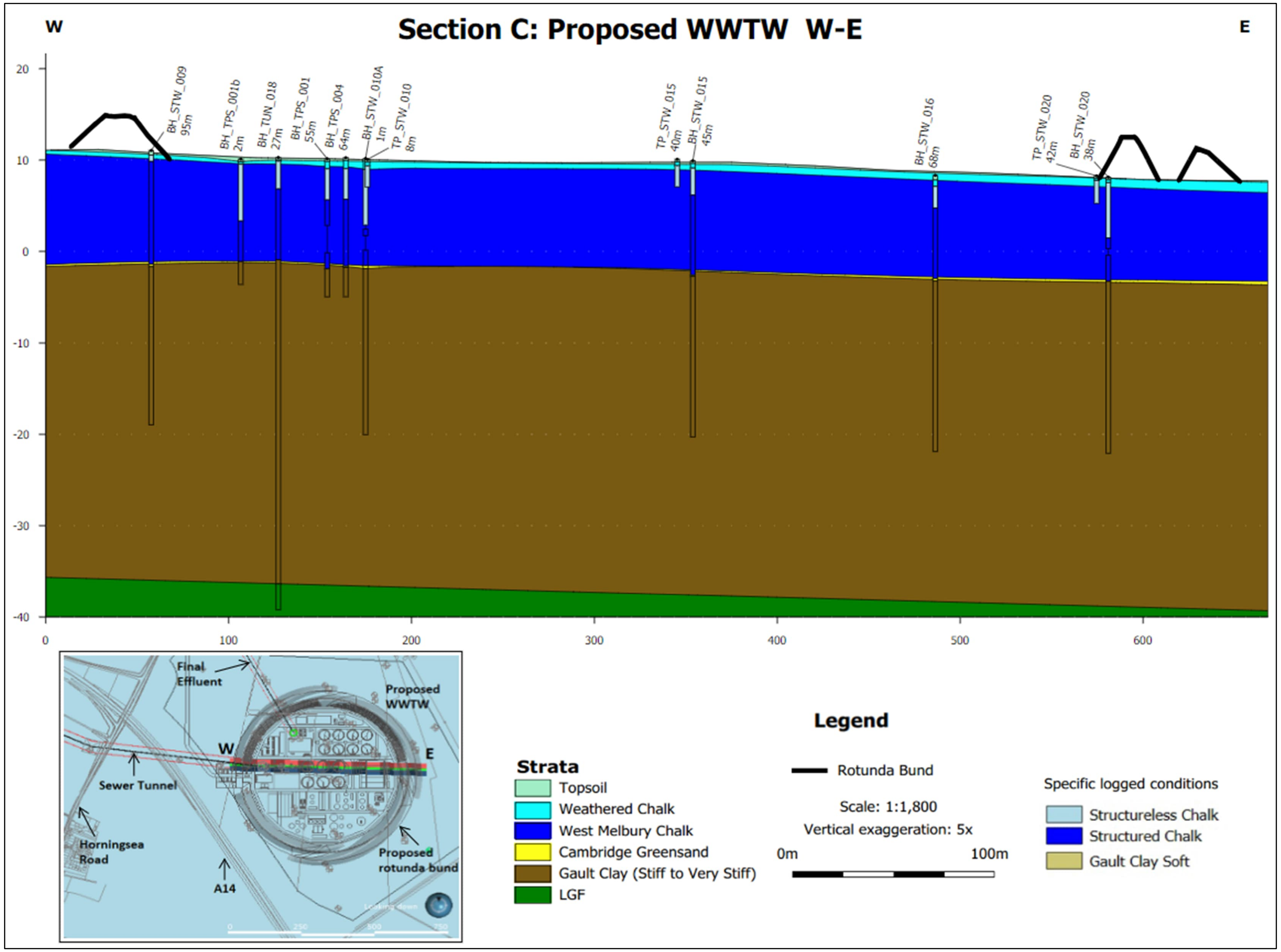


Figure 7.8: Geological Cross Section N-S in the proposed WWTW

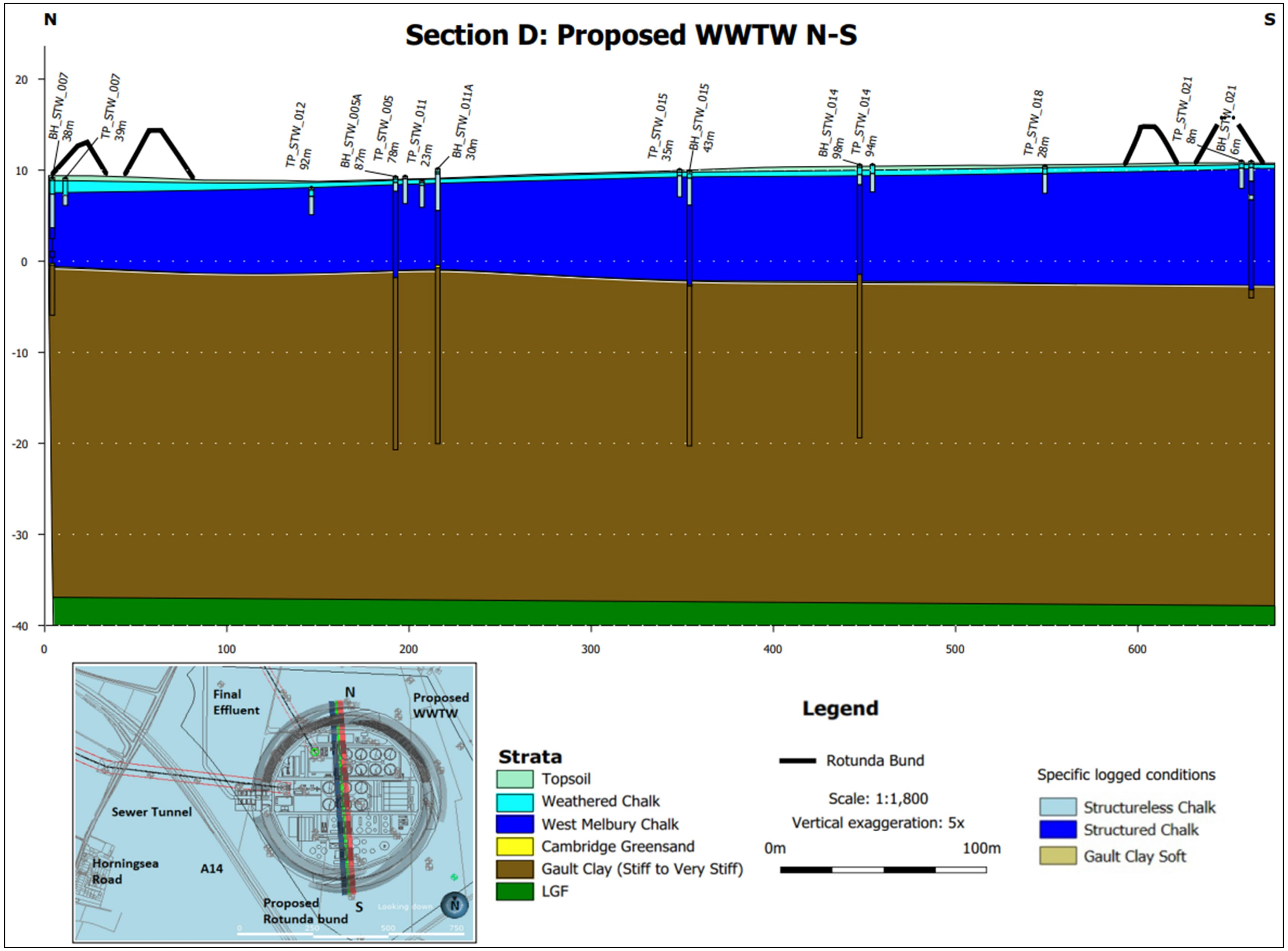


Figure 7.9: Geological Cross Section at Shafts 1 & 2

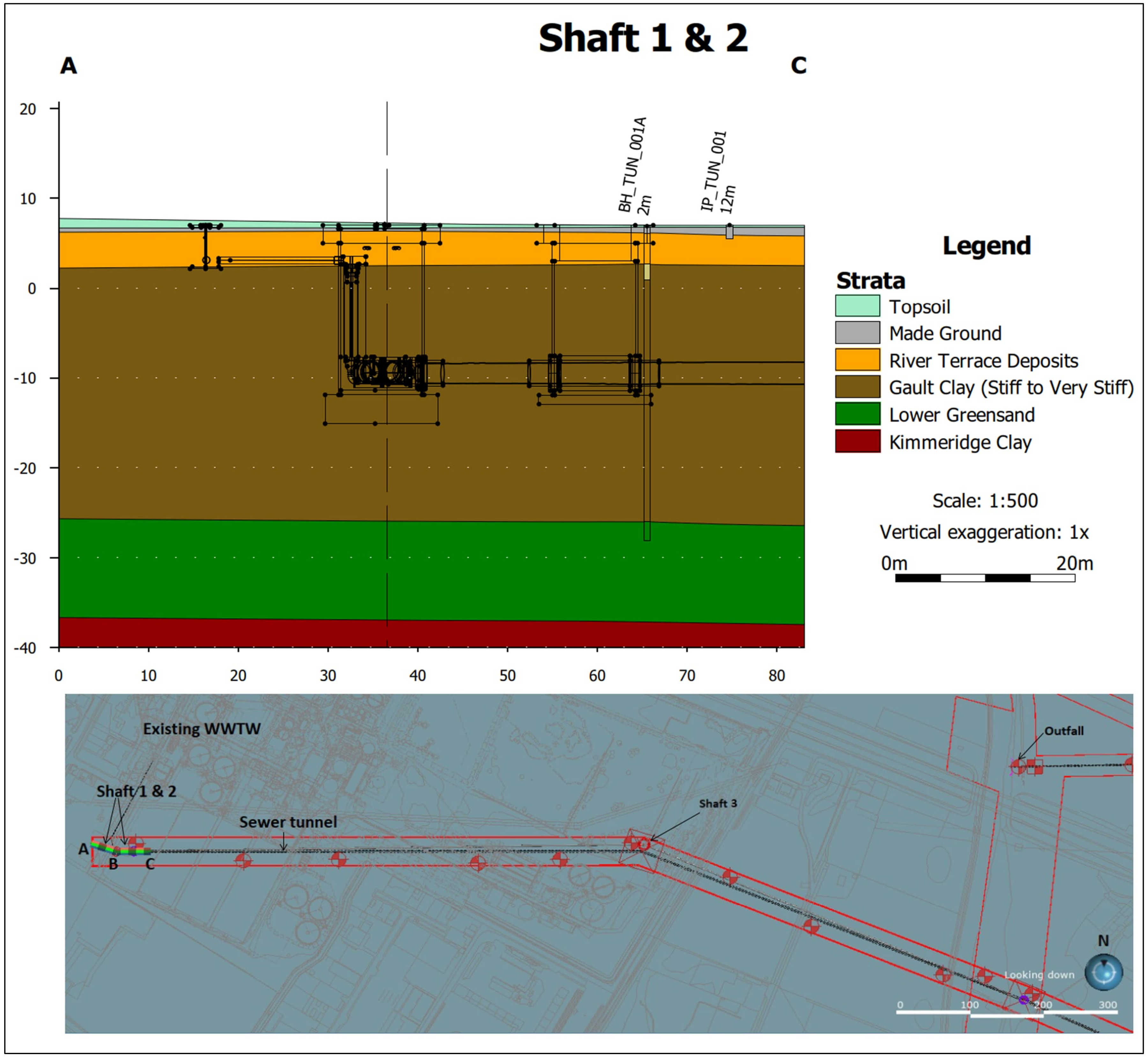


Figure 7.10: Geological Cross Section at Shaft 3

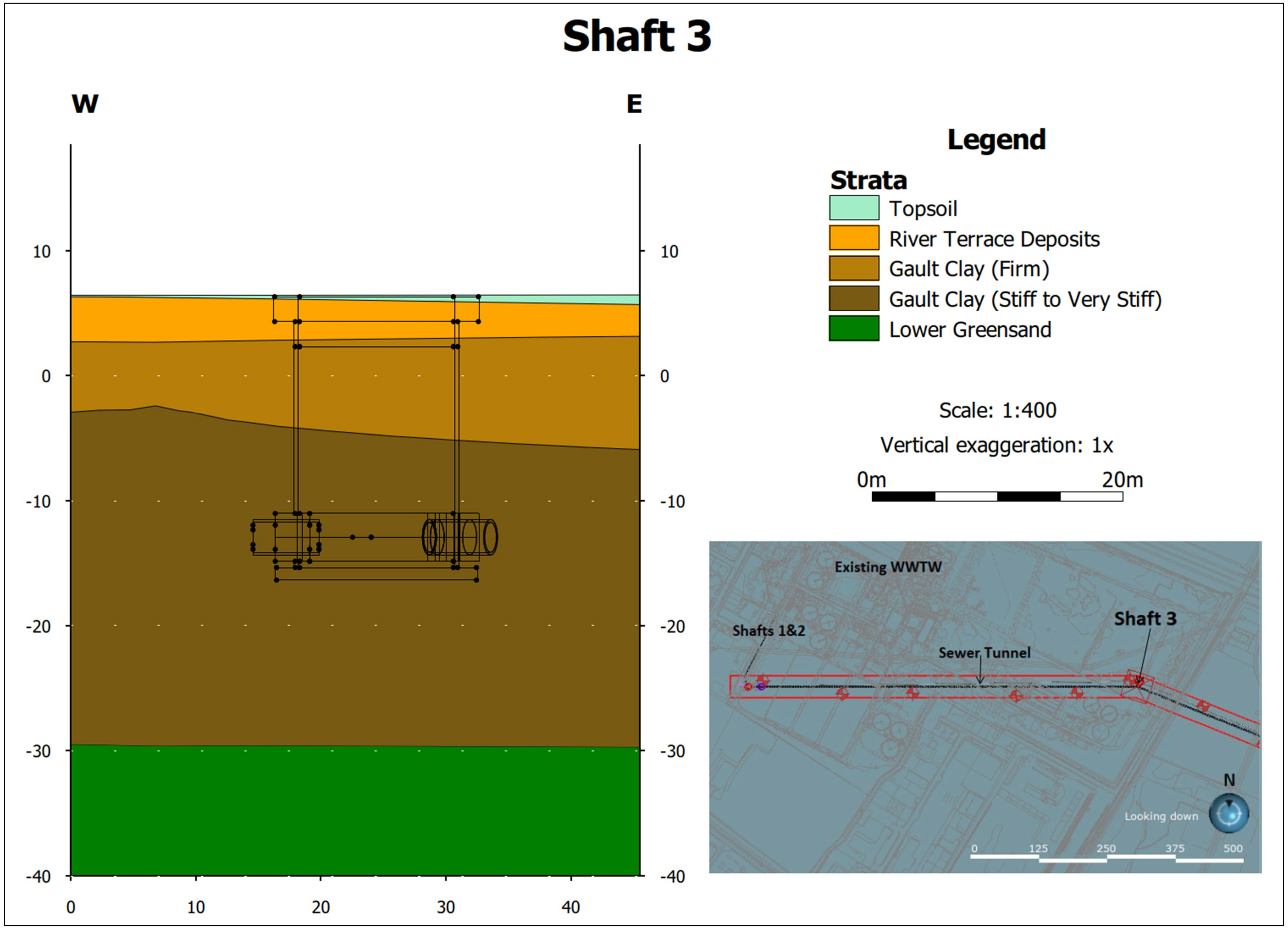


Figure 7.11: Geological Cross Section at Shaft 4

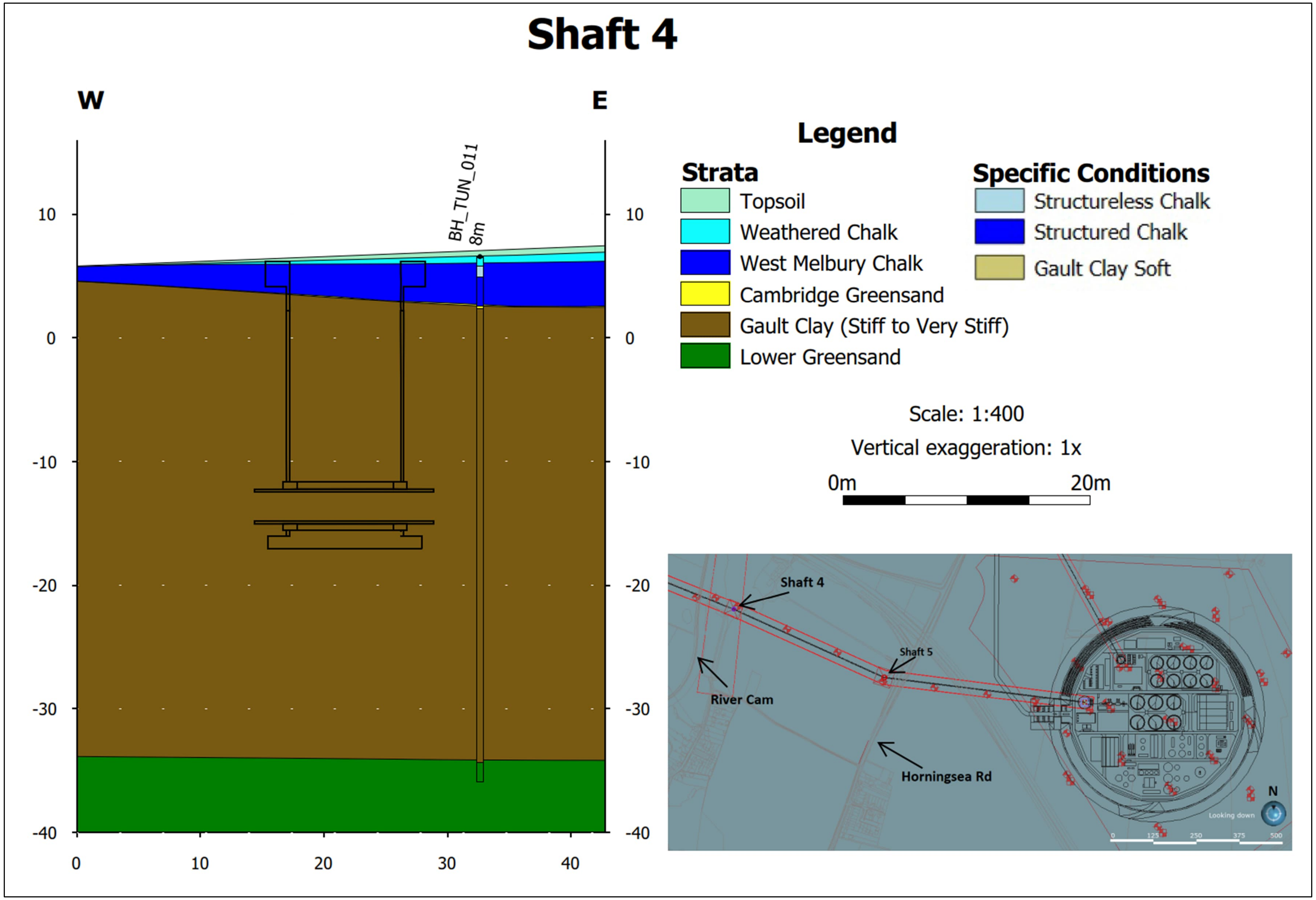


Figure 7.12: Geological Cross Section at Shaft 5

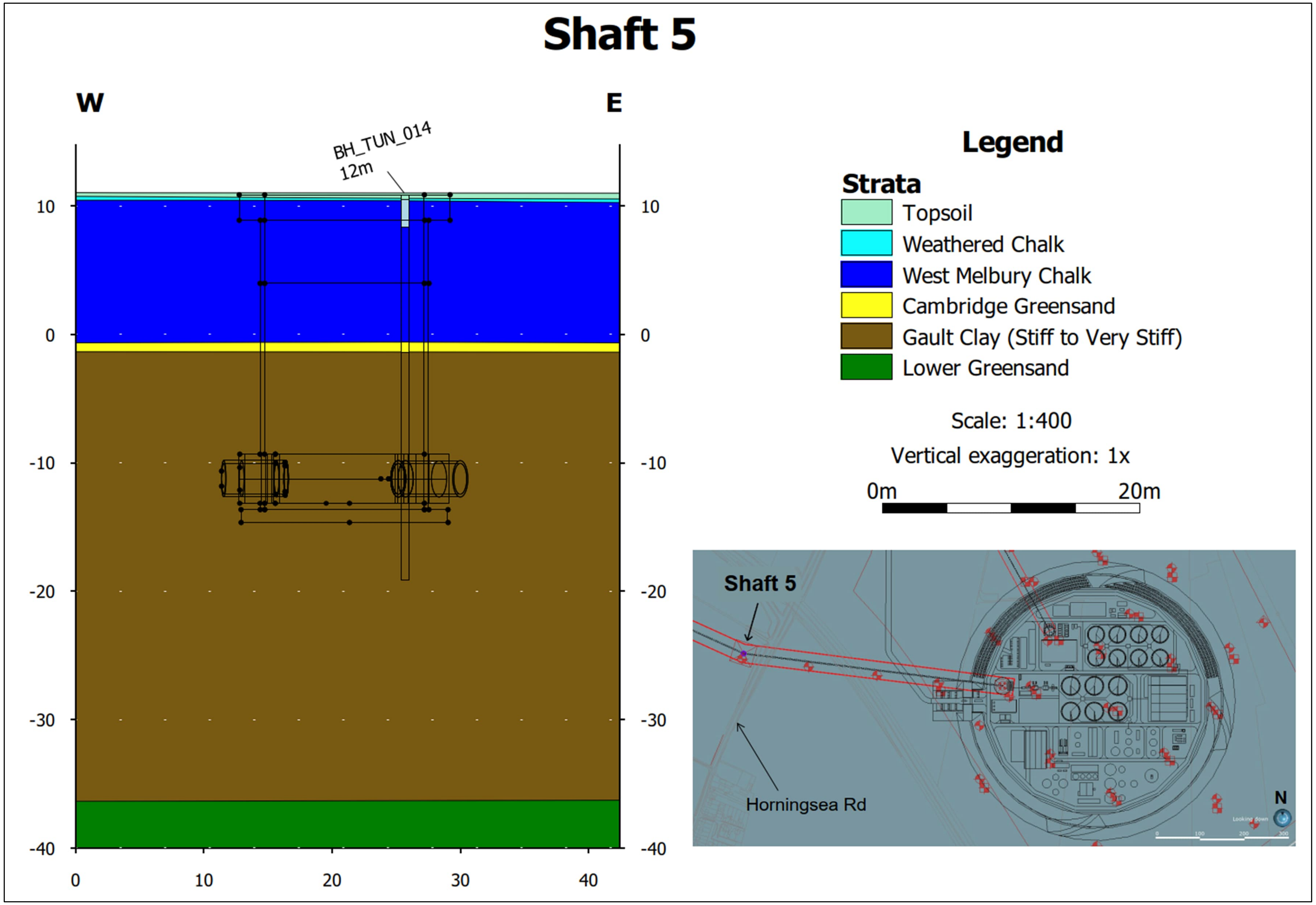
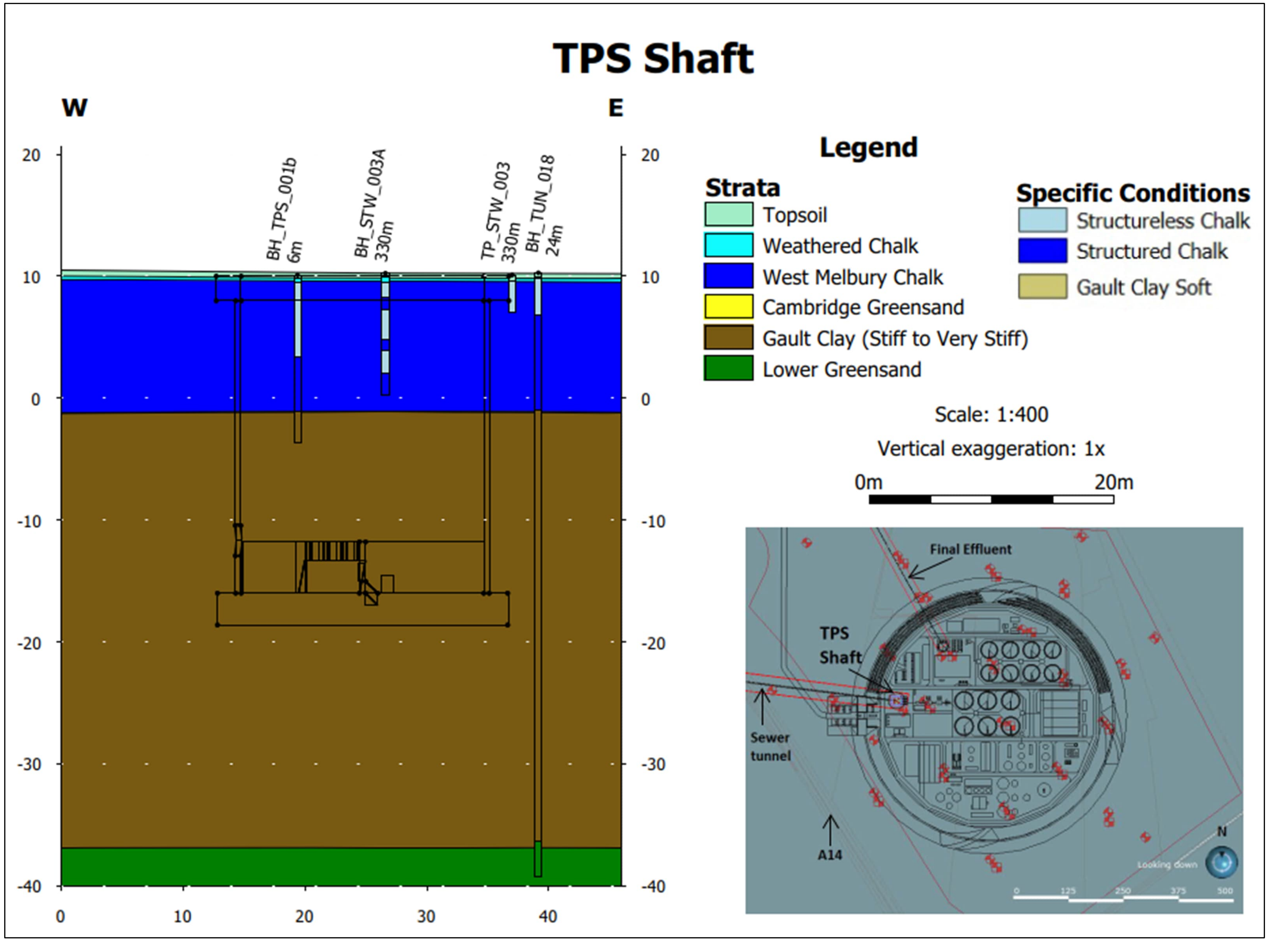


Figure 7.13: Geological Cross Section at TPS Shaft



A.3 Geotechnical Charts

A.3.1 Grading Curves

Figure 7.14: Particle Size Distribution – Topsoil

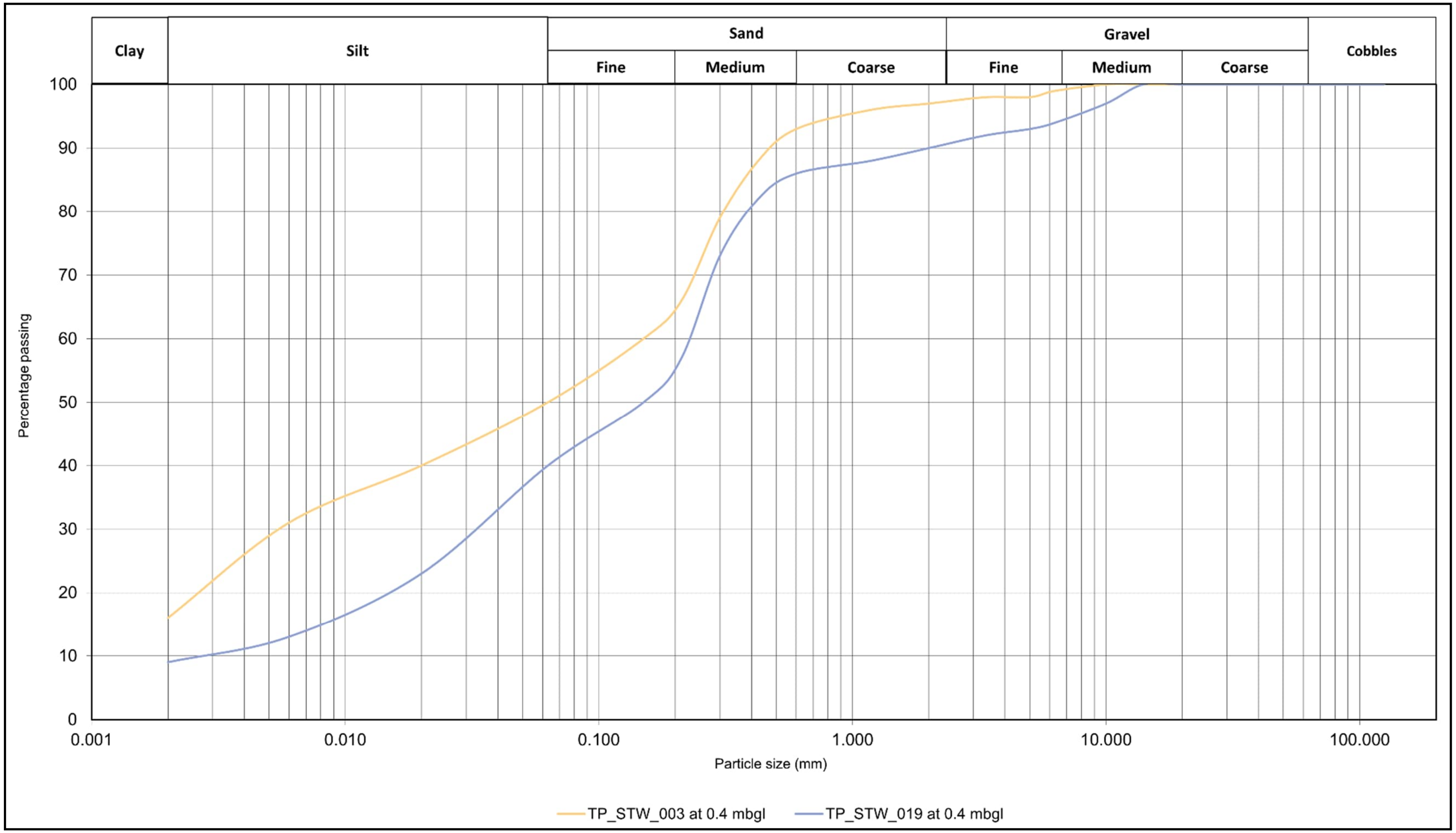


Figure 7.15: Particle Size Distribution – Made Ground

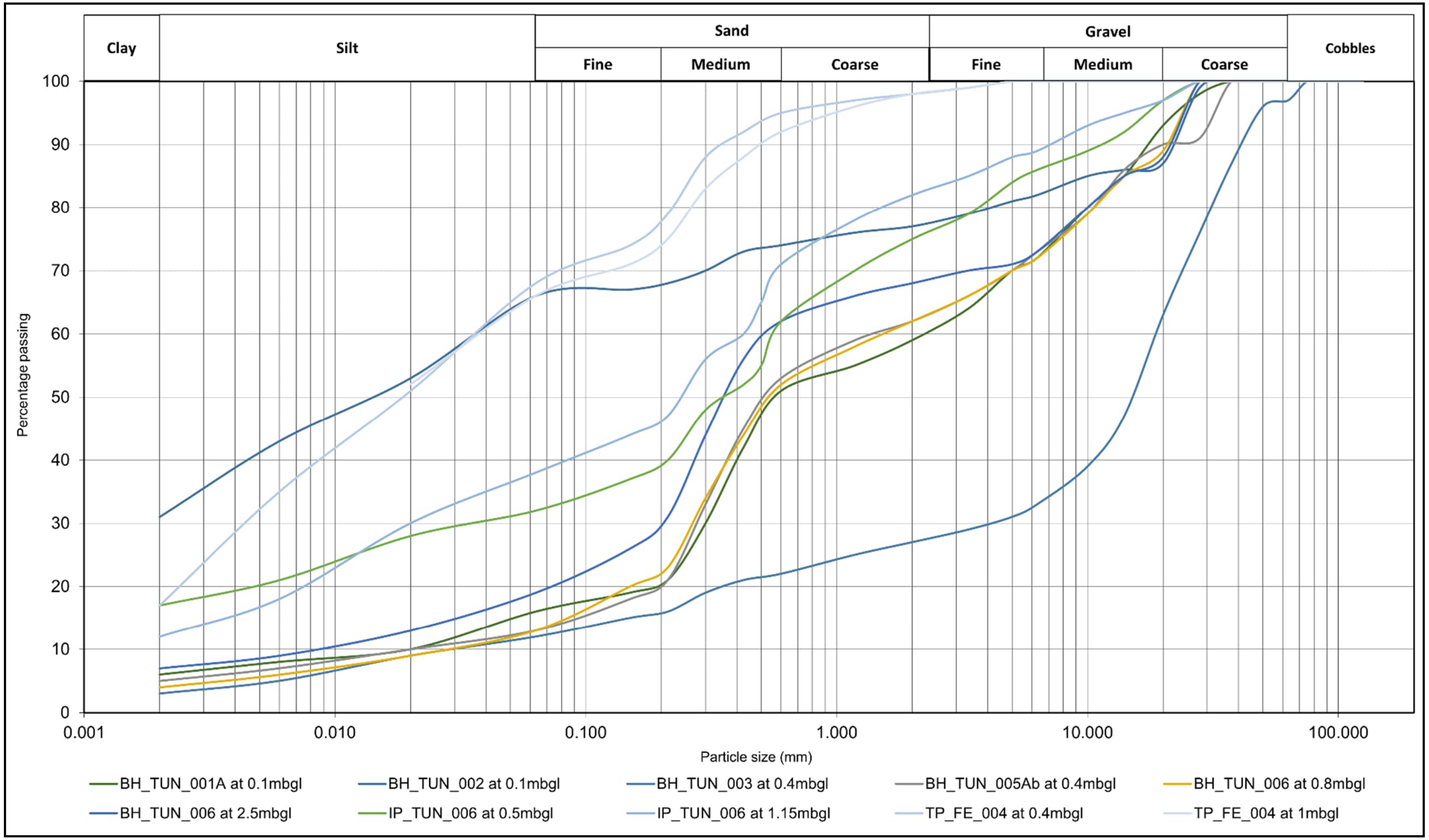


Figure 7.16: Particle Size Distribution – Alluvium

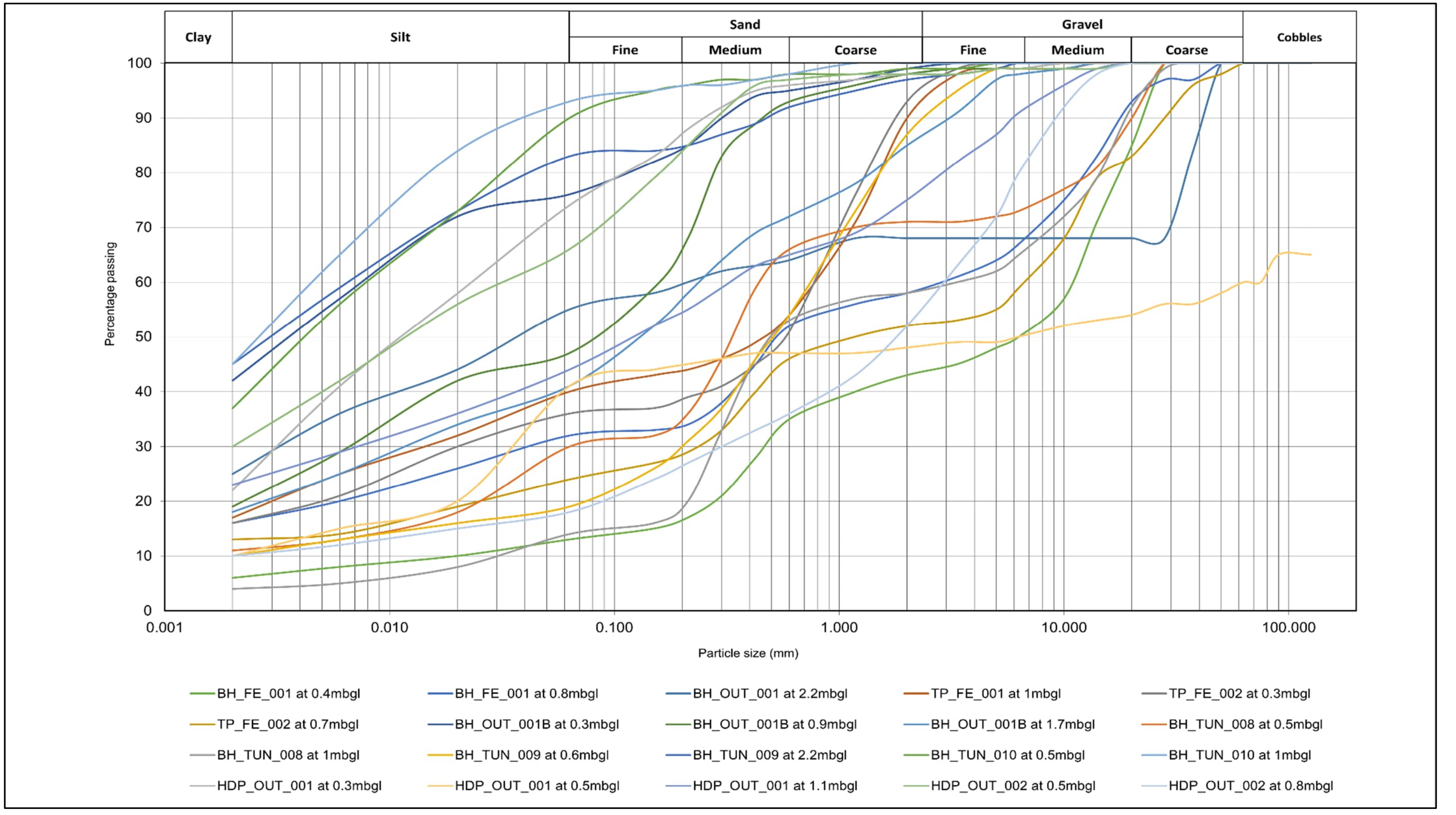


Figure 7.17: Particle Size Distribution – River Terrace Deposits

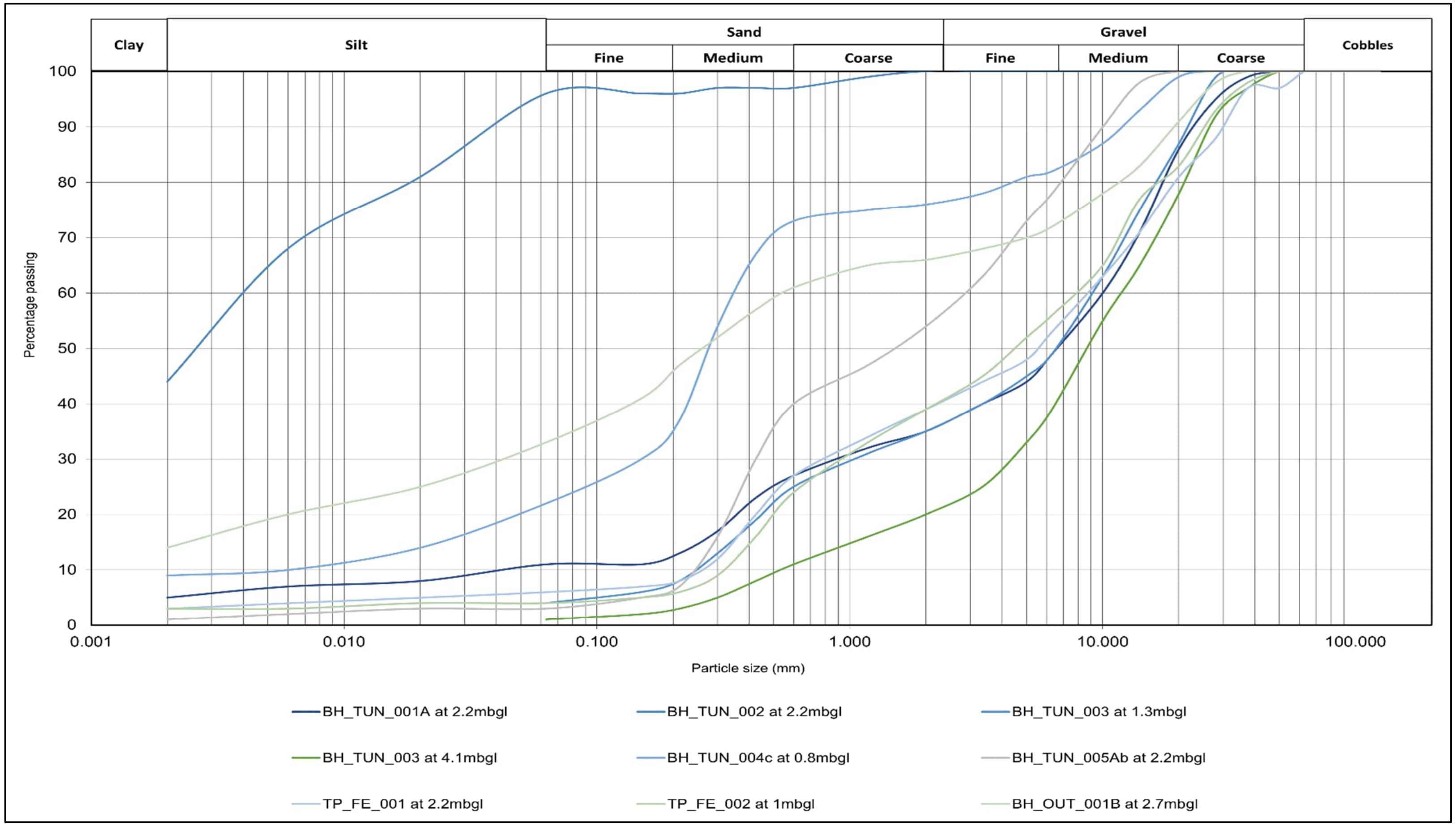


Figure 7.18: Particle Size Distribution – Weathered Chalk

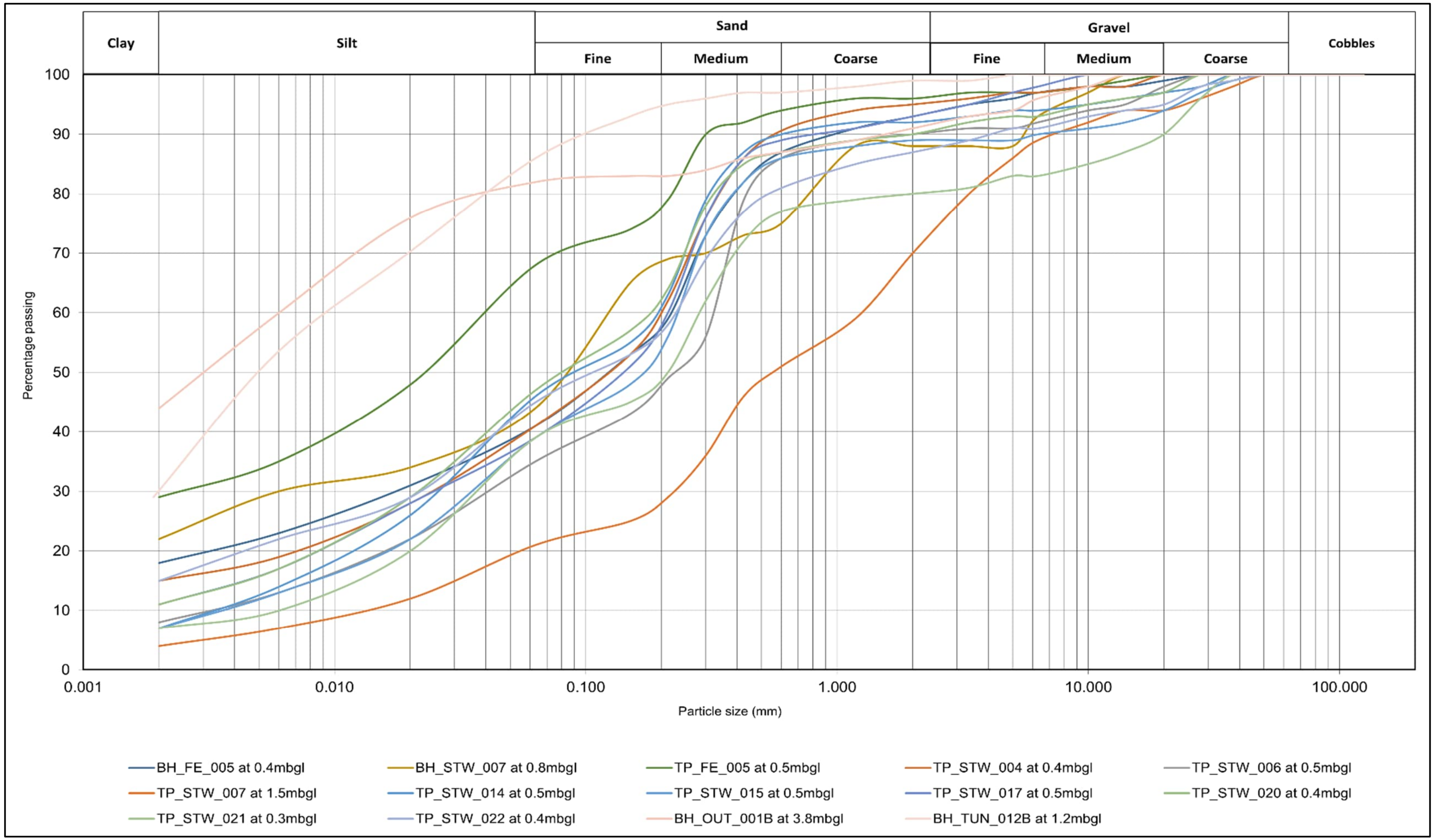


Figure 7.19: Particle Size Distribution – West Melbury Chalk Formation

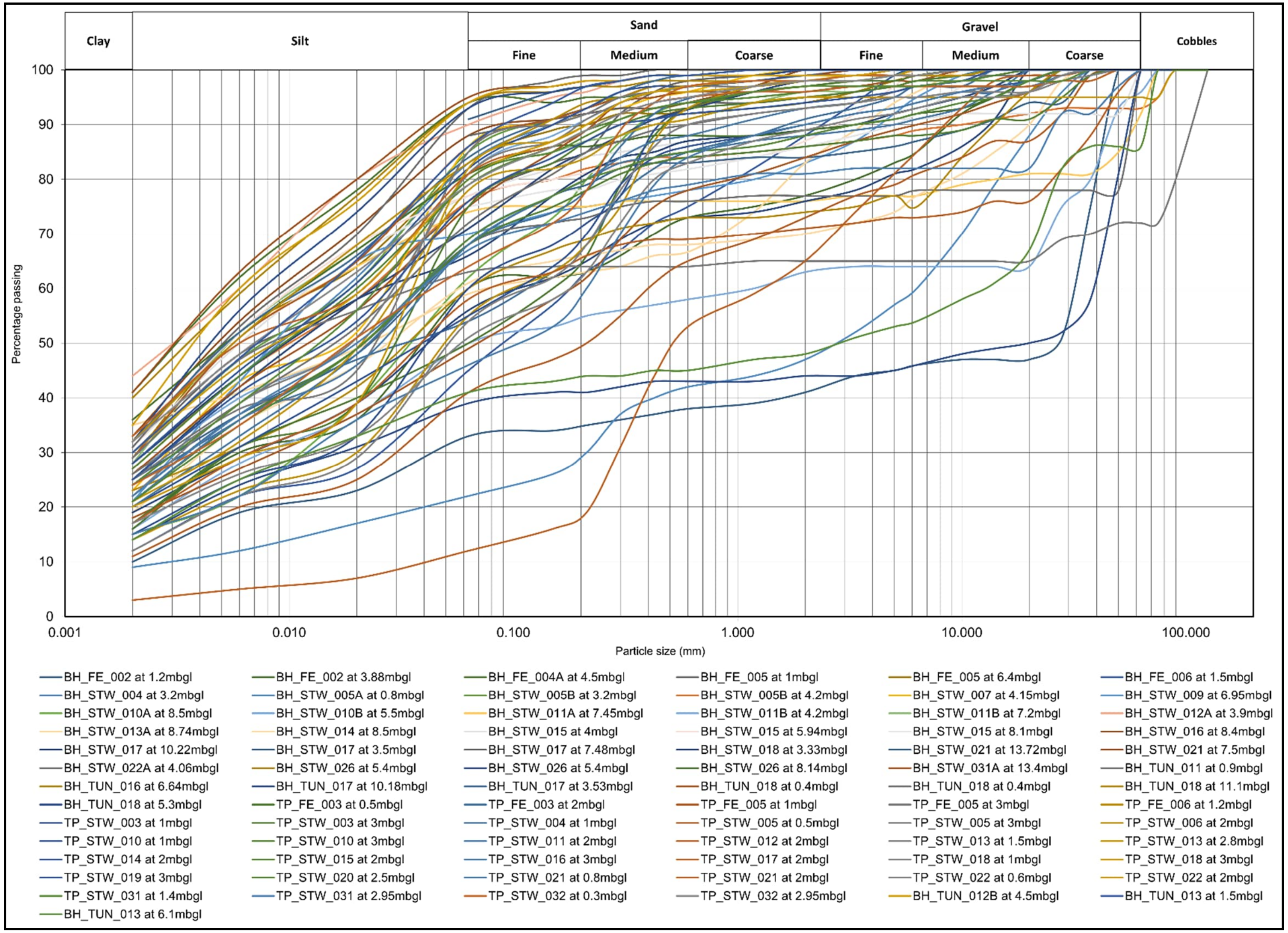


Figure 7.20: Particle Size Distribution – Gault Clay Formation

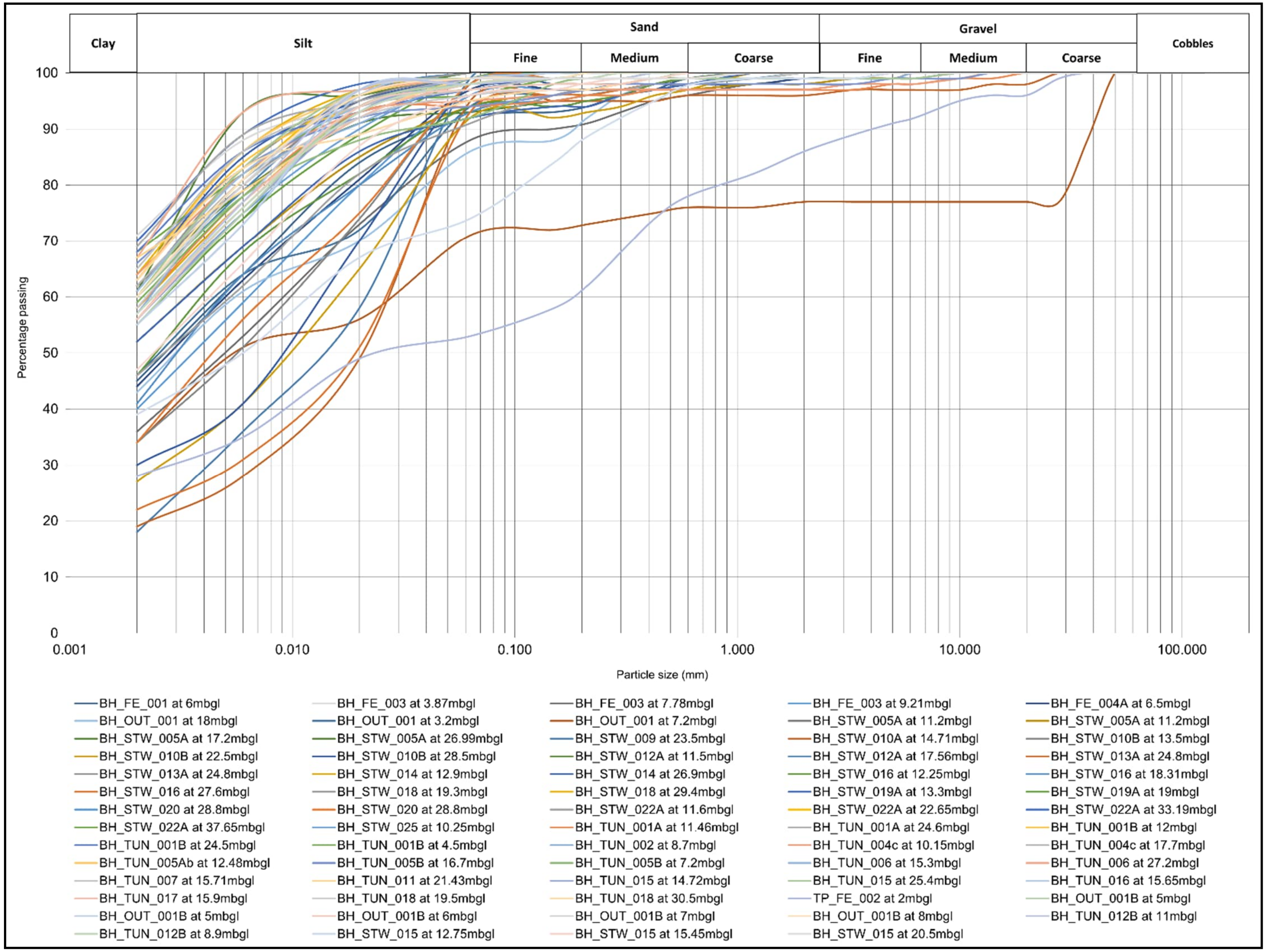
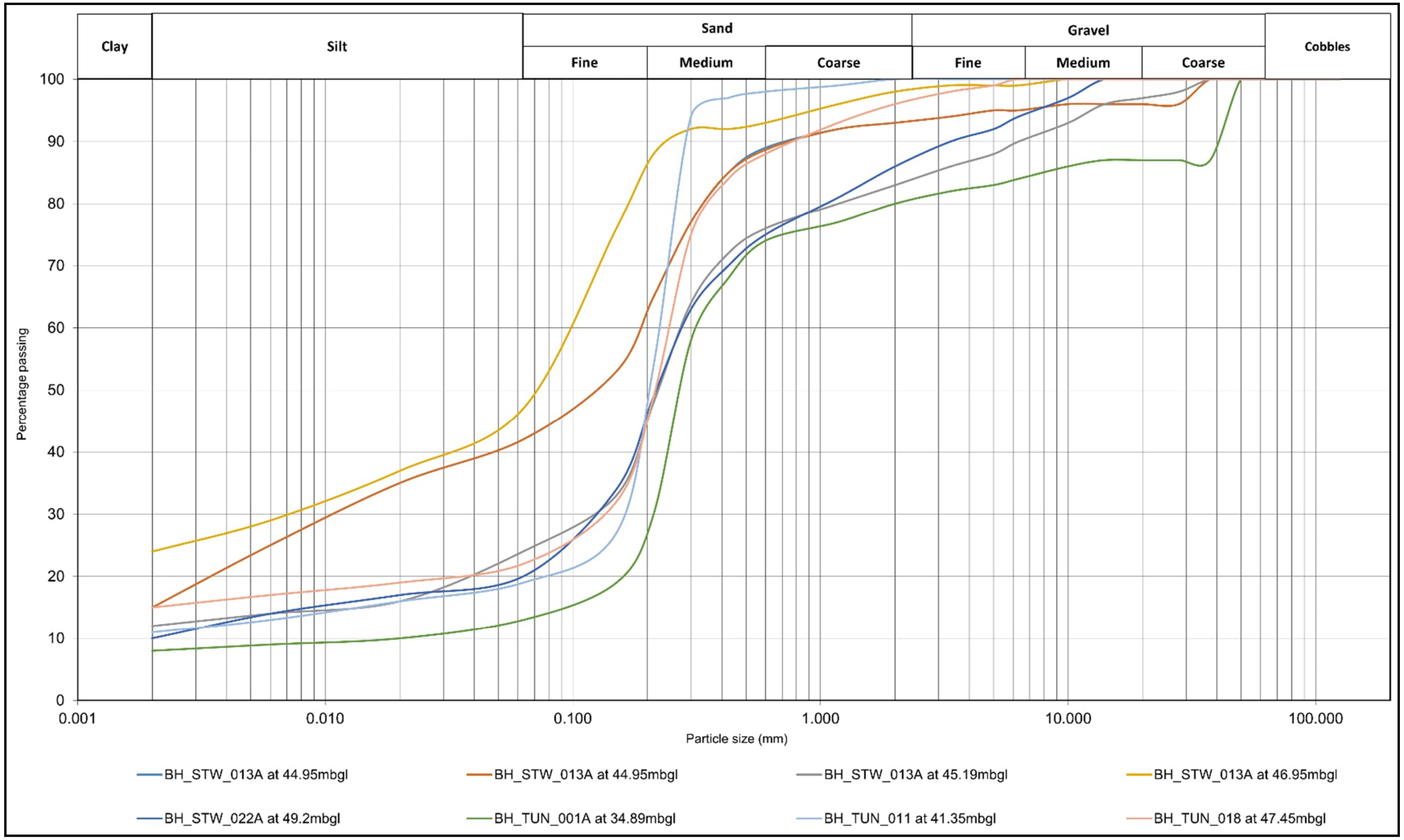


Figure 7.21: Particle Size Distribution – Lower Greensand Formation



A.3.2 Classification Test Results

Figure 7.22: Saturation Moisture Content of Chalk

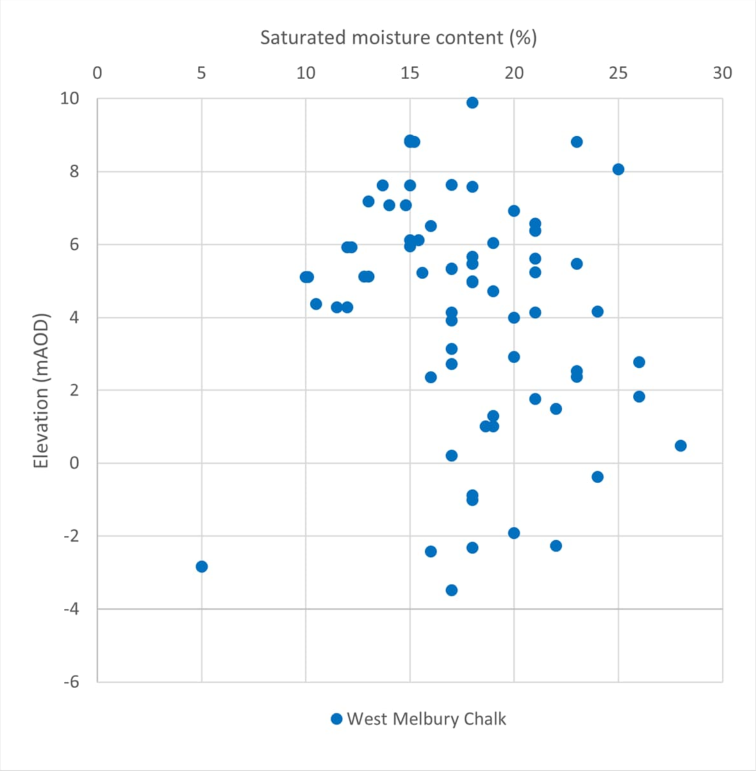


Figure 7.23: Natural Moisture Content Results

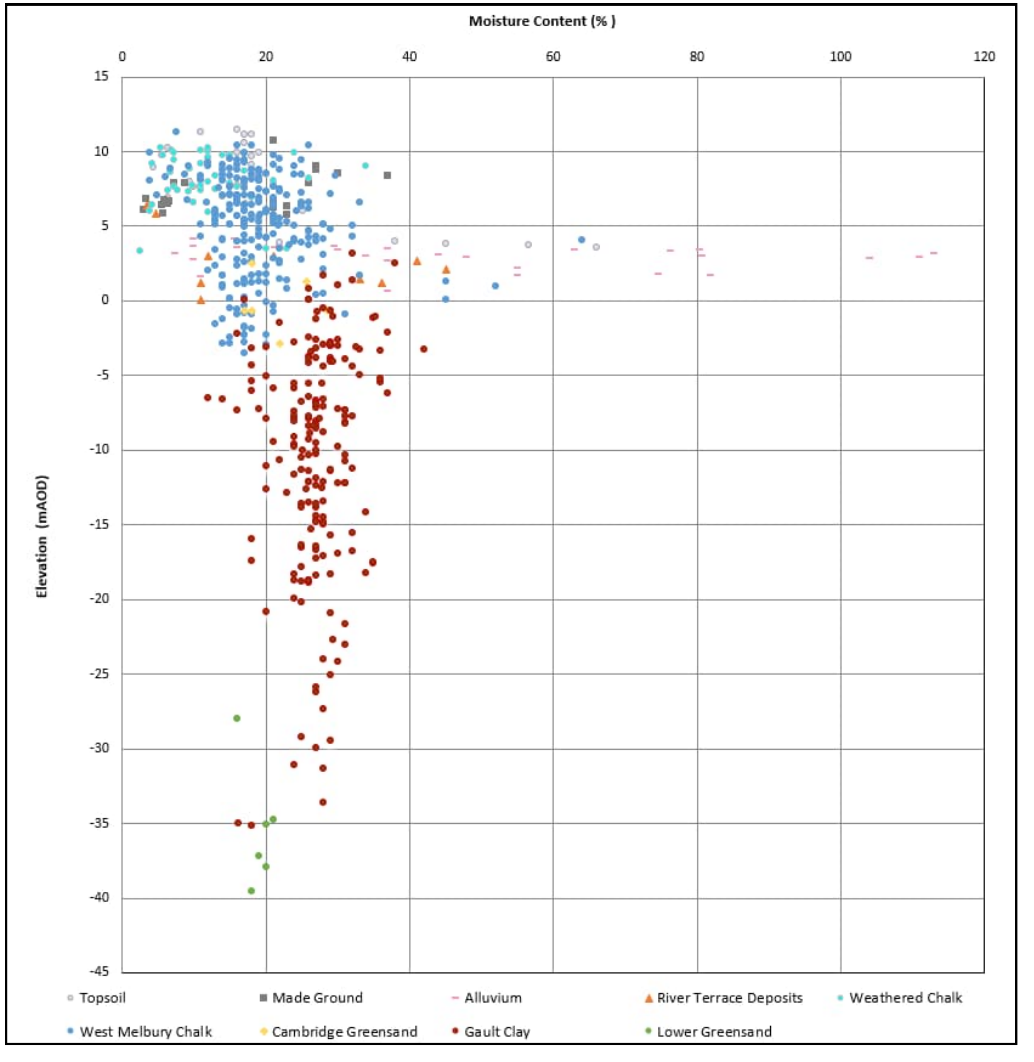


Figure 7.24: Atterberg Limit Results

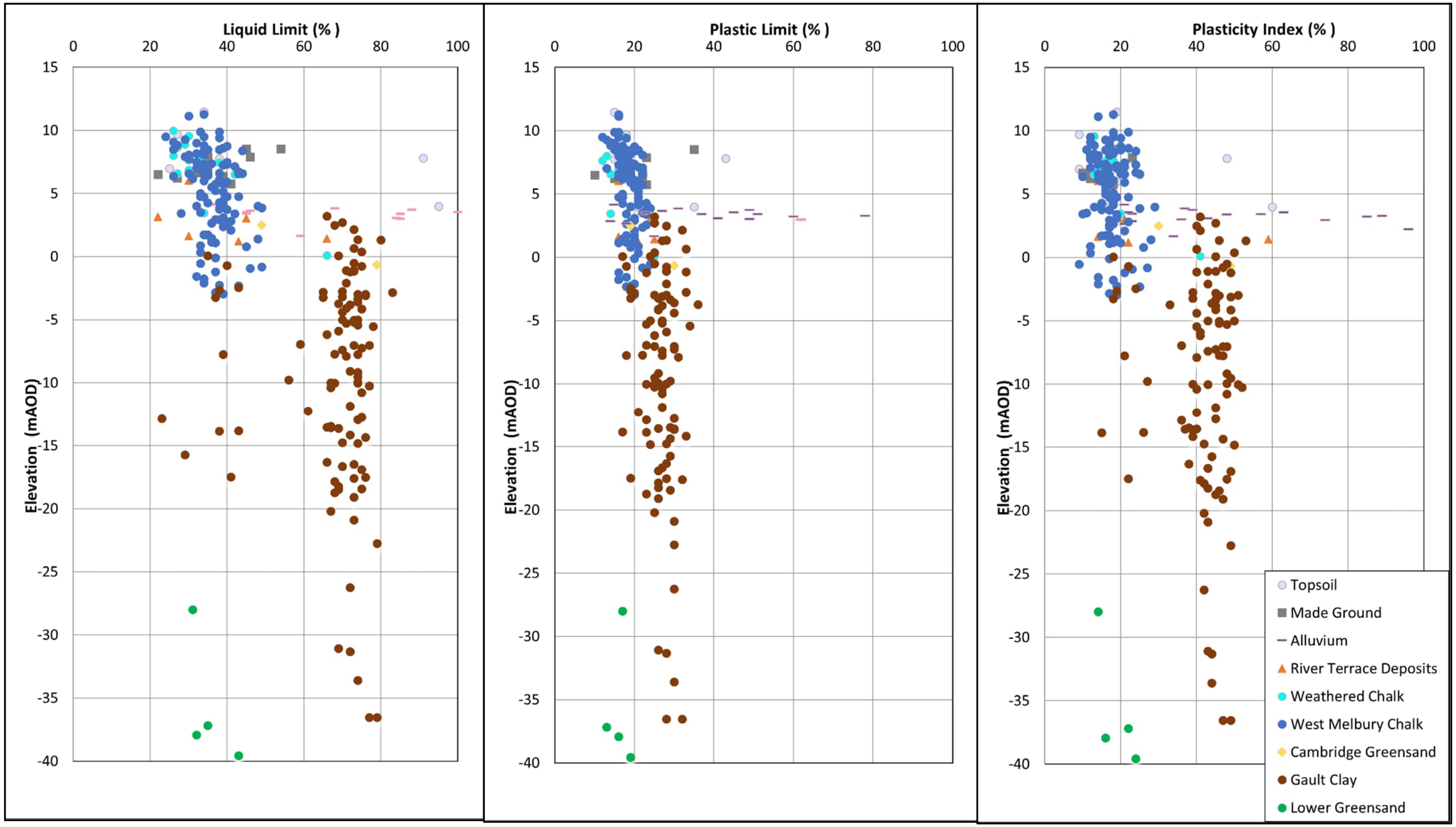


Figure 7.25: Plasticity Chart

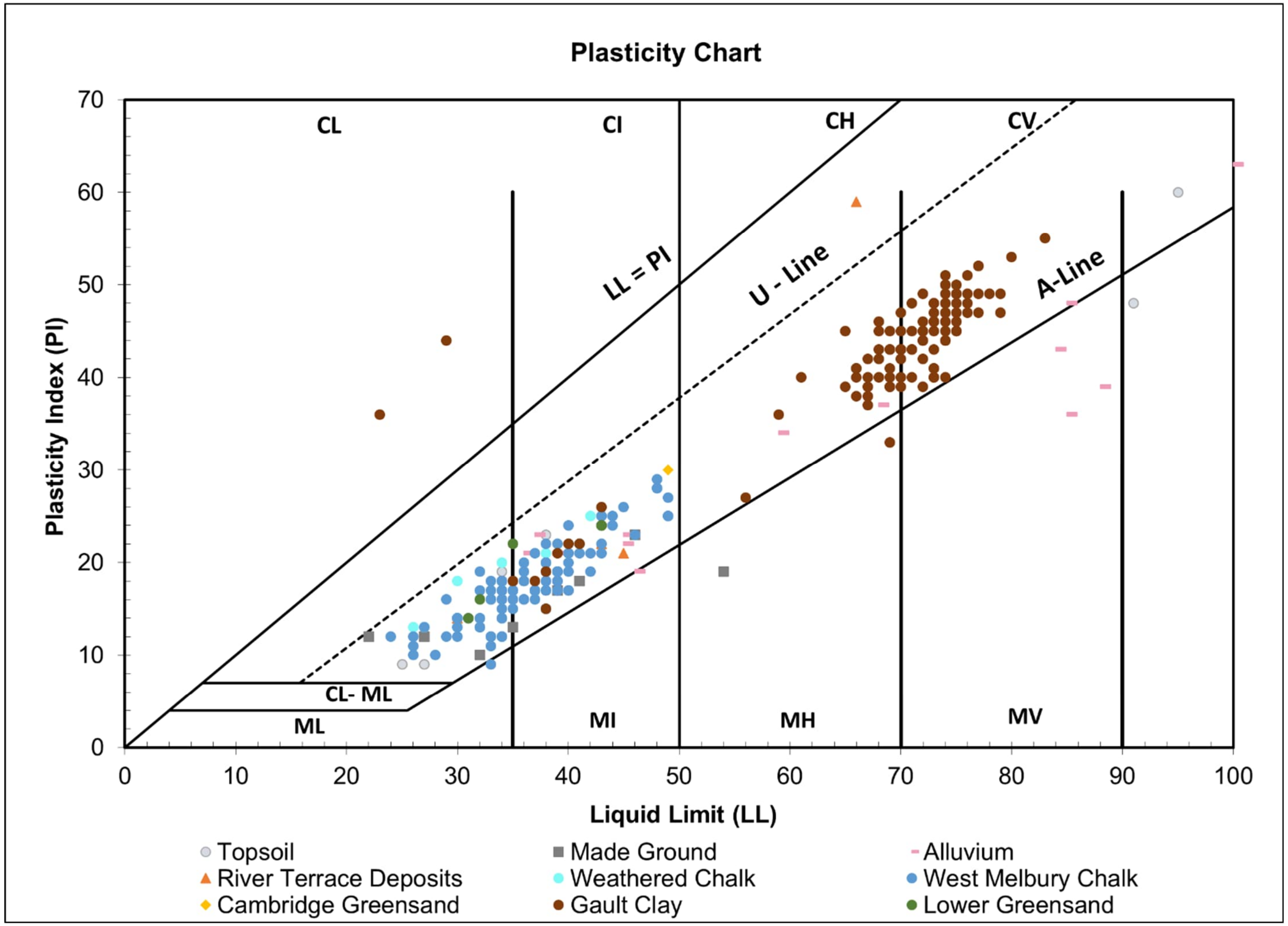
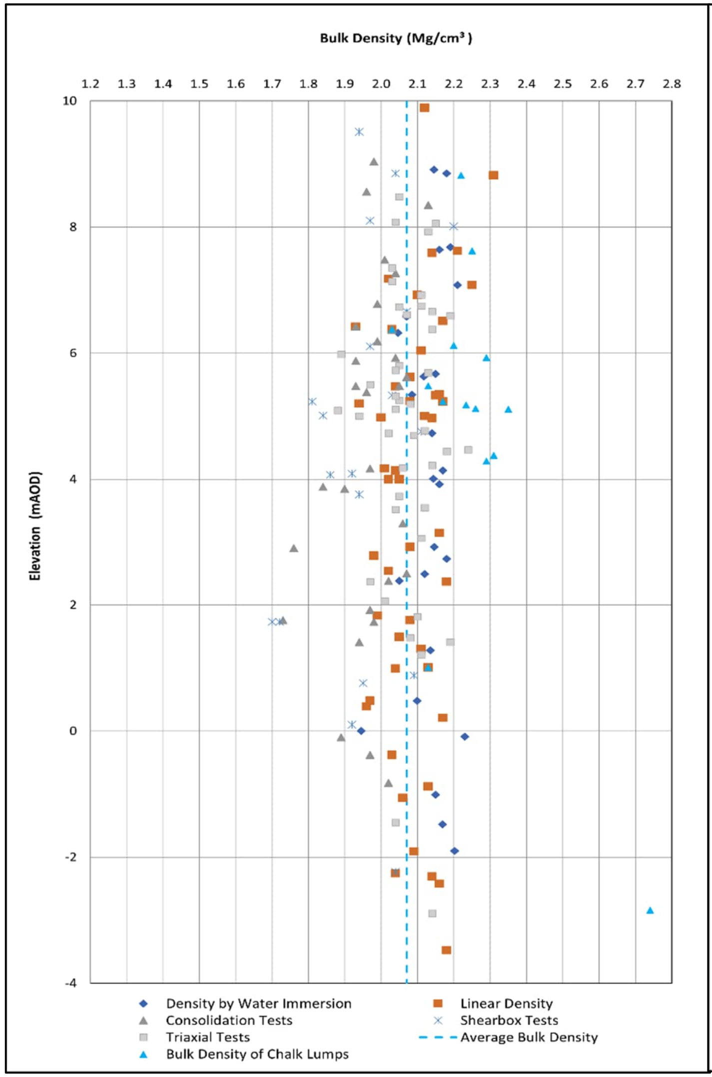


Figure 7.26: Density results of the West Melbury Chalk Formation



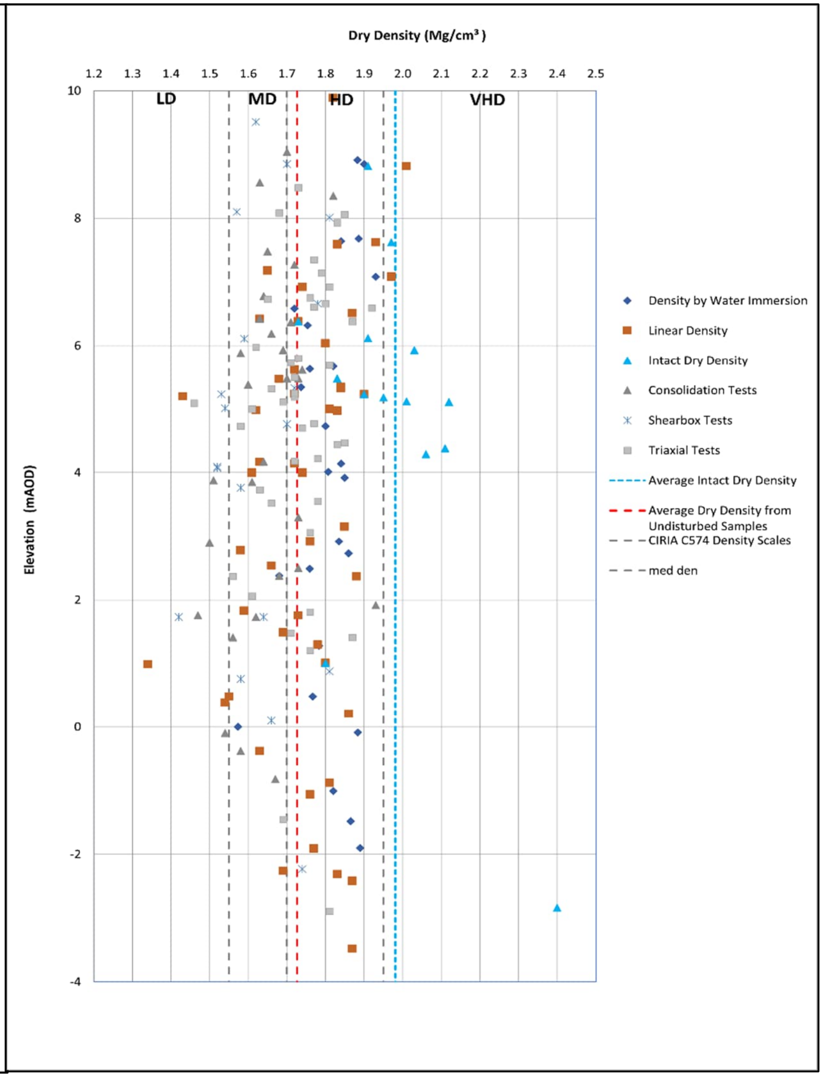
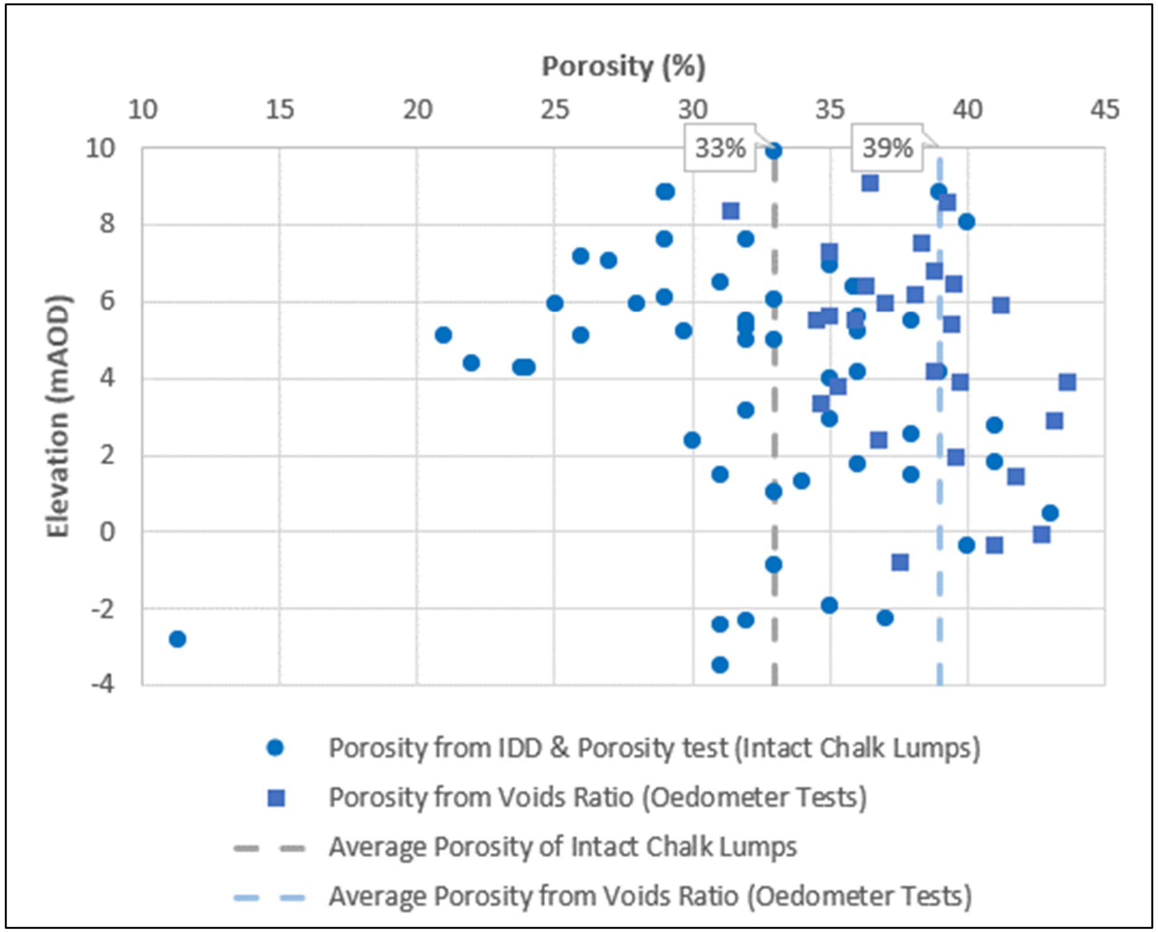


Figure 7.27: Porosity results for West Melbury Chalk Formation



A.3.3 Effective Shear Strength Parameters

Figure 7.28: Friction Angle of West Melbury Chalk Formation (undisturbed and remoulded conditions)

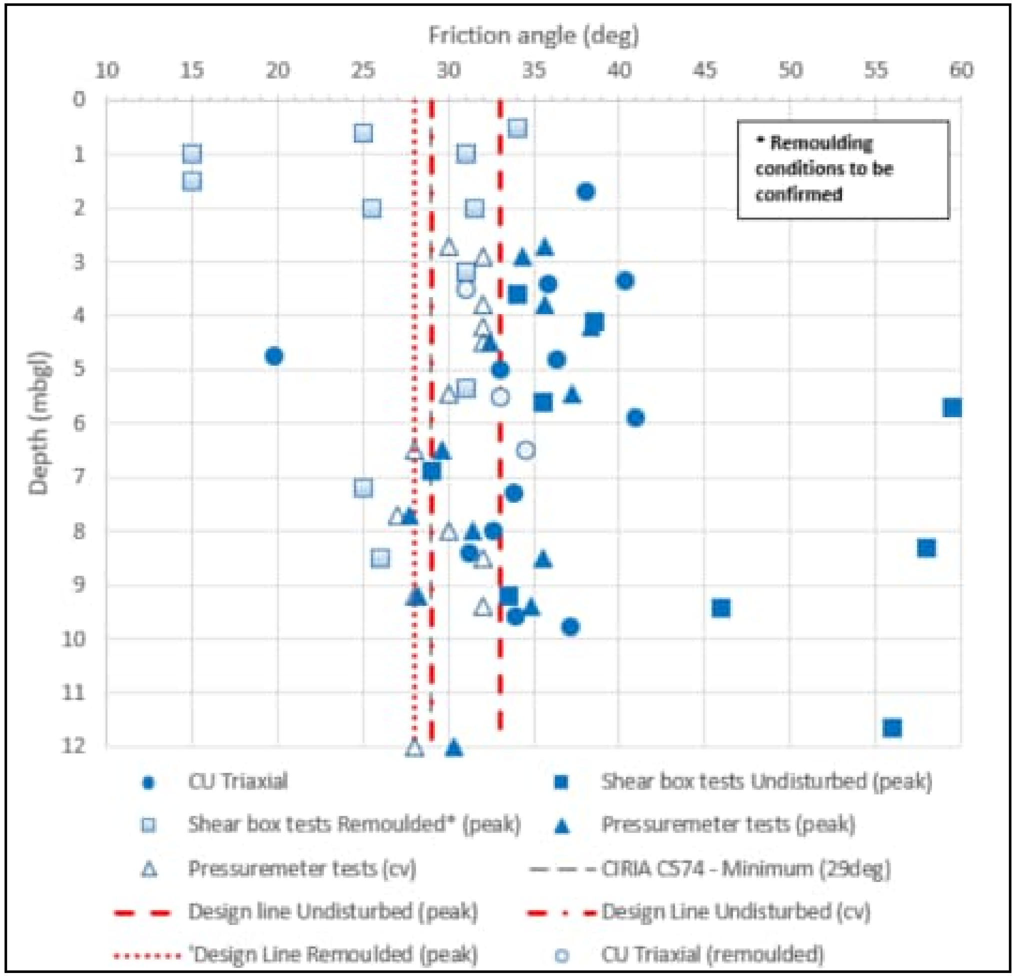


Figure 7.29: Cohesion of West Melbury Chalk Formation (undisturbed and remoulded conditions)

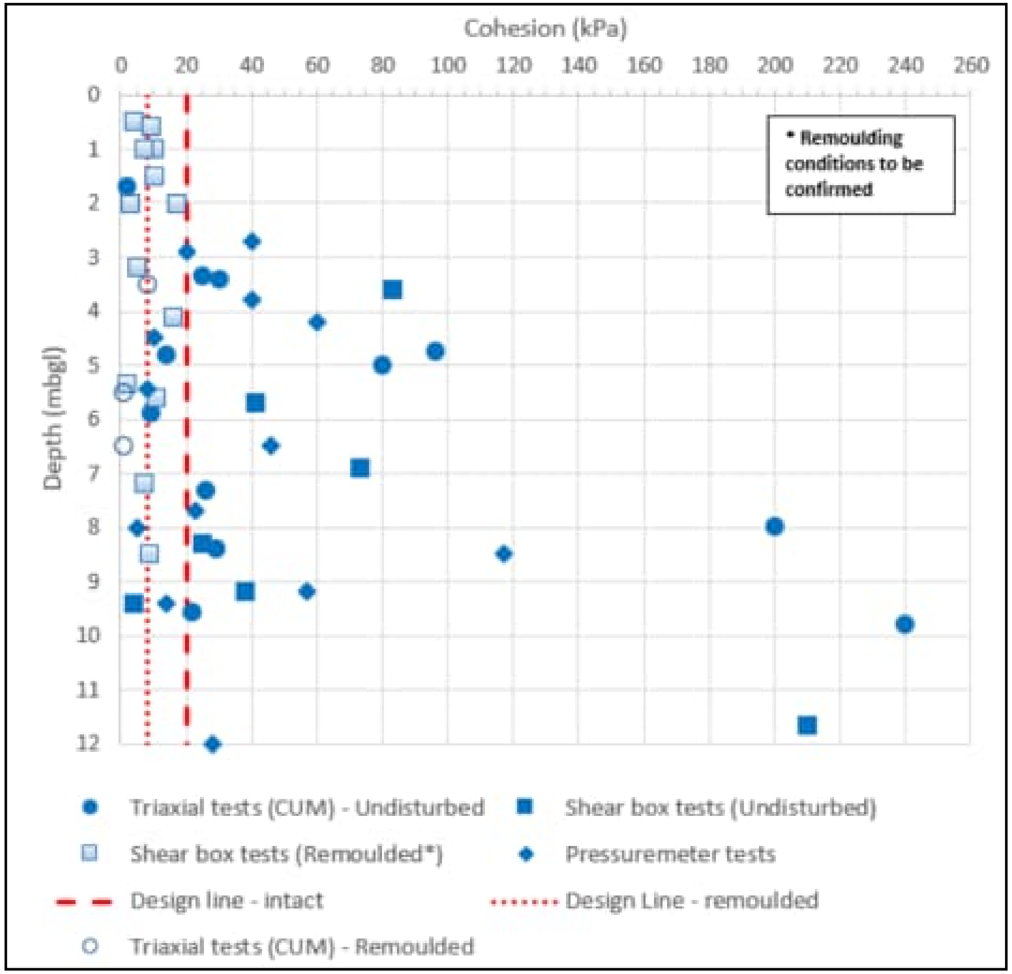


Figure 7.30: Friction Angle of Gault Clay Formation (undisturbed conditions)

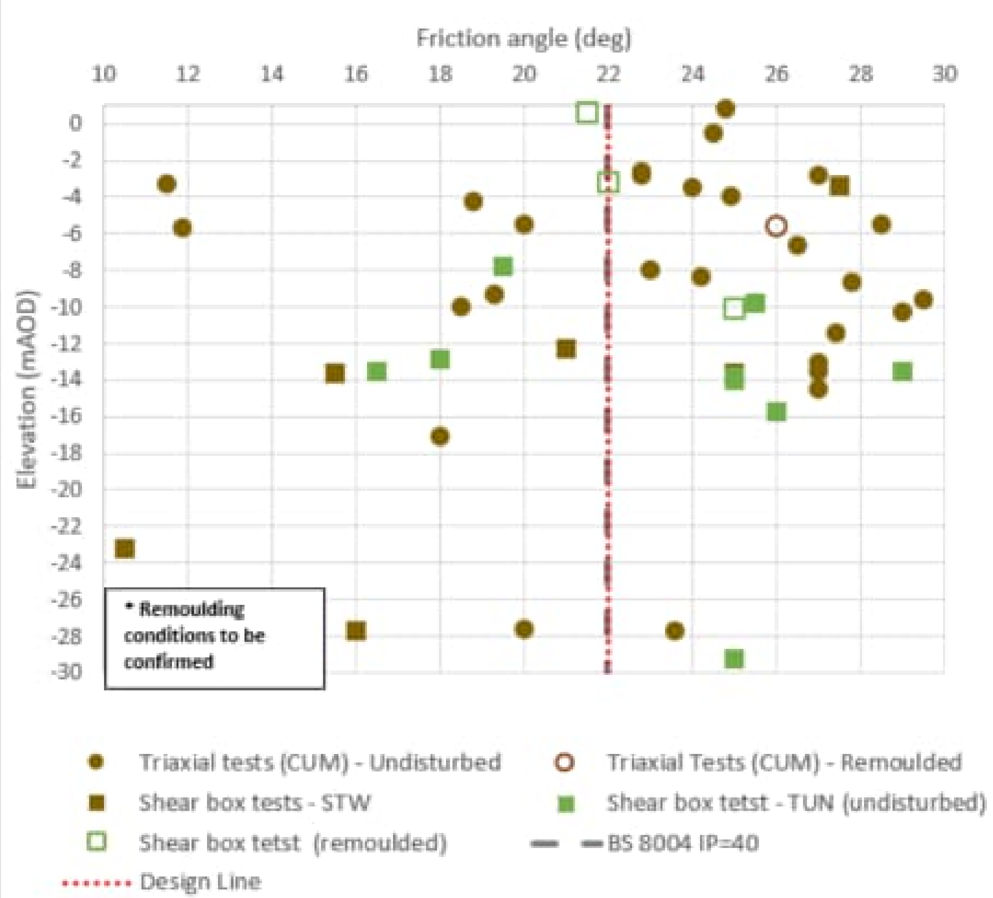
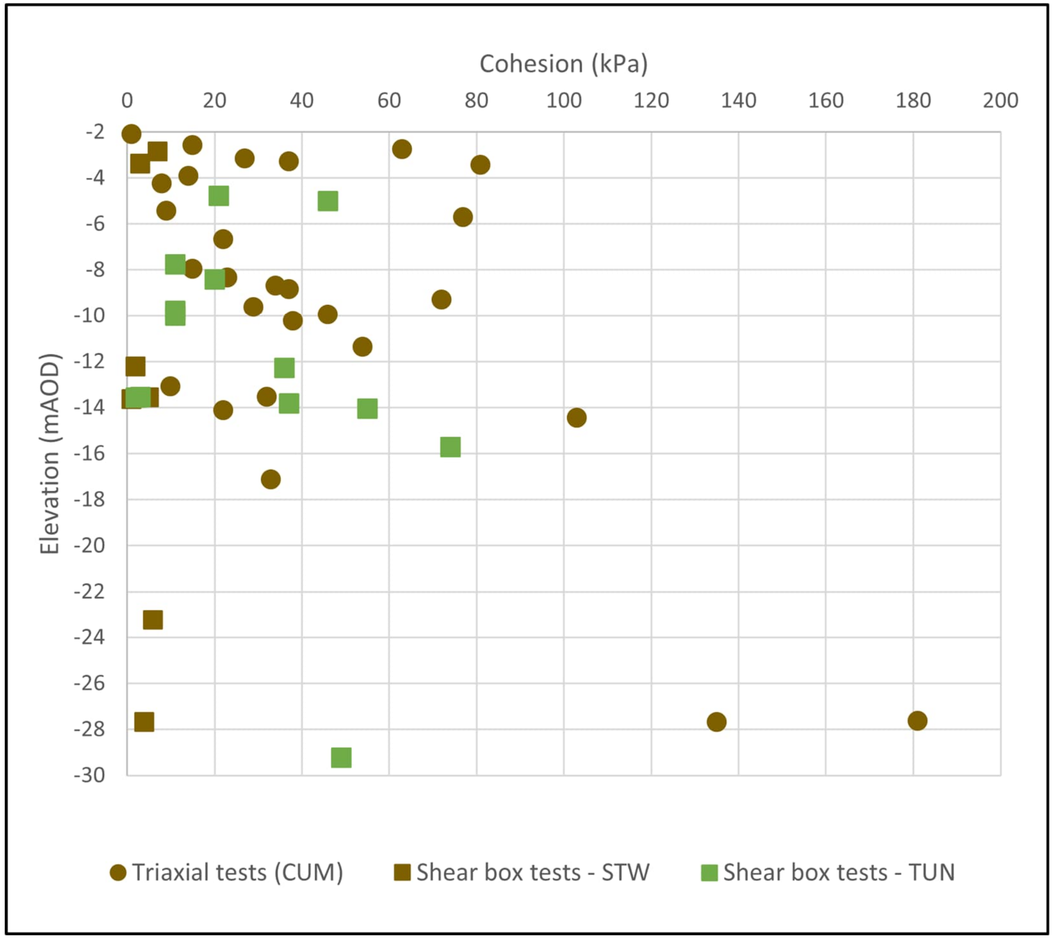


Figure 7.31: Cohesion of Gault Clay Formation (undisturbed conditions)



A.3.4 Undrained Shear Strength

Figure 7.32: Undrained Shear Strength of Topsoil

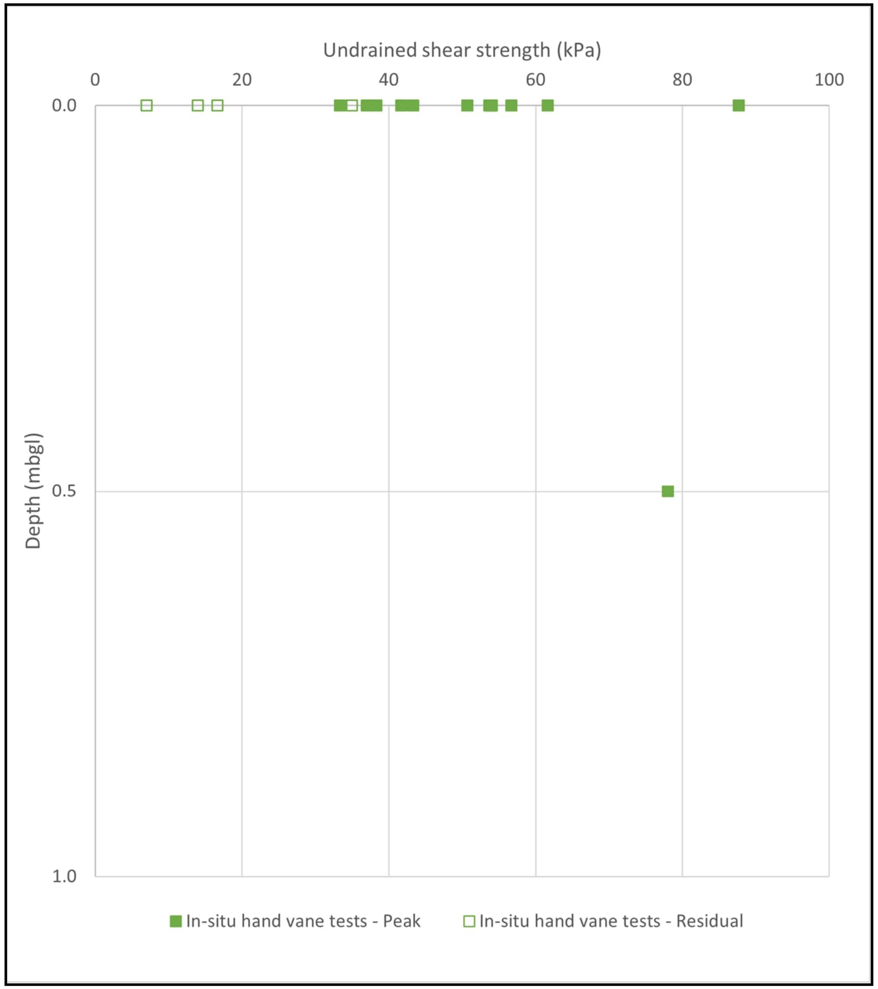


Figure 7.33: Undrained Shear Strength of Made Ground

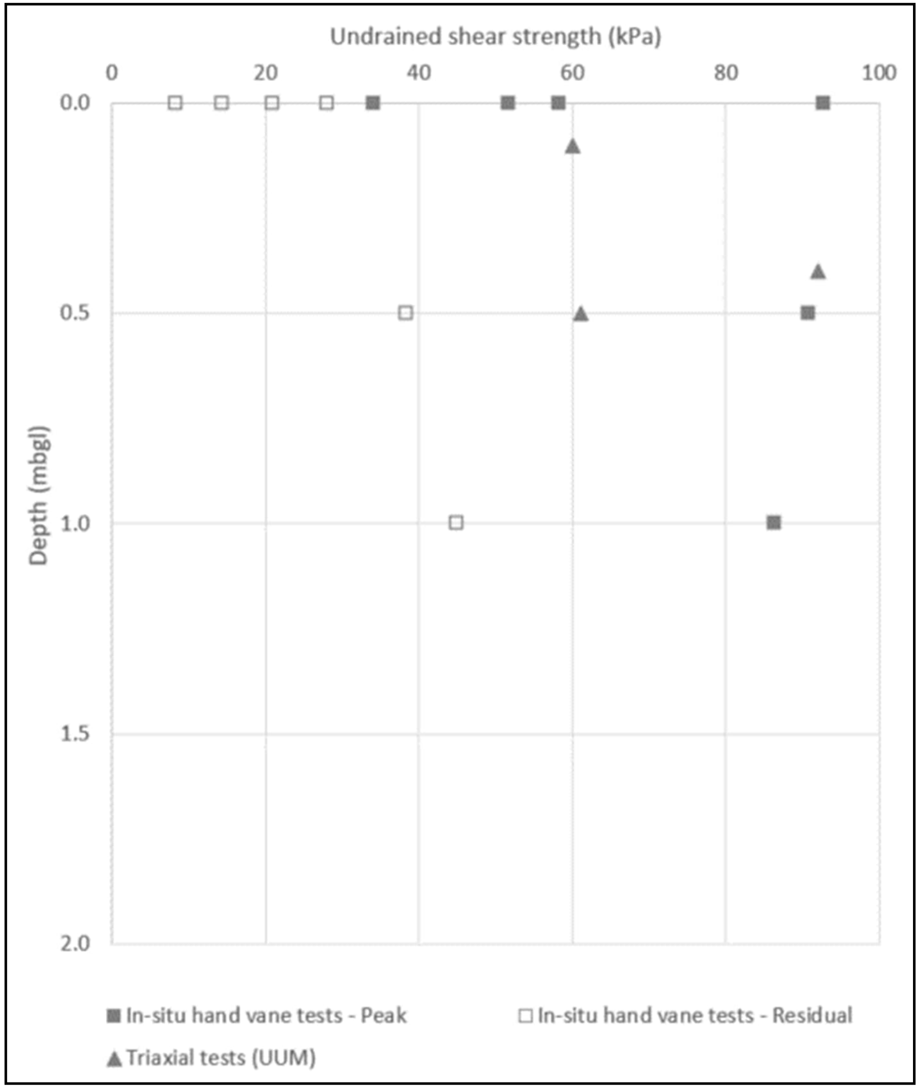


Figure 7.34: Undrained Shear Strength of Weathered Chalk

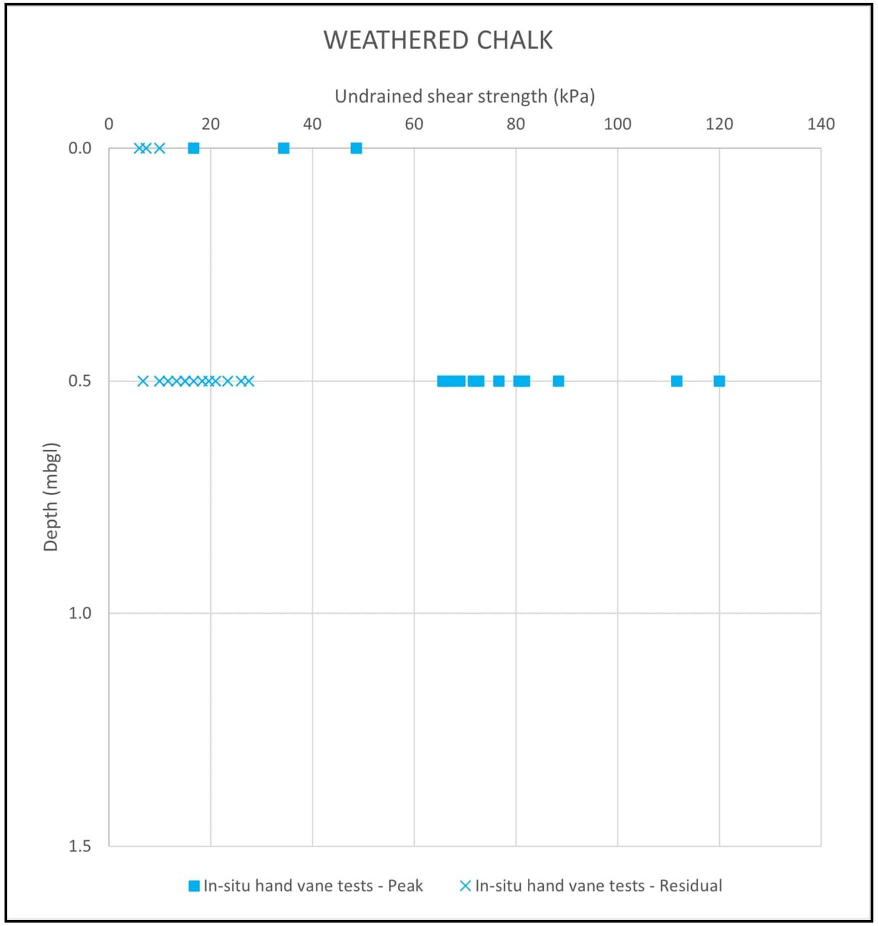


Figure 7.35: Undrained Shear Strength of Gault Clay Formation (Proposed Main Site)

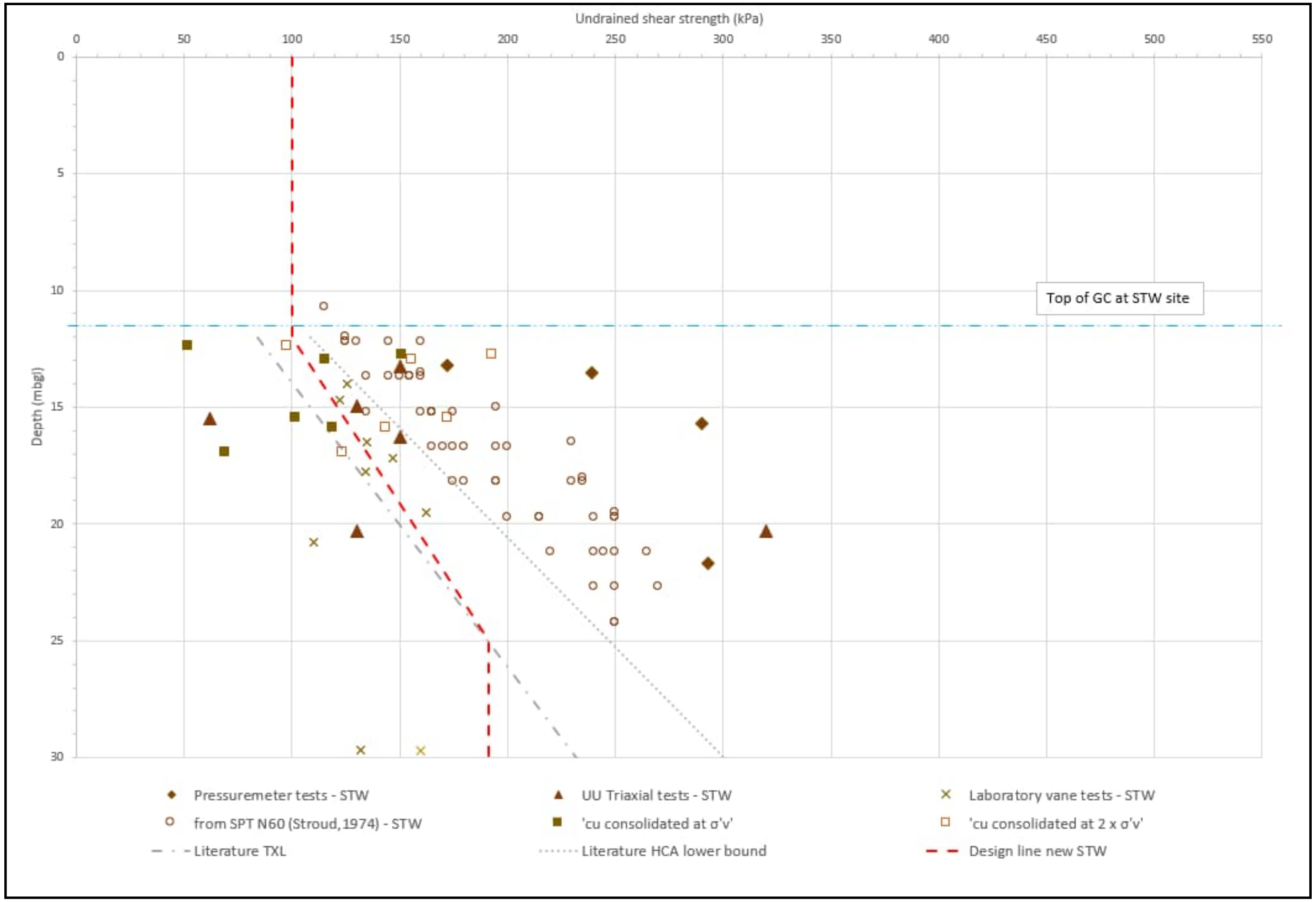
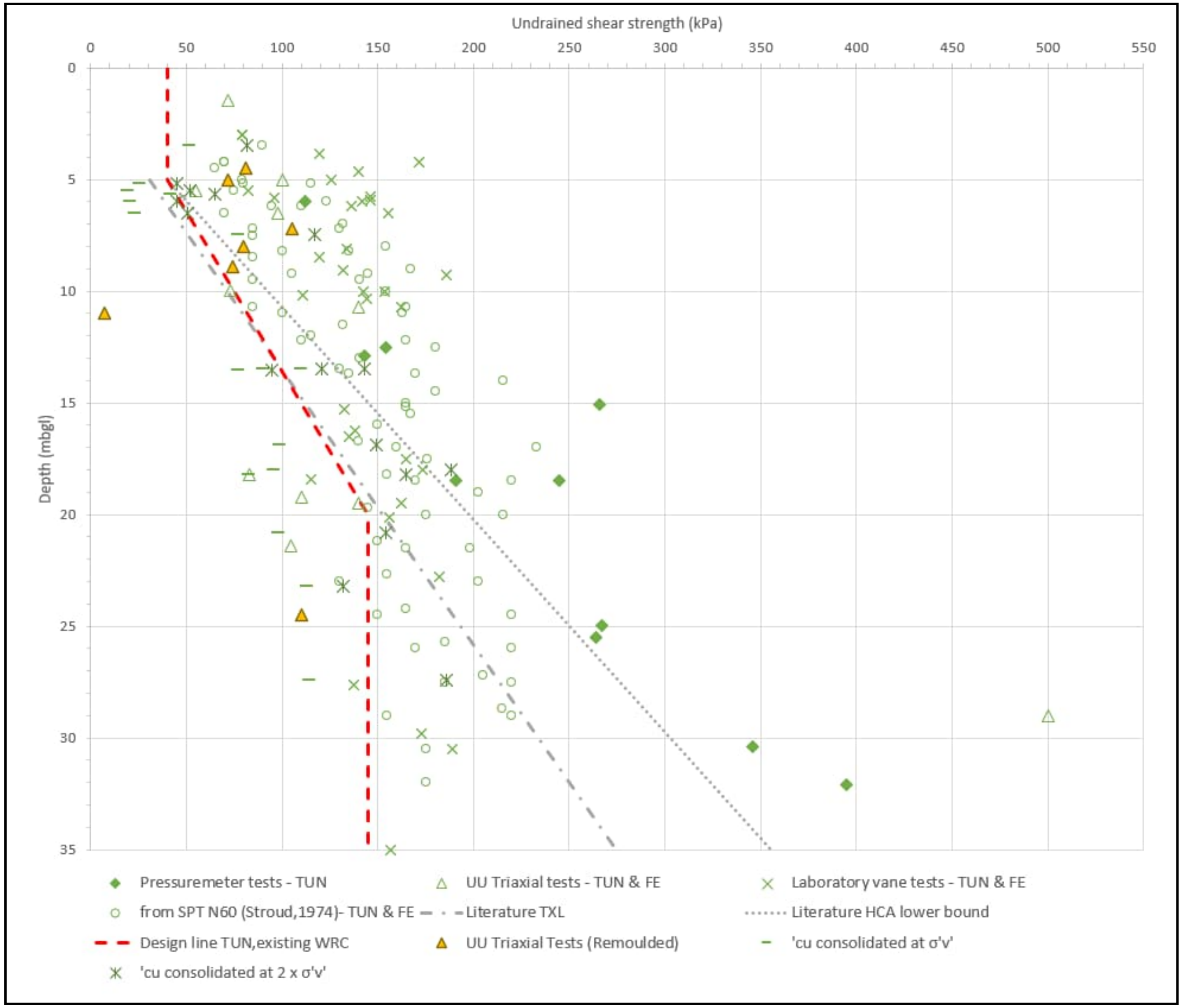


Figure 7.36: Undrained Shear Strength of Gault Clay Formation (Tunnel and FE Site)



A.3.5 Unconfined Compressive Strength

Figure 7.37: Unconfined Compressive Strength (UCS) of West Melbury Chalk Formation

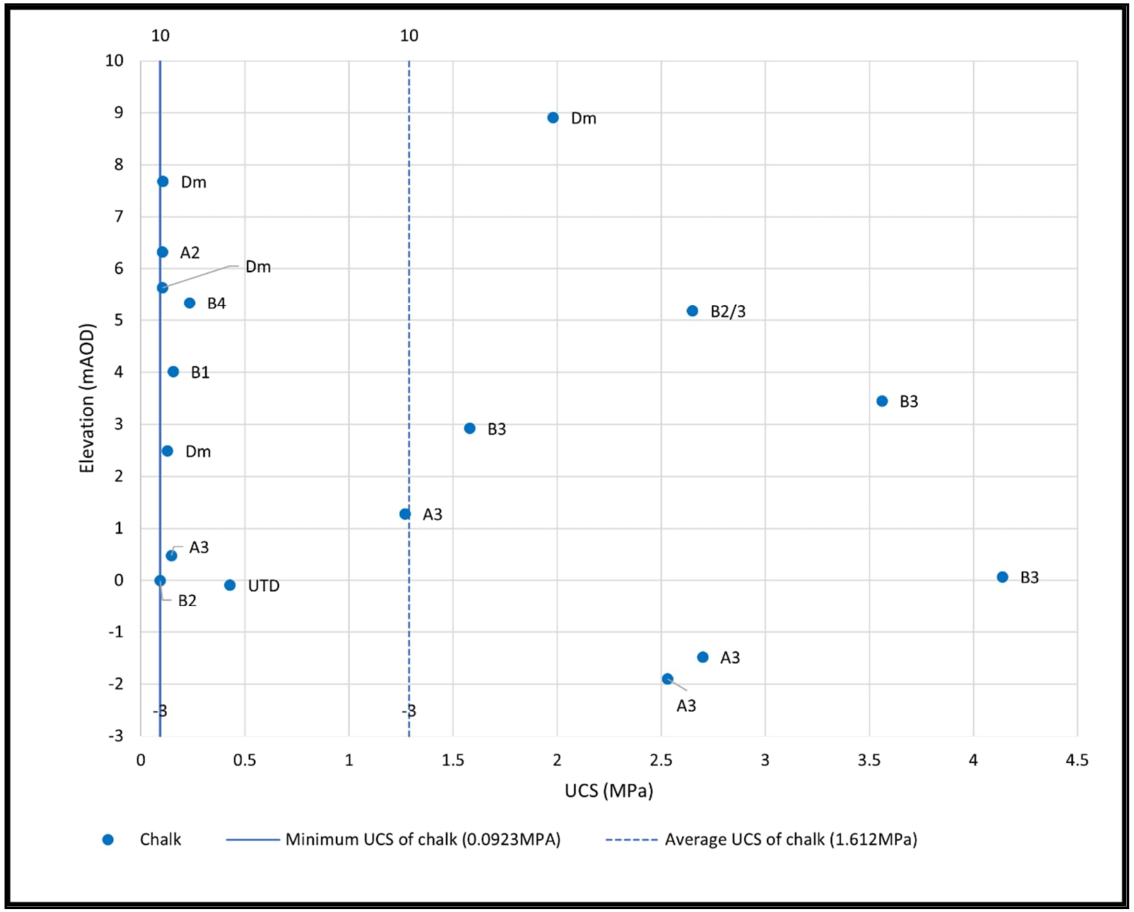
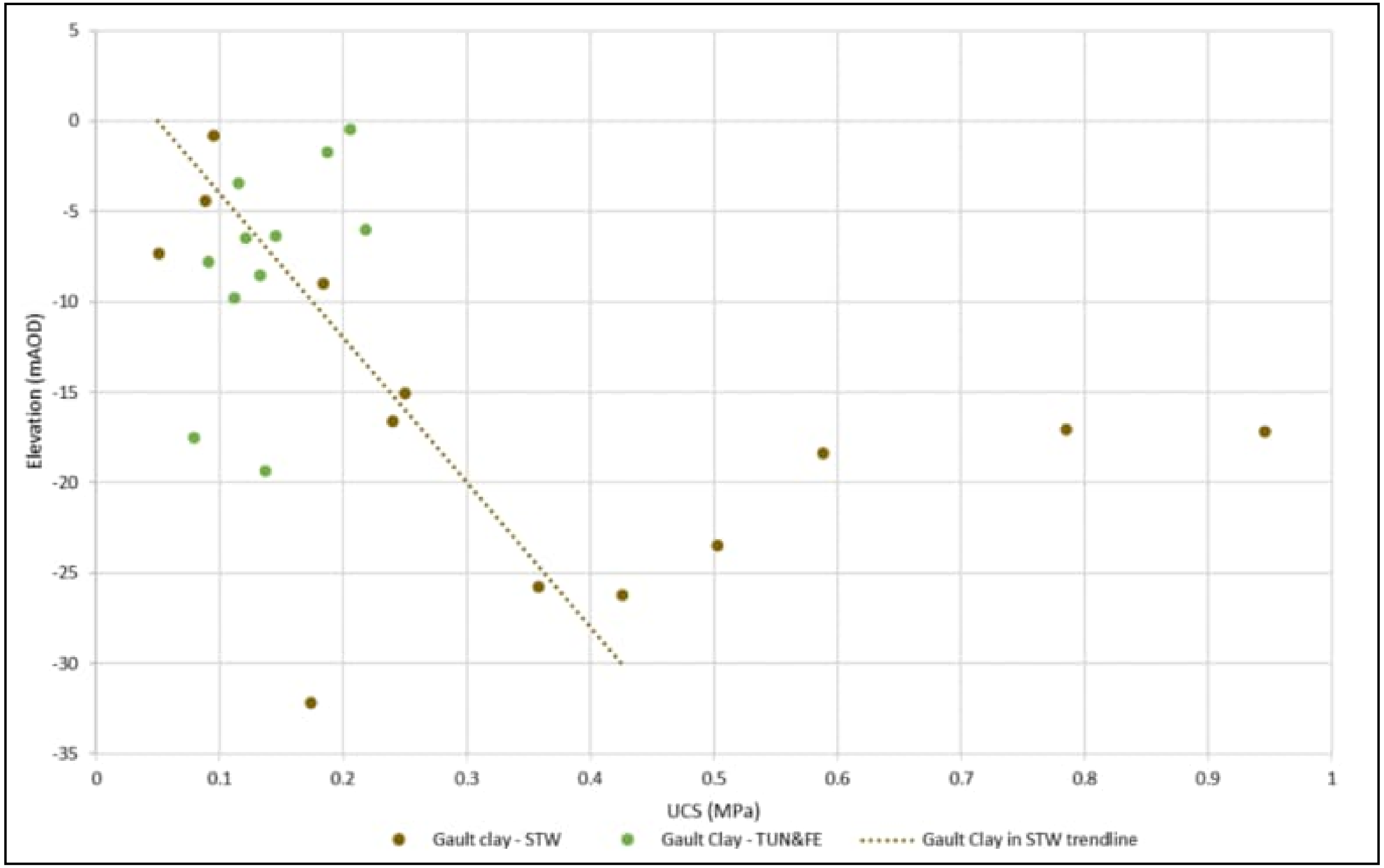
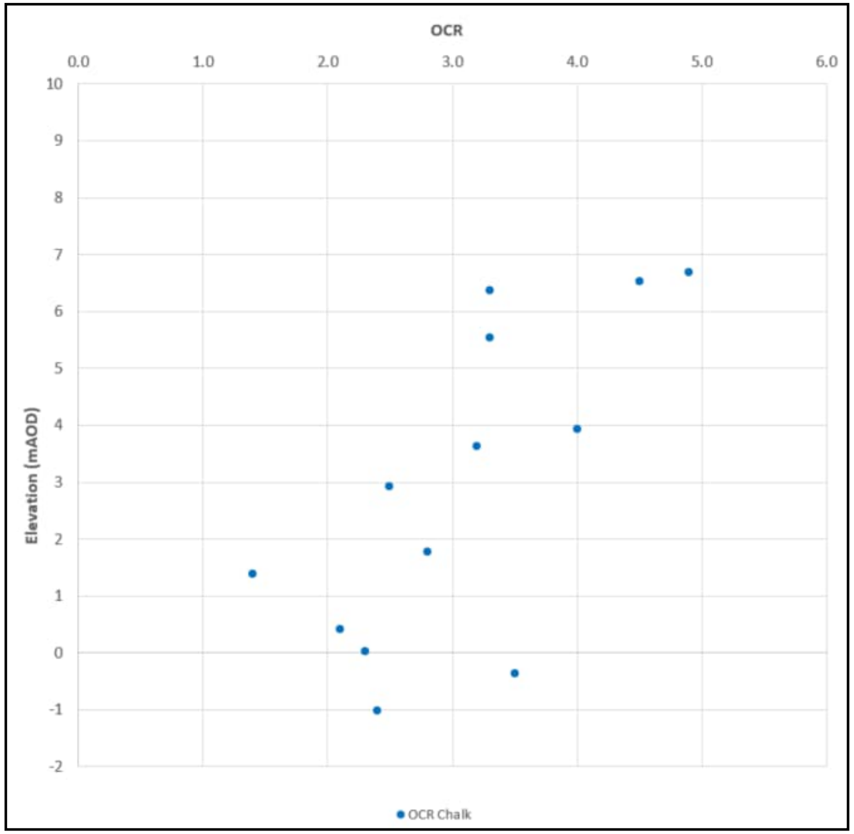


Figure 7.38: Unconfined Compressive Strength (UCS) of Gault Clay Formation



A.3.6 OCR and K0 profiles

Figure 7.39: OCR and K0 profile of West Melbury Chalk Formation



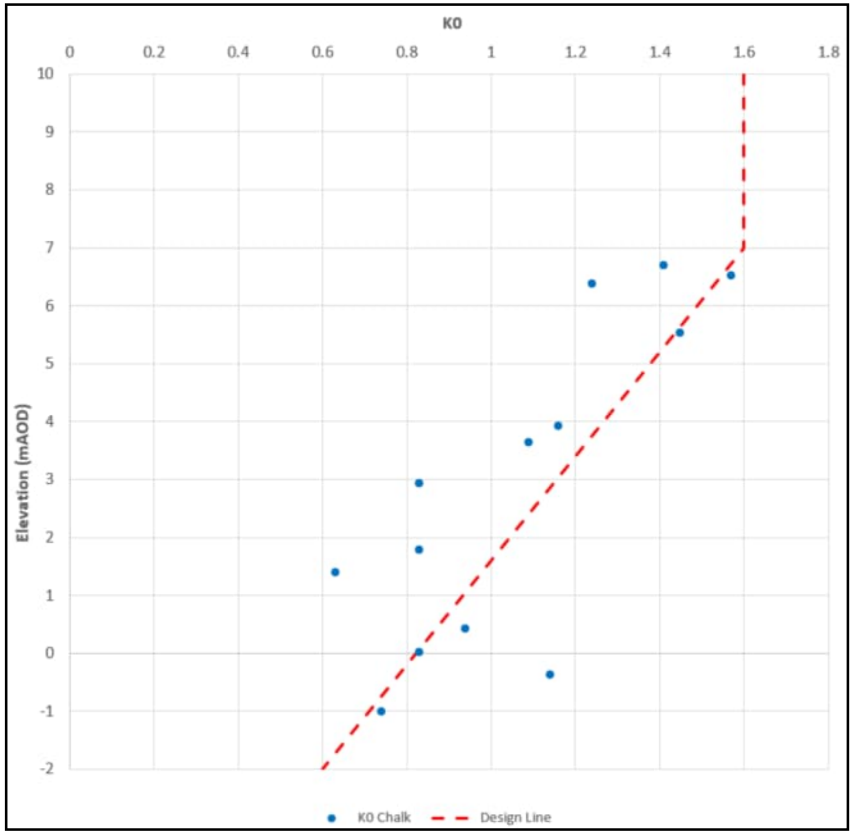
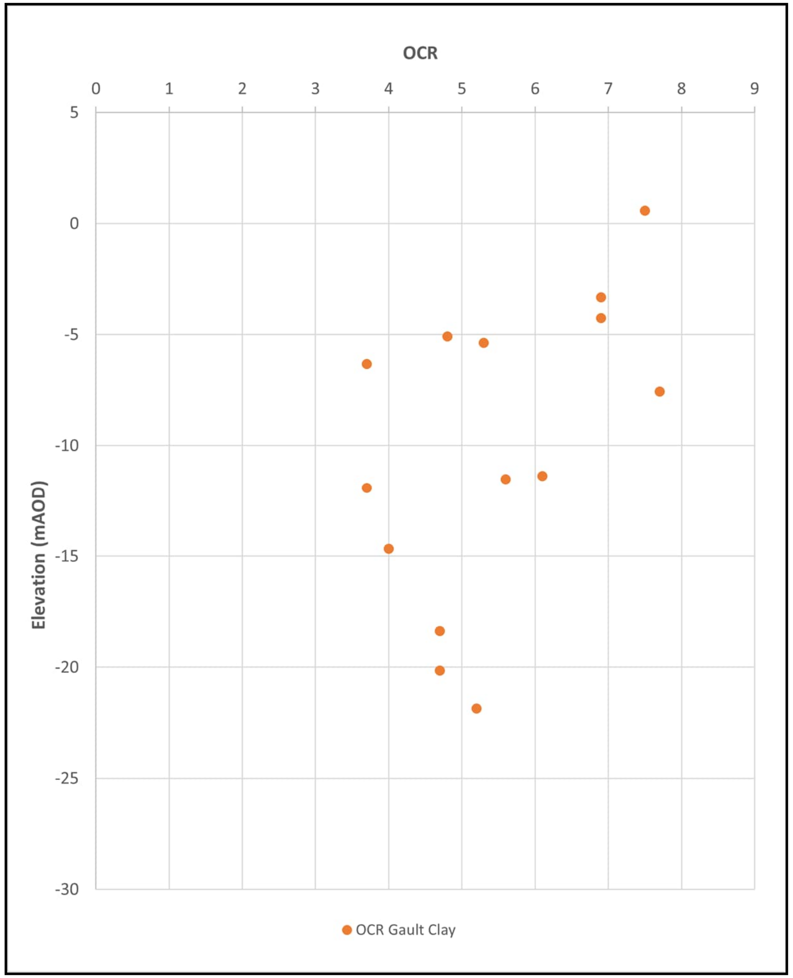
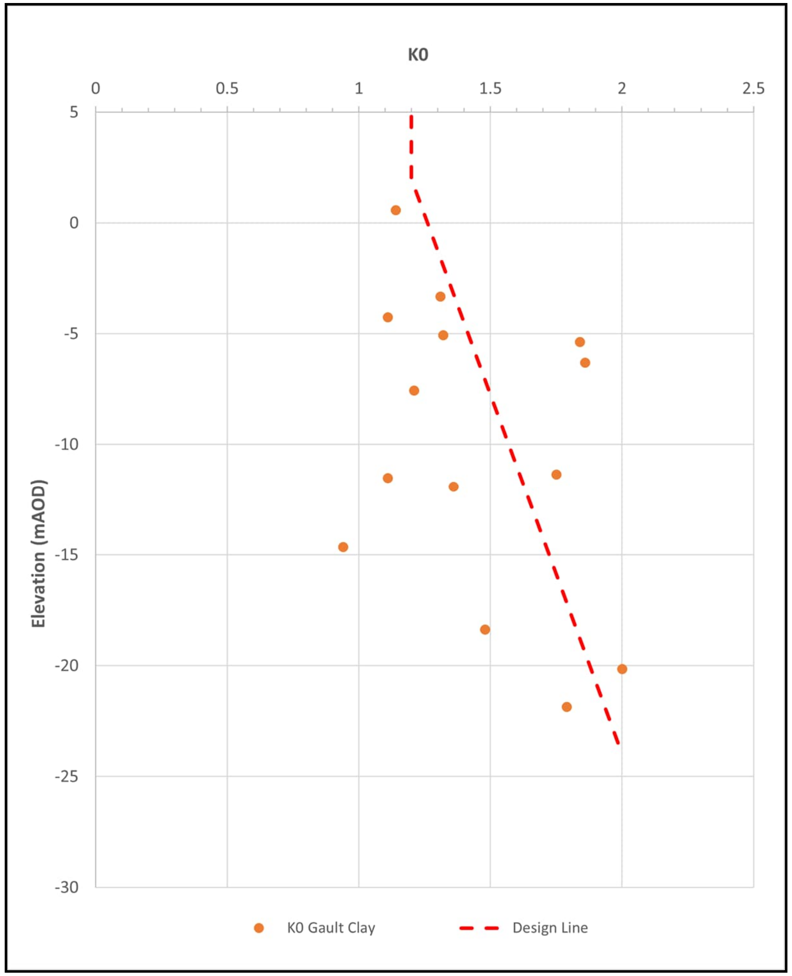


Figure 7.40: OCR and K0 profile of Gault Clay Formation





A.3.7 Compressibility

Figure 7.41: Compressibility of West Melbury Chalk Formation in loading – Design Line

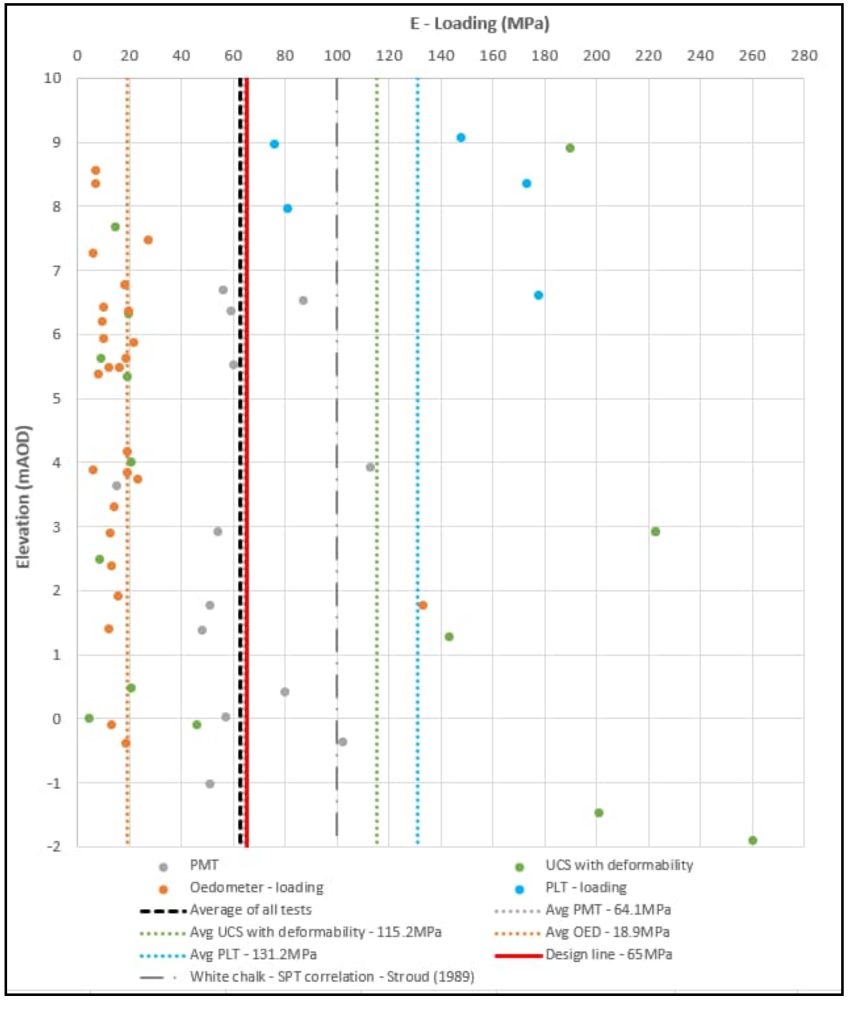


Figure 7.42: Compressibility of West Melbury Chalk Formation in reloading – Design Line

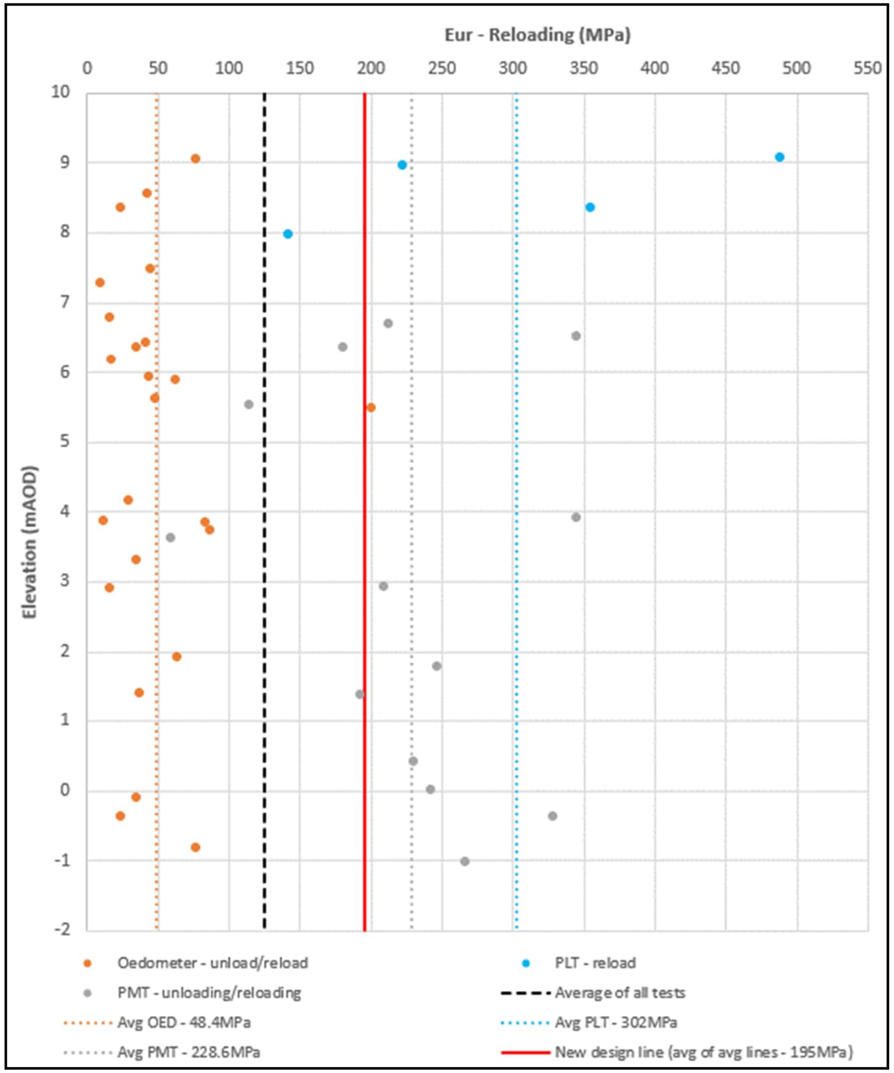


Figure 7.43: Compressibility of West Melbury Chalk Formation at strain levels 0.01% and 0.1% based on pressuremeter test data

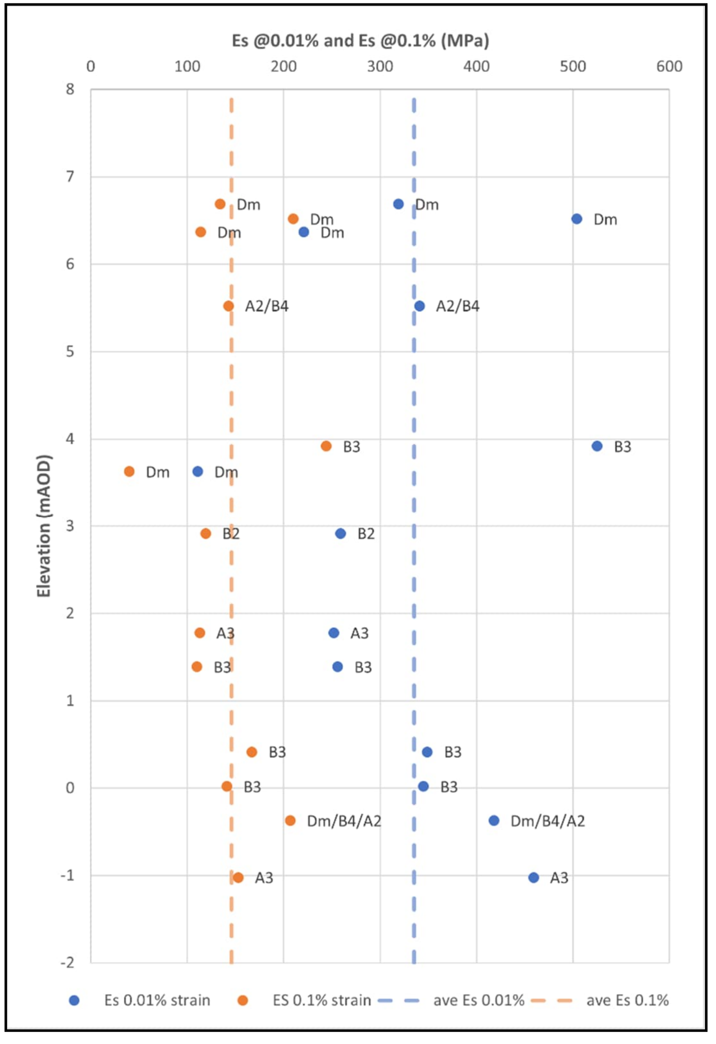


Figure 7.44: Compressibility of Gault Clay formation (E'v) – Design Line

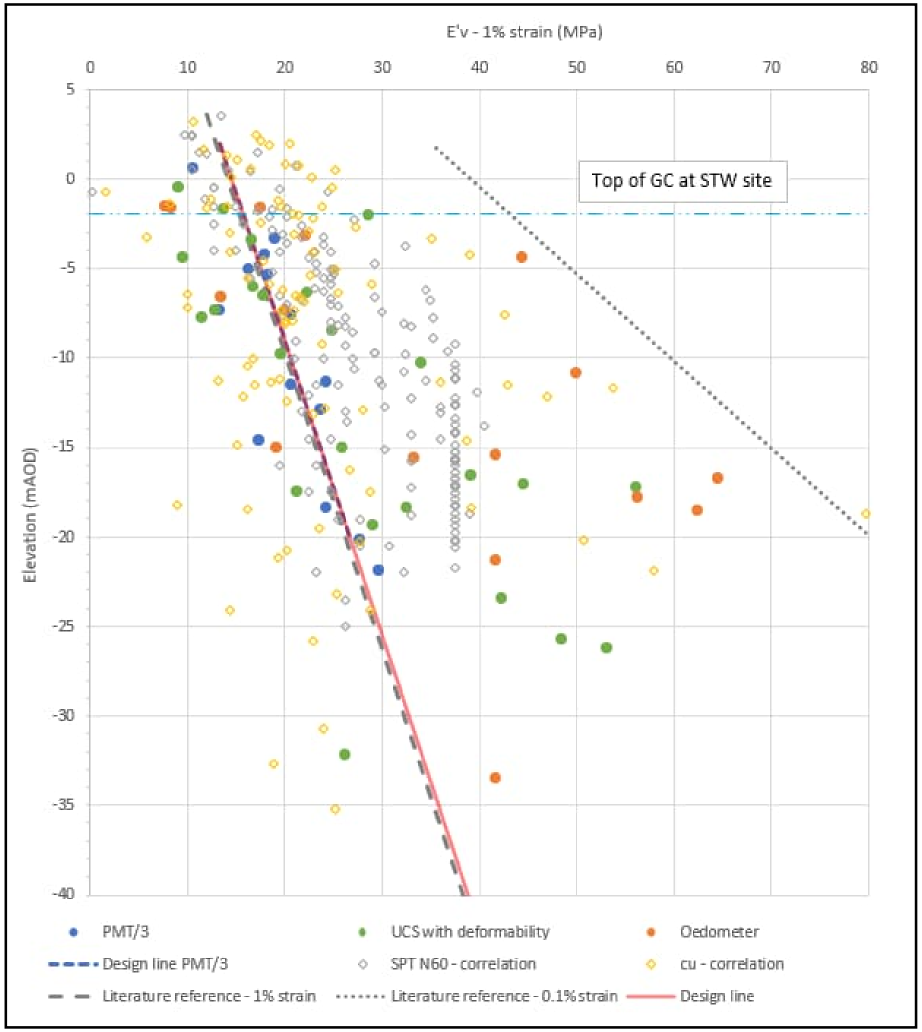


Figure 7.45: Secant horizontal drained stiffness (E'h) of Gault Clay formation from pressuremeter testing at 1% strain compared with literature reference for secant vertical drained stiffness (E'v) at 1% strain

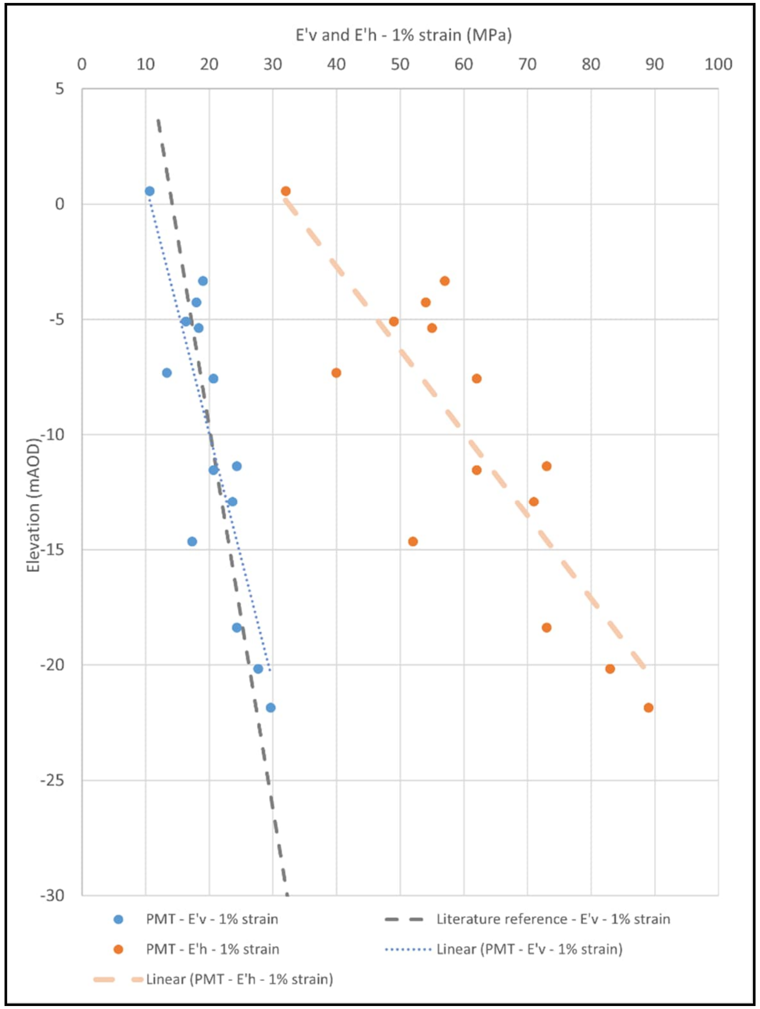
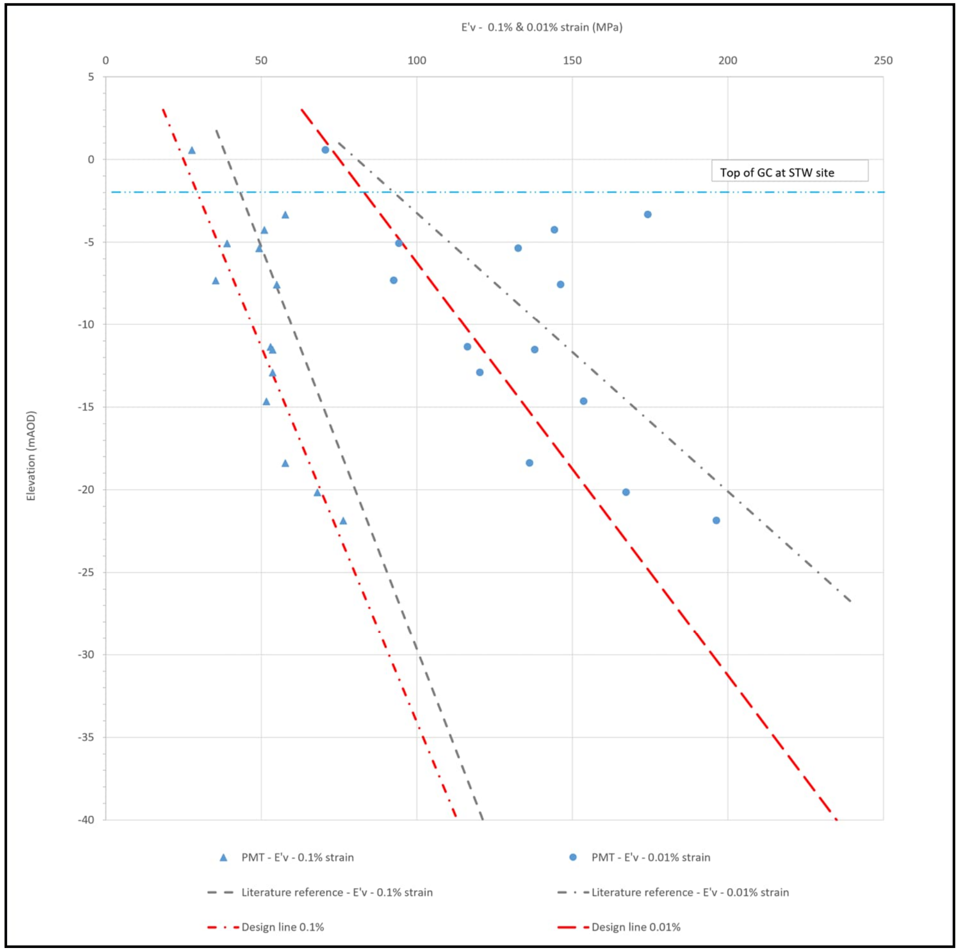


Figure 7.46: Secant vertical drained stiffness (E'v) of Gault Clay Formation at 0.1% and 0.01% strain, derived from pressuremeter testing using drained stiffness anisotropy ratio of E'h/E'v = 3 compared with literature reference



A.3.8 Compaction Tests

Figure 7.47: Compaction Test Results – Made Ground

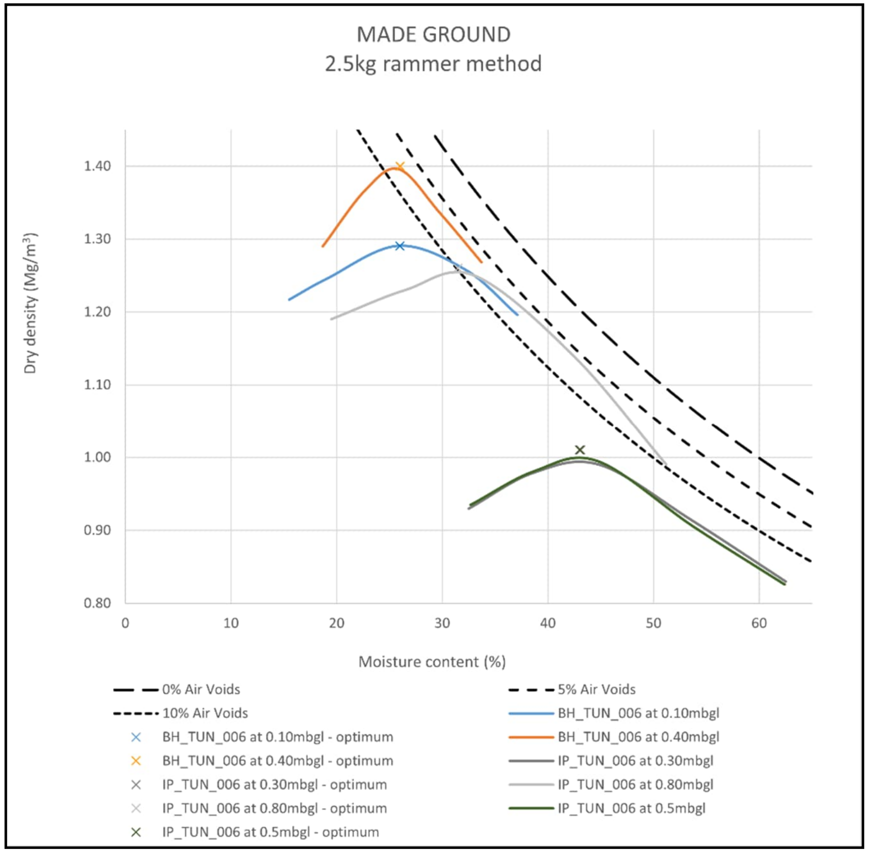


Figure 7.48: Compaction Test Results – 2.5kg rammer method – West Melbury Chalk Formation

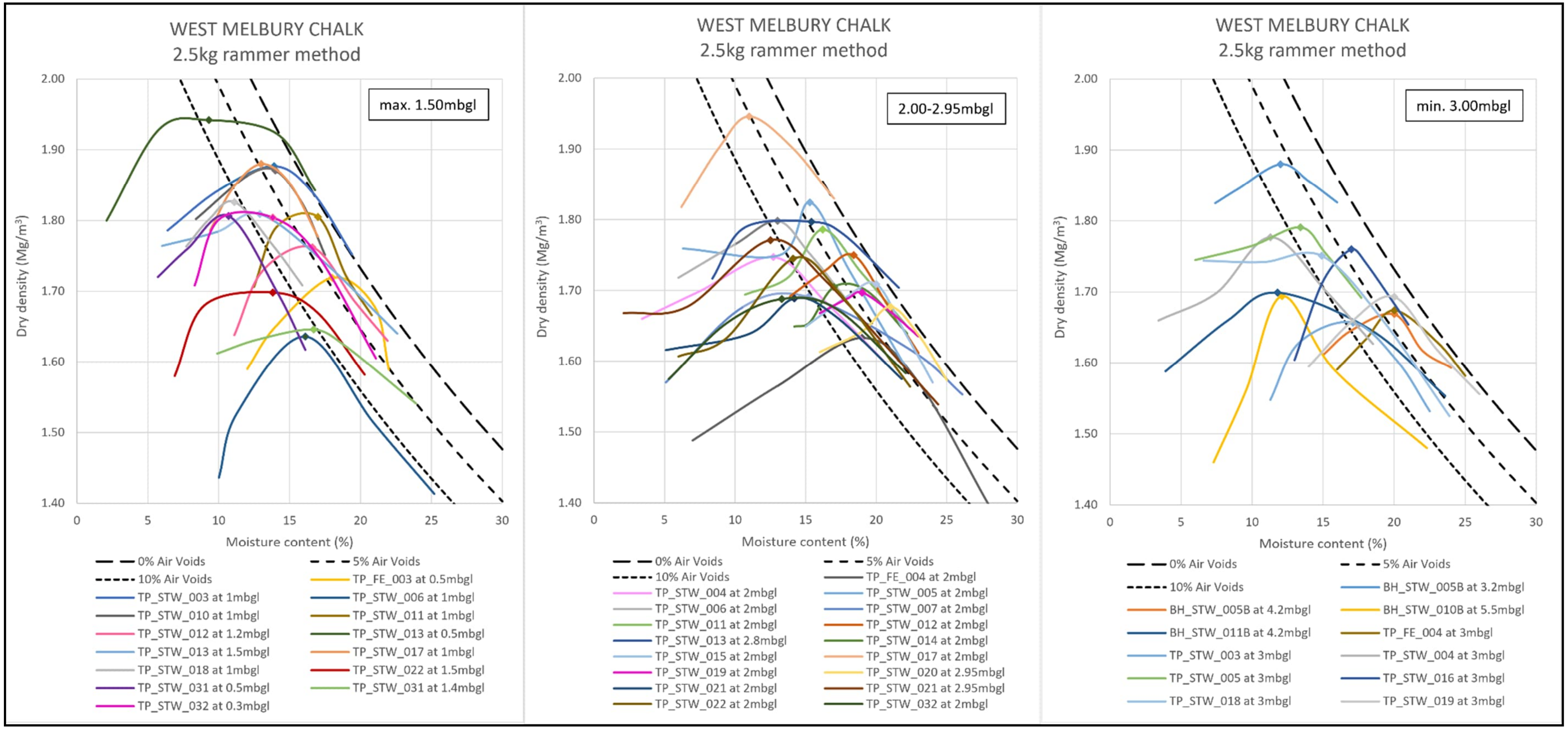


Figure 7.49: Compaction Test Results – 4.5kg rammer method – West Melbury Chalk Formation

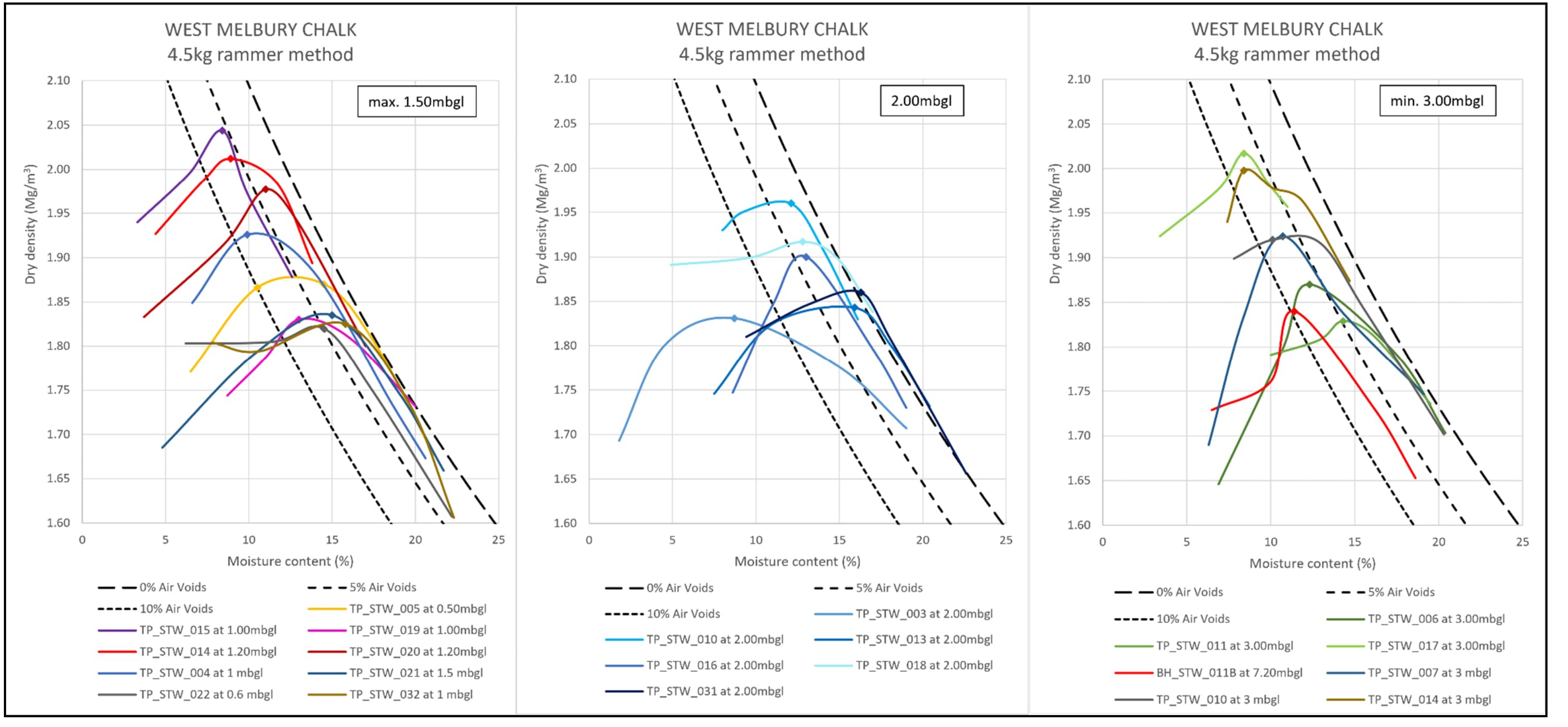


Figure 7.50: Compaction Test Results – Gault Clay Formation

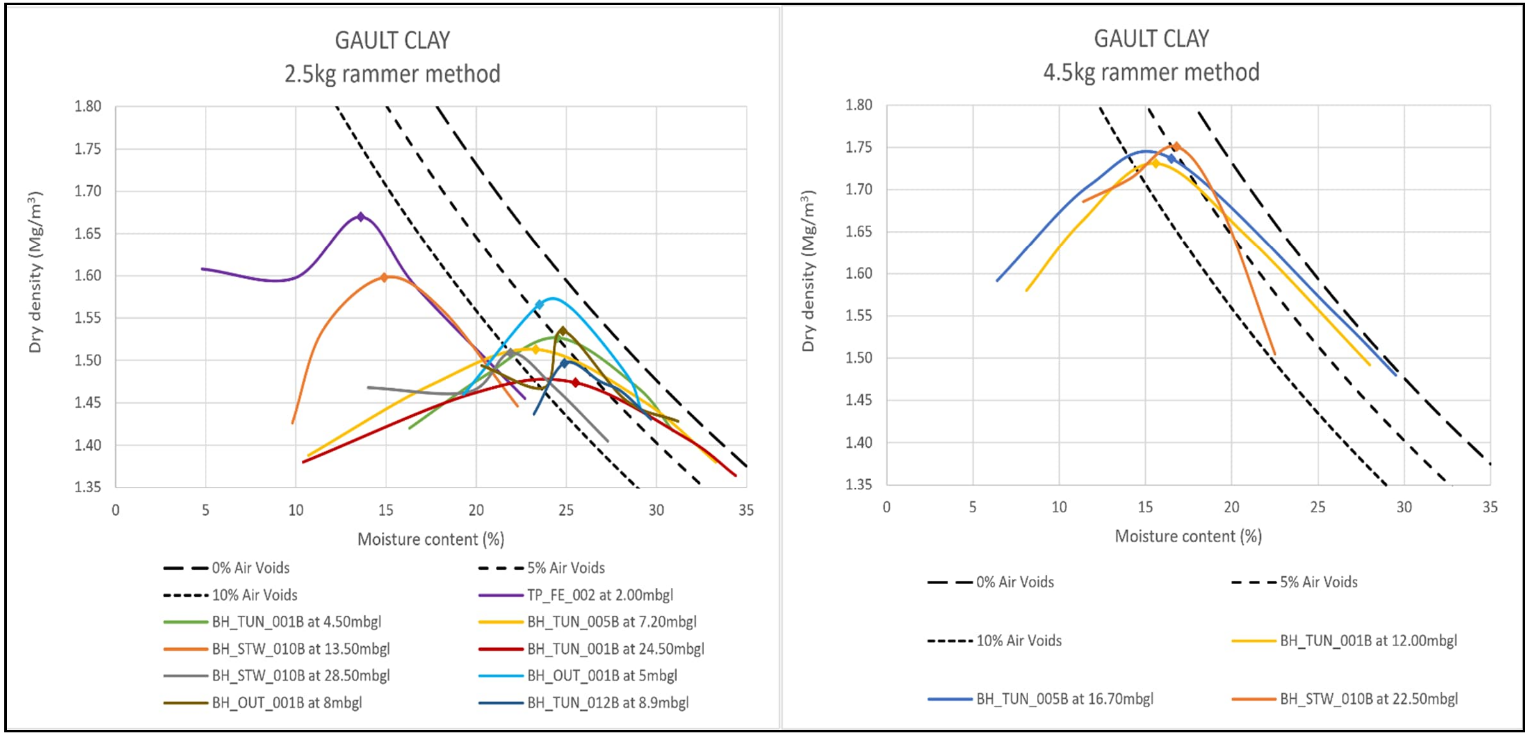


Figure 7.51: Compaction and CBR Tests Results – Made Ground

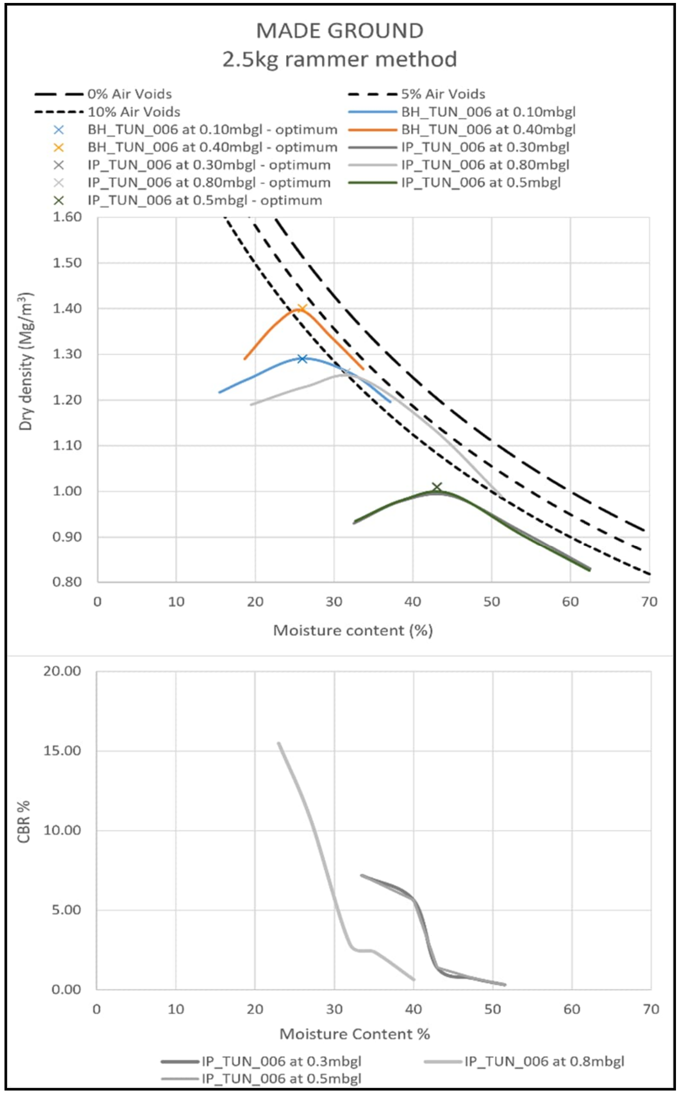


Figure 7.52: Compaction and (Unsoaked) CBR Tests Results – West Melbury Chalk Formation

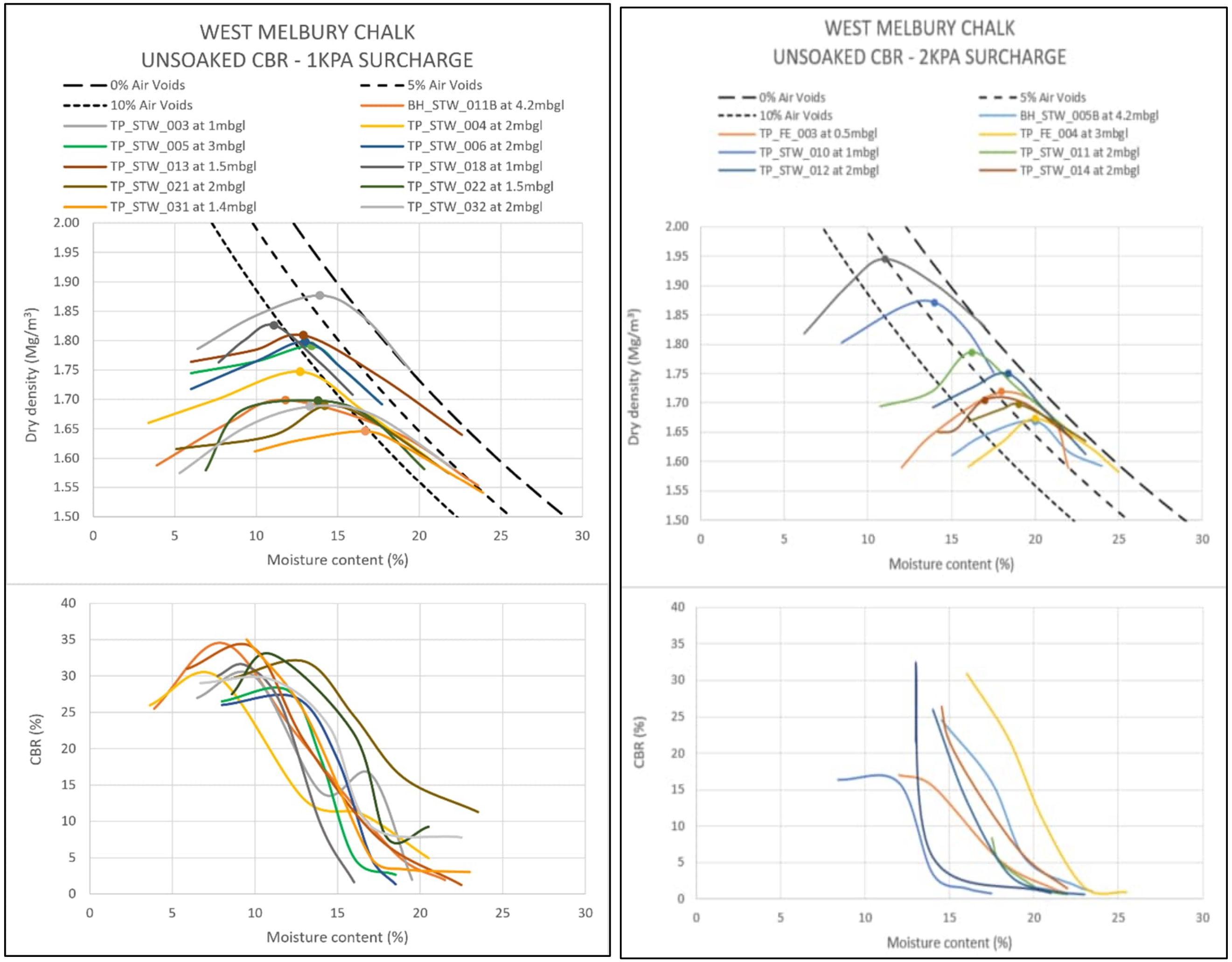
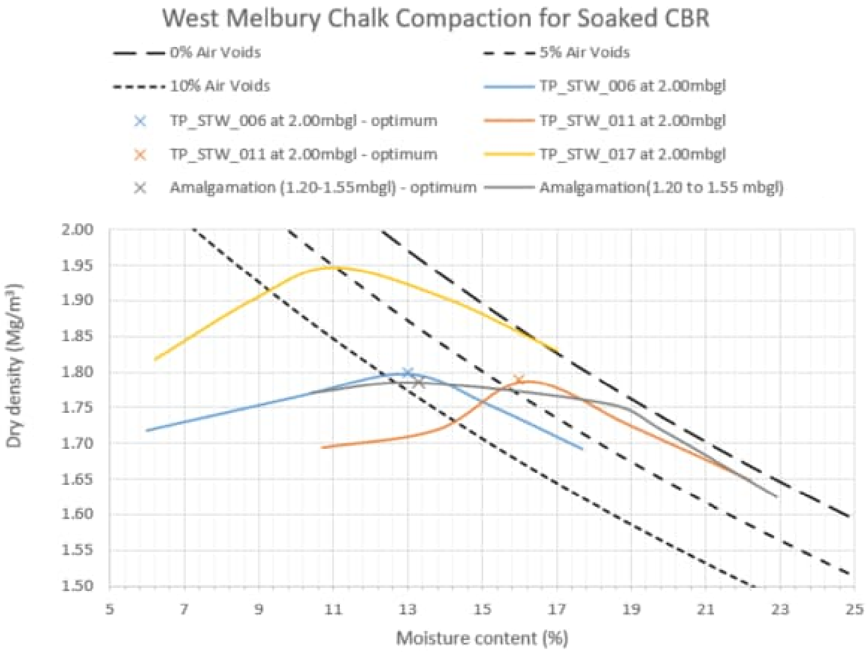


Figure 7.53: Compaction and (Soaked) CBR Tests Results – West Melbury Chalk Formation



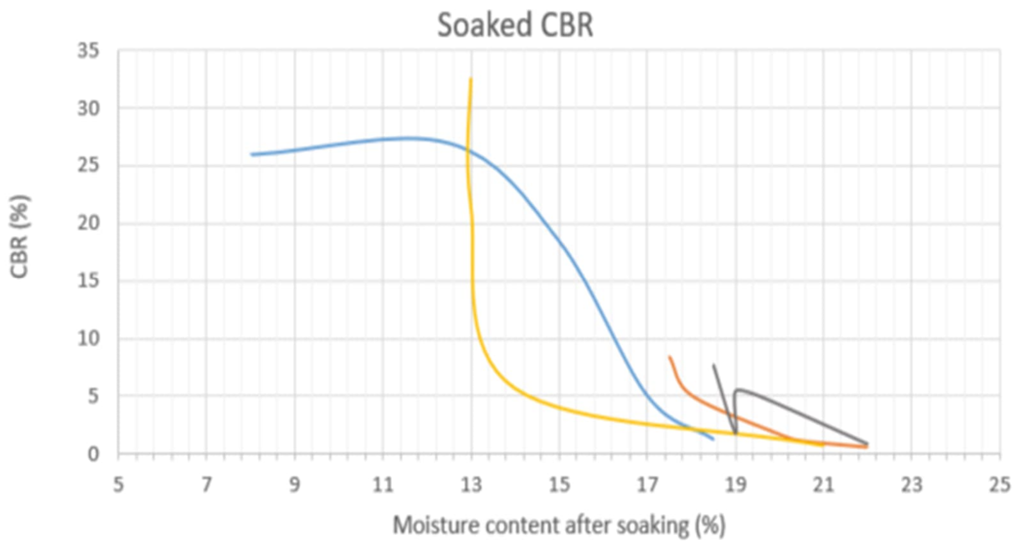


Figure 7.54: Compaction and CBR Tests Results – Gault Clay Formation

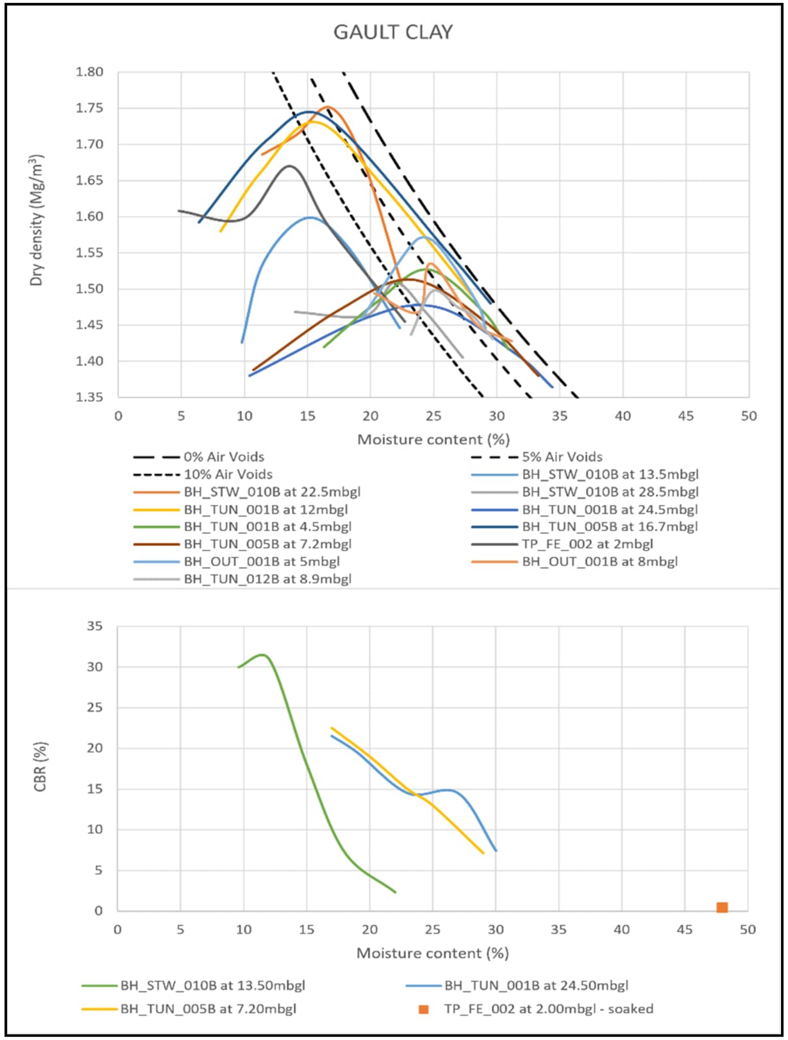
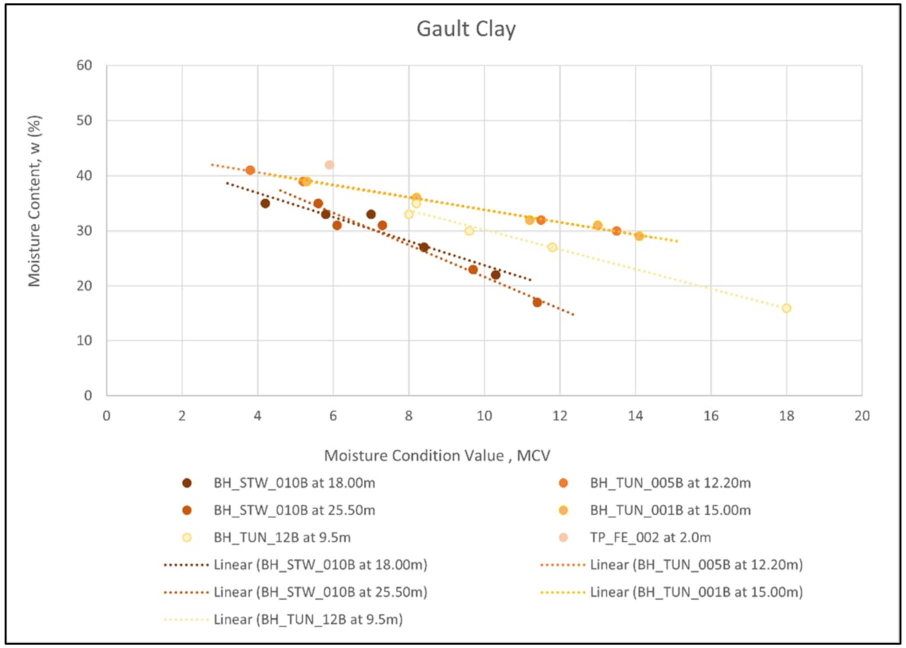


Figure 7.55 Moisture Condition Value Calibration Lines



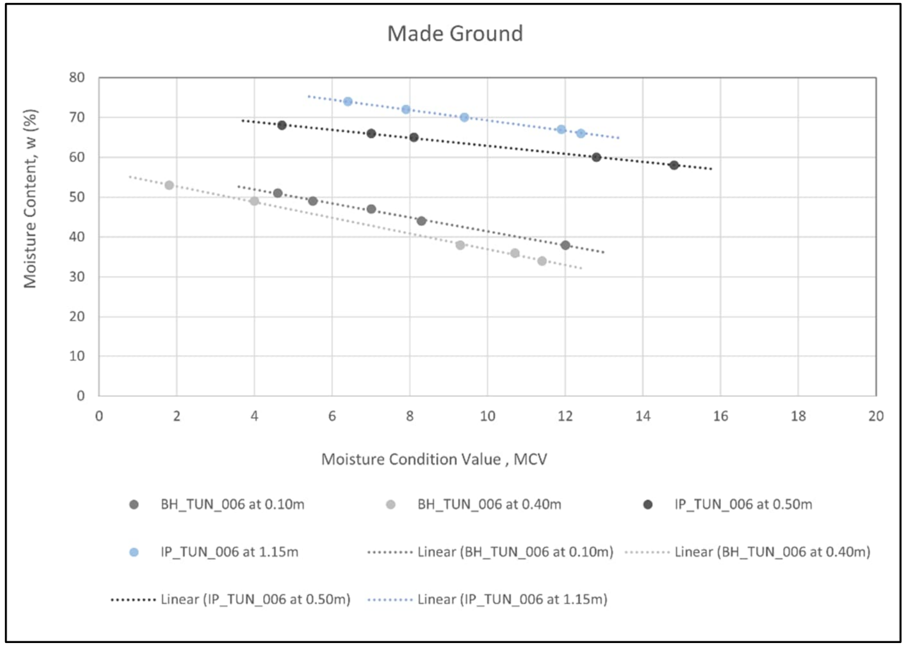


Figure 7.56 Plot of MCV calibration line slope vs intercept (Compaction Sensitivity)

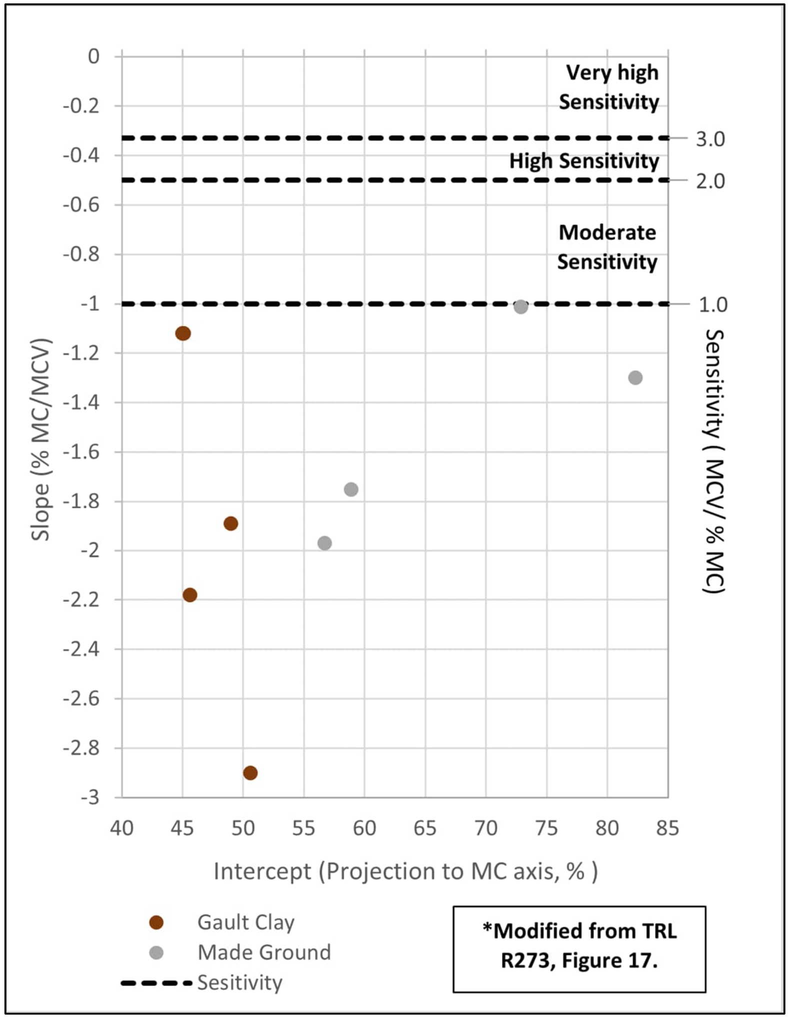
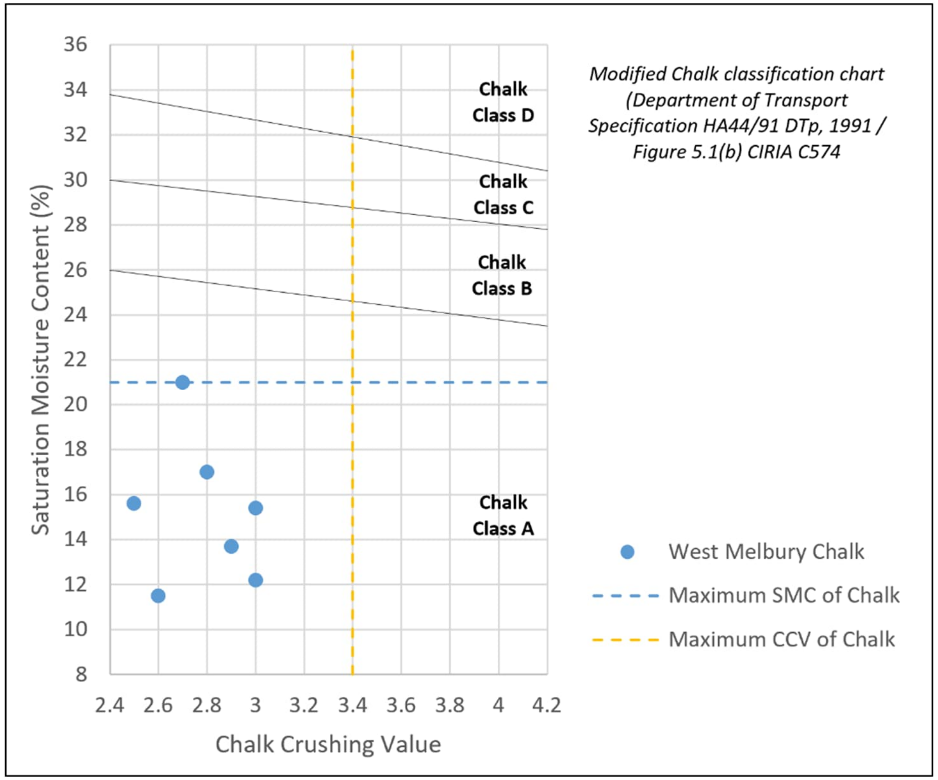
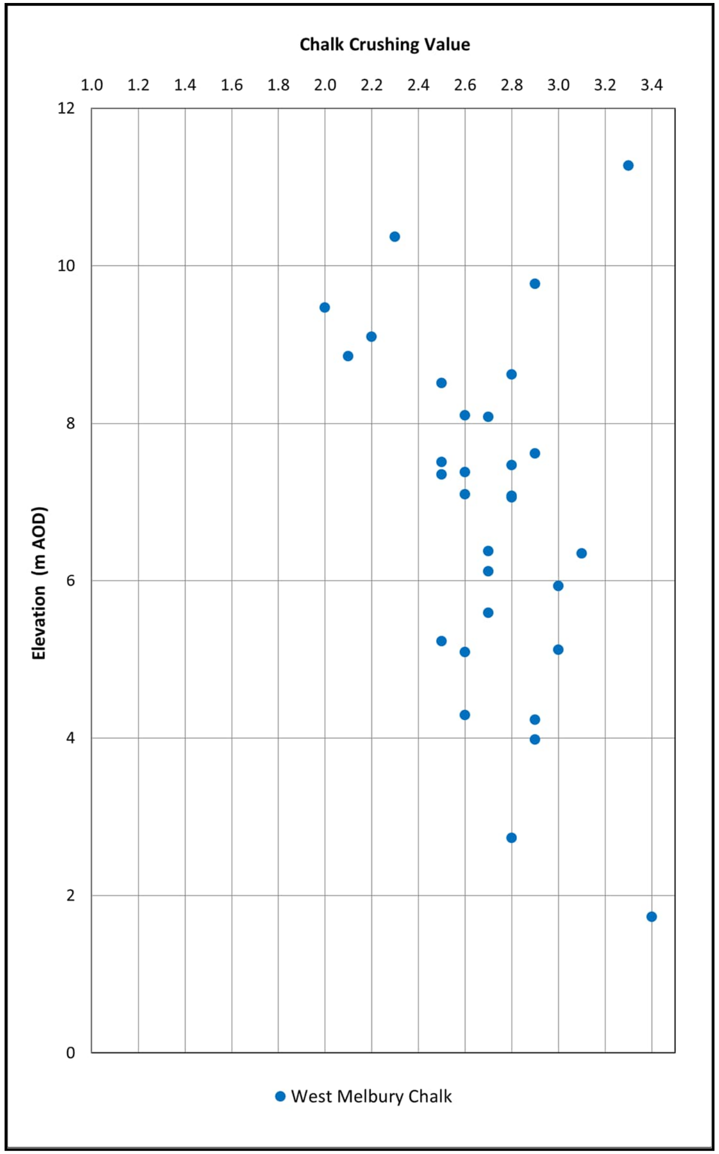


Figure 7.57: Chalk Crushing Value Results

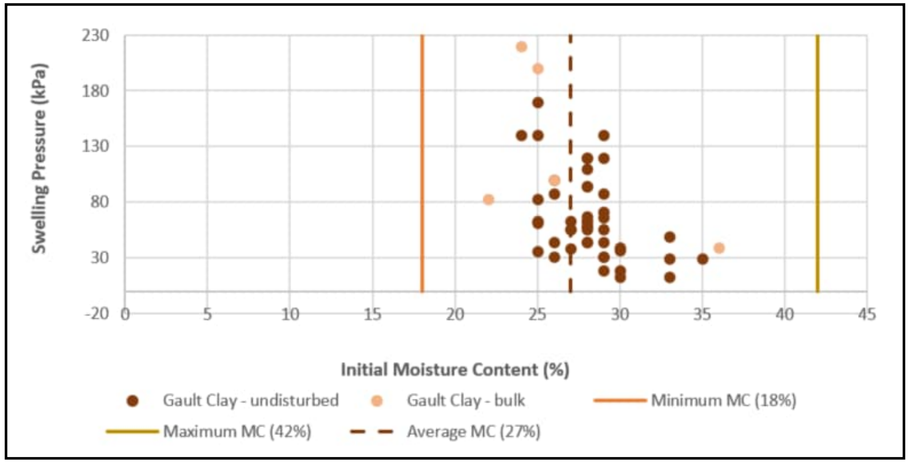
a. Saturation Moisture Content Vs Chalk Crushing Value, Chalk Earthworks Classes

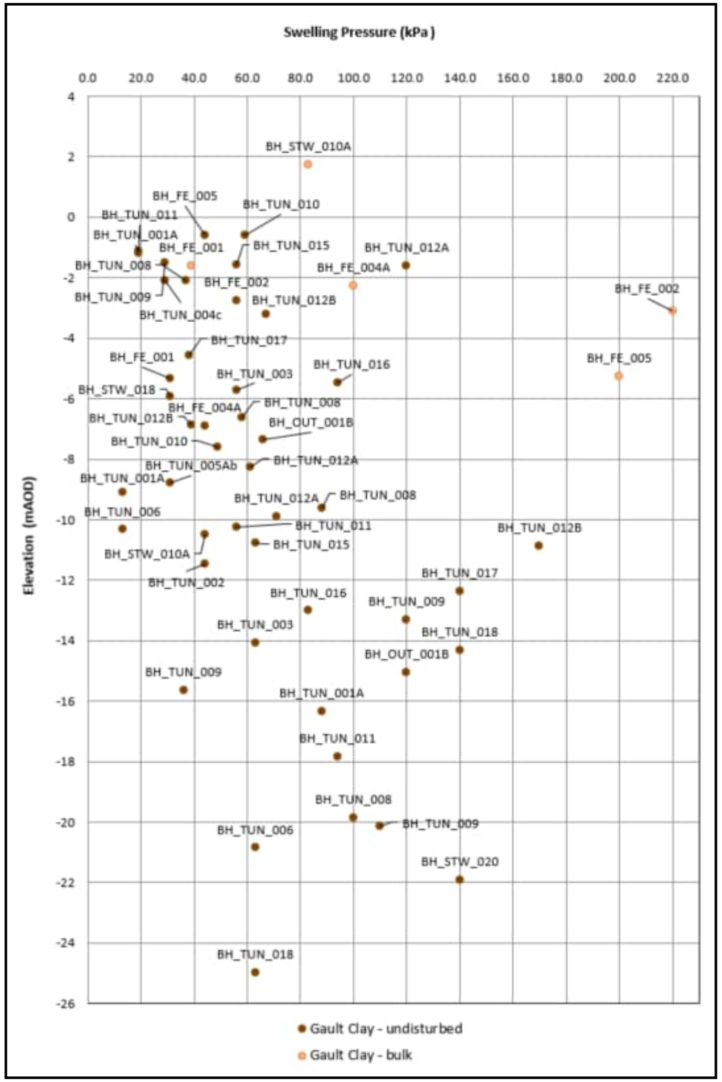




A.3.9 Swelling Potential

Figure 7.58: Swelling Pressure results for Gault Clay





A.3.10 Permeability

Figure 7.59: Permeability Test Results – River Terrace Deposits

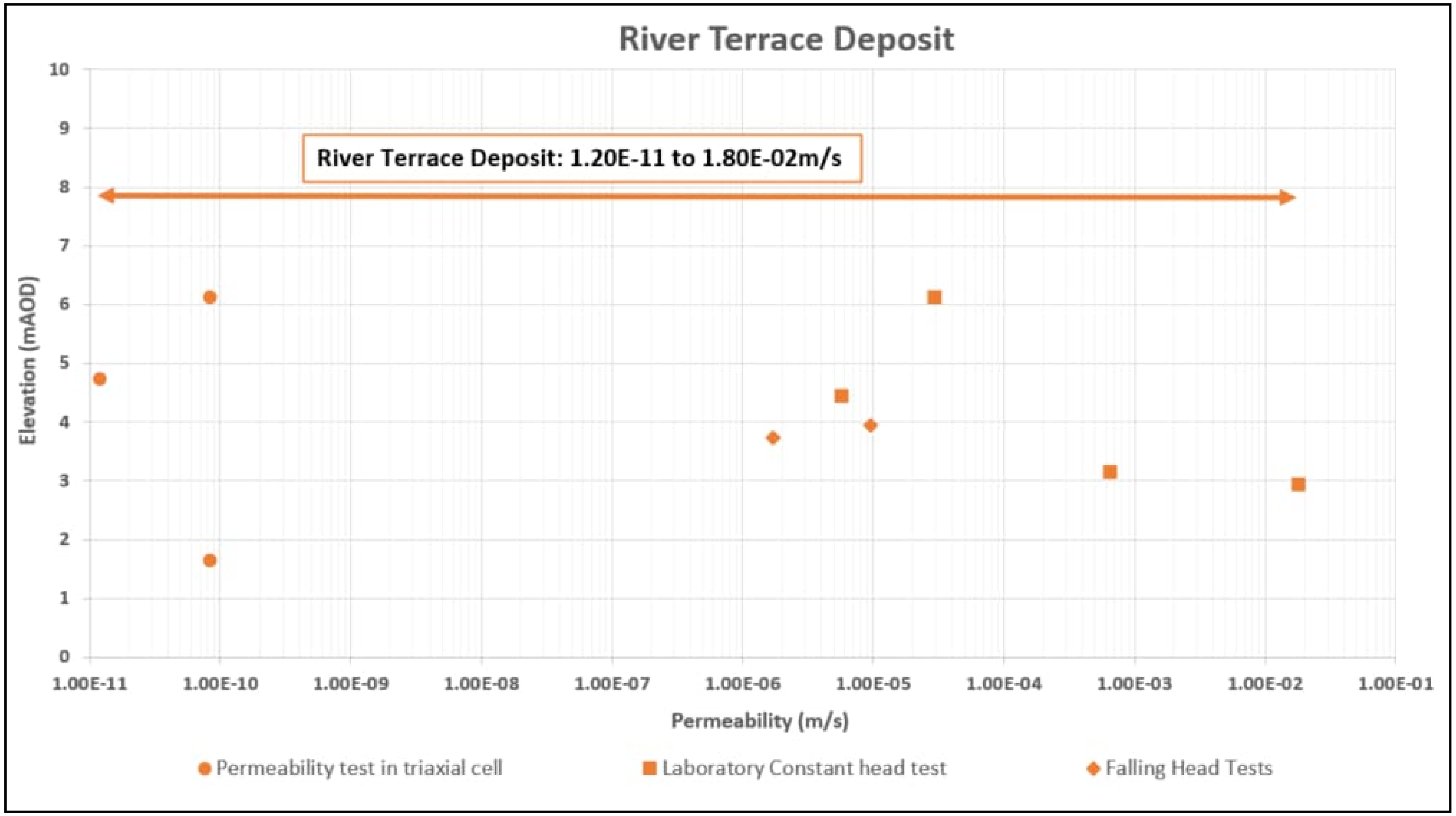


Figure 7.60: Permeability Test Results – West Melbury Chalk Formation

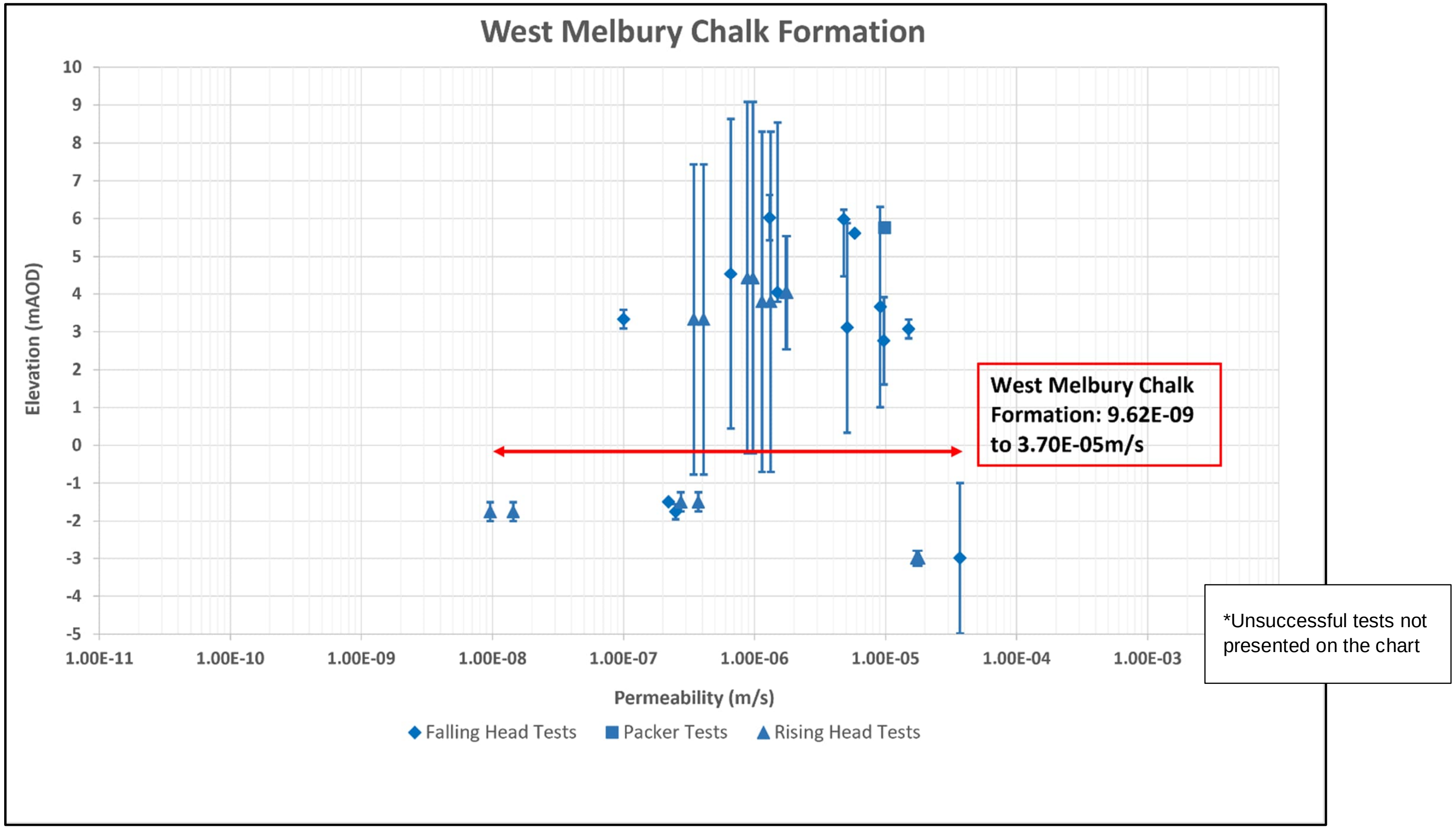
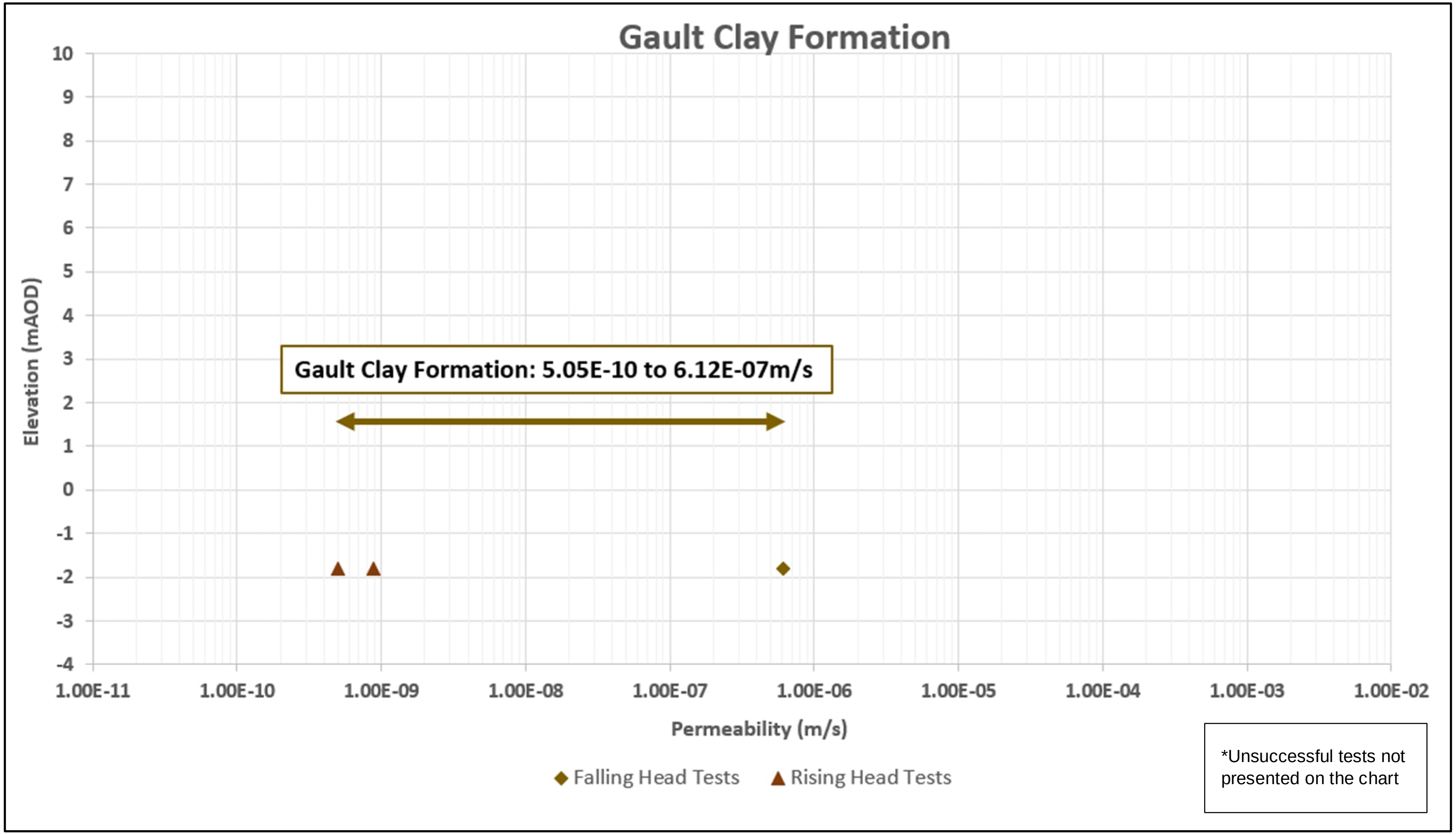


Figure 7.61: Permeability Test Results – Gault Clay Formation



A.3.11 Core recovery data

Figure 7.62: RQD records in West Melbury Chalk

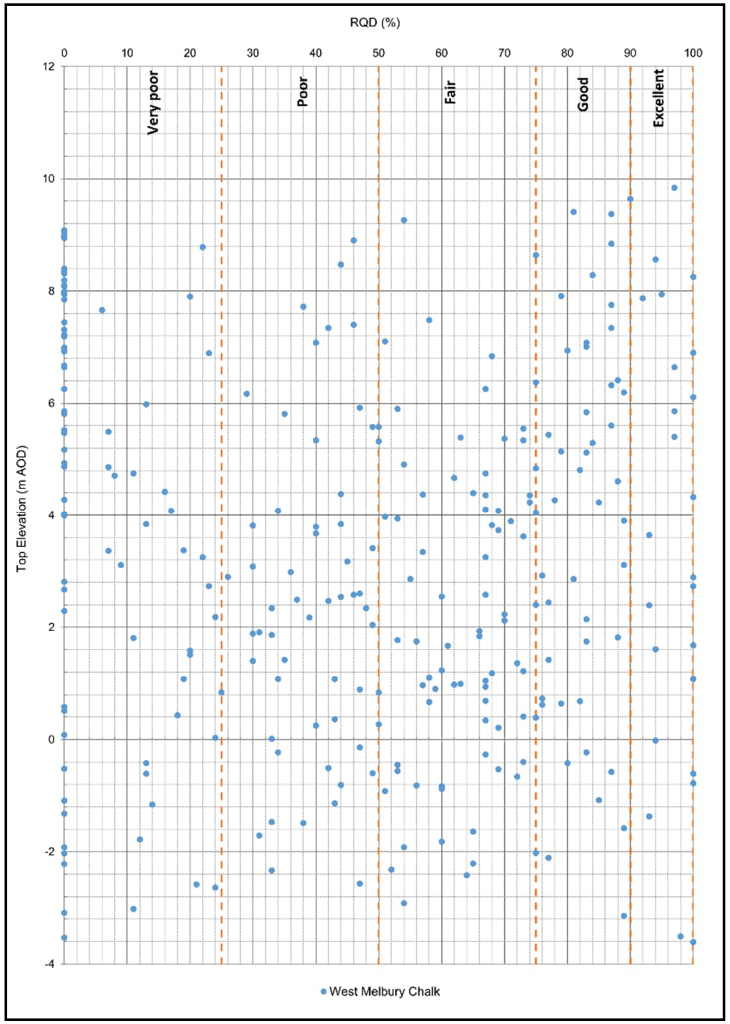


Figure 7.63: SCR records in West Melbury Chalk

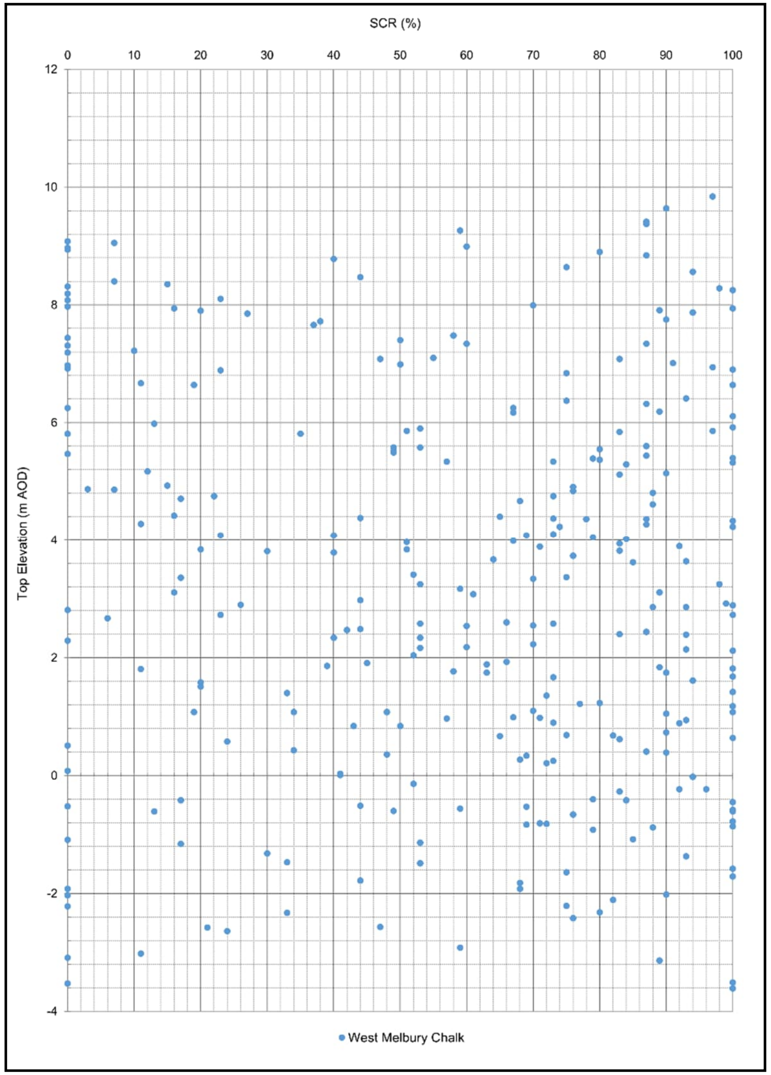


Figure 7.64: TCR records in West Melbury Chalk

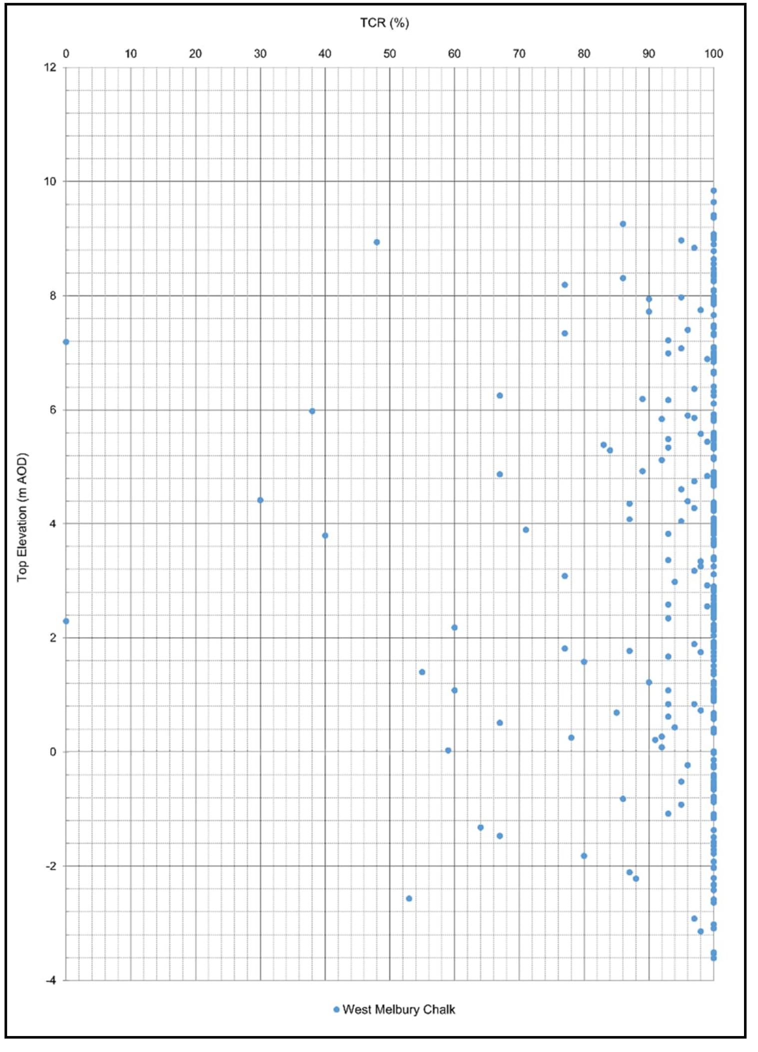
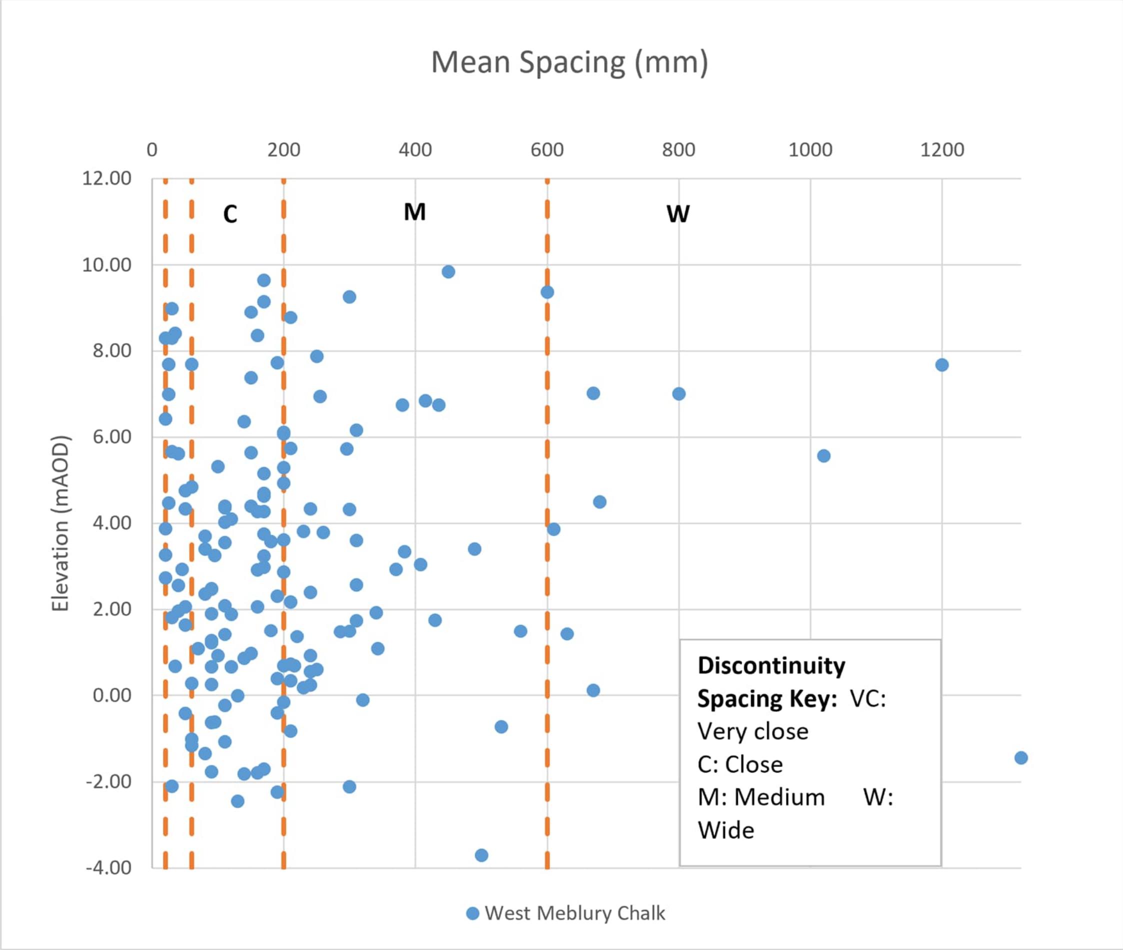


Figure 7.65: Mean Fracture Spacing representation in West Melbury Chalk



B. Risk Register

Note that the Geotechnical Risk Register is a live document and further items may be added during the development of the detailed design.

Cambridge Wastewater Treatment Works (WwTW) relocation
Geotechnical Risk Register

ALL	All items
STW	Plant area
TU_SEW	Sewer tunnel
TU_FE	Final effluent tunnel
SFT	Shafts
ROAD	Access roads
BUND	Earthworks bund

		Impact				
		1	2	3	4	5
Likelihood	1	N	N	N	N	A
	2	N	N	A	A	H
	3	N	A	A	H	S
	4	N	A	H	S	S
	5	A	H	S	S	S

	Hazard	Relevance	Consequence	Impact	Initial Likelihood	Initial Risk	Potential Control Measures	Revised Likelihood	Revised Risk	Progress (%)	Remarks on Interim Risk Mitigation	Group
1	Spatial limitations of existing ground investigations	ALL	Assumptions for design no longer valid, change of concept could mean significant increase in costs	4	5	S	Specify adequate number of exploratory holes both in plan and depth	2	A	100	Knowledge of depth and lateral extent of formations known/ confirmed with preliminary model. Some uncertainties close to the River Cam related to Alluvial deposits A number of boreholes on tunnel alignment are missing.	GEN
2	Uncertainty in extent of chalk layer, risk of weak formation layers	ALL	Damage to structures due to unacceptable magnitude of settlement or uneven settlement	3	4	H	Specify adequate number of exploratory holes both in plan and depth	2	A	100	Mitigated by having enough spatial coverage to confirm that below the proposed location of the works chalk will not outcrop. Location of chalk outcrop identified along the sewer tunnel route (shaft design) and FE route (trench design)	CHALK
3	Underground cavities in chalk due to dissolution, man made voids, frost shatter (glacial)	STW, ROAD	Collapse of void, damage to structures due to uneven settlement	4	2	A	Spatial distribution of boreholes, identify sudden drops in drilling. Geophysical survey to detect anomalies	1	N	100	BH reports no instances of anomalous drops in drilling, geophysical survey (ERT) for coverage of whole area showed no risk of cavities	
4	Presence of different grades of chalk on site, difference in strength or compressibility of founding materials	STW, ROAD	Damage to structures due to uneven settlement Uneconomic design, requirement of deep foundations	4	4	S	Specify adequate number of exploratory holes both in plan and depth, carry out pressuremeter and plate load tests	1	N	100	Based on the results of in-situ and laboratory testing, no clear correlation can be found in the properties of chalk with the change in grades.	
5	Creep settlement of chalk	STW	Damage to structures due to unacceptable magnitude of settlement or uneven settlement Requirement of deep foundations	4	3	H	Carry out appropriate insitu (carry out pressuremeter and plate load tests) and laboratory tests to understand yield stress of chalk.	2	A	100	Creep settlement shall be mitigated by limiting the load below the yield stress of the chalk	
6	Highly jointed/ fractured chalk	STW, TU_FE	Higher deformation of rock mass, unacceptable settlement, Requirement of deep foundations stability problems during excavations Increased flow rate to excavations, increased dewatering requirements	3	4	H	Determination of rock mass properties based on different sources, literature, joint quality and spacing, carry out pressuremeter and plate load tests Understand bulk permeability of Chalk by carrying out appropriate insitu (packer tests, falling head, pumping) tests.	2	A	100	The behaviour of the chalk structure is less dominated by fractures. The intact material is largely heterogenies based on the UCS testing, which provides more significant difference than fracturing, Chalk confirmed as water bearing.	
7	Weak planes or slickensides in chalk	STW, TU_FE	Unstable rock mass during excavation, increased loading on support systems	3	3	A	Assess joint orientation and quality	1	N	100	Rock mass characteristics is less blocky nature	
8	Hard-to-excavate material (High density chalk)	SFT, TU_FE	Difficulties in excavation, slower advance rates, wearing of equipment	2	3	A	Assessment of chalk grades with depth Use of applicable excavation plants	2	N	100	Chalk is classified as high-very high density however with low carbonate content, marly in nature. Excavation difficulties found in few TPs with standard bucket size. First attempt of doing SBP in chalk stuck. Risk can potentially manifest in sporadic locations only	
9	Flint bands in chalk	SFT, TU_FE	Difficulties in excavation, slower advance rates, wearing of equipment	3	2	A	Identifying the locations and thickness of flint bands in boreholes Use of applicable excavation plants	1	N	100	No flint bands were encountered. Only occasional flint gravel.	
10	Uncertainty the Gault Clay/Lower Greensand interface	SFT, TU_SEW	Unexpected face conditions causing difficulties in TBM excavation, significant delays in programme Base failure of deep shafts, significant dewatering requirements	4	3	H	Specify adequate number of exploratory holes both in plan and depth targeting the Gault Clay/Lower Greensand interface	1	N	100	Interface identified with sufficient precision and consistency throughout the alignment.	GAULT CLAY
11	Mudstone bands in Gault Clay	SFT, TU_SEW, TU_FE	Difficulties in excavation, slower advance rates, wearing of equipment	3	4	H	Identifying potential locations of hard strata in boreholes Use of applicable excavation plants	2	A	100	Very rare, and rare siltstone nodules encountered.	
12	High locked-in horizontal stress in Gault Clay	SFT, TU_SEW, TU_FE	Increase in load on tunnels leading to structural failure of the lining	3	4	H	Carry out self-boring pressuremeter test to determine in-situ horizontal stress. Determine OCR from sufficient number of laboratory tests	2	A	100	K0 profile in Gault Clay was determined with accuracy. Designer to take value into account in calculations.	
13	Shrinkage potential of Gault Clay; seasonal fluctuations of moisture content near surface	TU_FE, STW, ROAD	Damage to shallow foundations, shallow buried structures & roads	2	4	A	Design exploratory holes with appropriate spatial coverage to understand Gault Clay outcrop Carry out appropriate laboratory testing to understand swelling potential Understand variation of moisture content with depth Consider depth of foundation levels during the design of structures	2	N	100	Based on laboratory testing Gault Clay exhibits a medium shrinkage potential. No outcrop of Gault Clay at the main site, the structures are proposed to be founded on chalk, only shafts will penetrate the Gault Clay horizon. Since the overlying chalk layer is water-bearing, desiccation of the Gault Clay below the main site is unlikely.	
14	Swelling potential of Gault Clay; decreasing moisture content during water drawdown in excavations & recharge of water table afterwards	SFT, TU_FE	Increased loading on ground support elements after insitu water table is restored	3	4	H	Carry out appropriate laboratory testing to understand swelling potential Understanding water table and the extent of the potential water drawdown from adjacent layers through permeability testing	3	A	100	During a packer test in Gault Clay a notable volume change of the borehole wall was experienced and the hole had to be redrilled Results for swelling pressure tests carried out at natural MC are available for the designer to incorporate into structural loadings. Other mitigation measures shall be implemented where possible to prevent Gault Clay coming in contact with water.	
15	Shrinkage potential of Gault Clay; decreasing moisture content due to heat generation	STW, SFT	Damage to shallow foundations, uneven heave/settlement	2	2	N	Design exploratory holes with appropriate spatial coverage to understand Gault Clay outcrop. Carry out appropriate laboratory testing to understand swelling potential Design of appropriate foundations to heat generating equipment	1	N	100	Refer to No. 13	
16	Gault Clay containing aggressive chemical (sulphates & acids)	SFT, TU_SEW, TU_FE	Chemical attack on buried concrete structures	3	4	H	Chemical analysis of water and soil samples to specify appropriate aggressivity class for concrete for the design	2	A	100	Concrete classes based on BRE SD1 2005 has been assigned. Appropriate mitigation measures corresponding to these classes shall be applied during design.	
17	Corrosive ground	STW	Corrosion of buried steel structures	3	4	H	Chemical analysis of water and soil samples, specify corrosion protection measures	3	A	100	Moderate potential to corrode steel	

18	Confined water/ artesian pressures (Lower Greensand)	TUN_SEW	Unexpected requirement for high fluid balance pressure for TBM, significant delays in programme	2	4	A	Hydrogeological investigation including determination of water pressures, permeability and overall continuity of water	2	N	100	Water head in Lower Greensand confirmed to almost reach, but stay below ground surface. Tunnel route entirely in Gault Clay.	GROUNDWATER
19	Confined water/ artesian pressures (Lower Greensand)	SFT	Base heave, hydraulic failure of deep excavations, uplift of permanent structures	2	4	A	Hydrogeological investigation including determination of water pressures, permeability and overall continuity of water	2	N	100	Water head in Lower Greensand confirmed to almost reach, but stay below ground surface. In shaft design this confined water pressure shall be considered.	
20	Fluctuation of groundwater level due to seasonal changes	SFT, TU_FE	Increased dewatering requirements, flooding/hydraulic failure of excavation bases Increased water pressures on structures	3	3	A	Year-long monitoring of groundwater table to understand seasonal fluctuations of water table	2	A	100	Year-long monitoring complete to provide necessary information for design	
21	Suitability of soils for reuse as earthworks	STW, ROADS, TU_FE	Excessive import of acceptable materials and / or disposal of unacceptable onsite materials.	3	4	H	Schedule appropriate earthworks acceptability testing as part of the ground investigation. Programme earthworks into a season with favourable weather. Consider improvement of onsite soils. Monitoring and testing of soils throughout placement of earthworks.	2	A	100	Chalk confirmed to be able to be reused for earthworks. Trial embankment is recommended	EARTHWORKS
22	Physical properties of locally sourced material are not well understood	BUND	Slope failure of earthworks bund sourced from local material Excessive import material required to achieve envisaged slope angles	3	4	H	Schedule appropriate earthworks testing as per Specification of Highway Works. Programme earthworks into a season with favourable weather. Consider improvement of onsite soils. Monitoring and testing of soils throughout placement of earthworks.	2	A	100	Risk passed to construction contract	
23	Frost susceptible subgrade soils and earthworks from chalk	ROAD, BUND	Damage due to frost heave and frost shattering	3	4	H	Carry out frost heave and frost susceptibility laboratory testing Design of appropriate drainage system to avoid saturation of the foundation soils and subgrade Surface protection or slope reinforcement for structures	3	A	100	Despite low carbonate content and high IDD of chalk the result of frost heave test shows that the material proposed for earthworks is frost-susceptible.	
24	Trafficability problems during construction	ROAD	Delays to programme, damage to equipment	4	3	H	Carry our appropriate laboratory testing to understand physical properties of chalk in relation to its moisture content. Provide strengthened access roads.	2	A	100	In-situ CBR and CBR vs. Moisture content values for compacted samples have been provided. Protect surface during construction. Avoid ponding of water.	SUBGRADE
25	Soft/unacceptable subgrade soils for roads	ROAD	Damage/settlement of access roads, delays in construction	3	3	A	Carry out CBR testing of the subgrade design	2	A	100	In-situ CBR and CBR vs. Moisture content values for compacted samples have been provided. GI doesn't cover access roads, only internal roads are covered Design of suitable drainage system	
26	Unexploded Ordnance	ALL	Potential serious injury to construction workers, damage to plant and / or structures.	5	2	H	Zetica UXO risk map has identified the area as low risk Carry out GPR survey at near surface	1	A	100	Ground investigation did not encounter any indications for the presence of UXO	UXO
27	Presence of made ground on site, potentially scattered locations due to backfill of coprolite mining locations	TU_FE	Unstable ground, potential contaminants	3	3	A	Specify sufficient number of exploratory holes within the suspected area	2	A	100	Made ground encountered in two trial pits at FE alignment. Geo-environmental assessment in separate report.	MADE GROUND/ SUPERFICIAL
28	Presence of soft alluvial soils Presence of Peat or organic matter within alluvial deposits near to River Cam	SFT, TU_FE	Increased pressure on ground support systems High compressibility, and settlement, including creep, lateral movement of soils (outfall structure).	3	3	A	Specify sufficient number of exploratory holes (percussive & hand dug pits) around planned excavations and the outfall Carry out appropriate in-situ (SPT, shear vane) and laboratory testing to understand strength/stiffness of superficial deposits May require dig and replace or extend foundations to competent founding horizon	2	A	100	Peat is identified near the outfall location. Proposed foundation level is deeper than encountered depth. In case found deeper, dig and replace is appropriate due to its expected limited thickness.	
29	Presence of highly permeable soils (e.g. Terrace gravels) near excavations	SFT, TU_FE	Increased flow rate to excavations, increased dewatering requirements	3	4	H	Specify sufficient number of exploratory holes around planned excavations Carry out appropriate in-situ (falling head) and laboratory testing to understand permeability of superficial deposits	3	A	100	Extents of River Terrace Deposits (RTD) identified within geological cross-section. Permeability of RTD is determined for design purposes.	
30	Presence of made ground on existing WRC site (stockpile at Shaft 3)	SFT	Unacceptable location to set up temporary works due to bearing capacity / settlement problems, requirement of relocating or disposing large amount of unclassified ground	2	5	H	Classification of material for disposal or removal or alternative method for shaft sinking	2	N	100	It is recommended that stockpile is removed before shaft sinking. Bulk samples taken from stockpile for laboratory show that the material is not acceptable for earthworks.	
31	Soft bands/horizons or pockets of soft clay within Gault Clay Presence of water bearing layers/veins within clay	TUN	Layers of low strength and stiffness along tunnel alignment can cause difficulties to the construction and increase in support requirements of tunnel and shafts Water ingress to shaft excavation	4	4	S	Additional work required to understand vertical and horizontal extent of local soft soil occurrences	3	H	50	Location of softer Gault Clay identified on the geological cross-sections. Recommended extra GI for compete mitigation.	GAULT CLAY

Additional risks other than geotechnical (not complete, risk definition by others)

	Hazard	Relevance	Consequence	Impact	Likelihood	Current Risk	Potential Control Measures	Residual Likelihood	Residual risk
A	Contaminated land	ALL	By others				Design exploratory holes with appropriate spatial coverage Contaminated land testing. WAC testing	By others	
B	Hydrogeological risks, aquifer vulnerability	ALL	By others				Understand permeability of the Chalk layer by carrying out appropriate insitu (packer, falling head, pumping) tests.	By others	
C	Construction works nearby river	ALL	By others				Conduct a detailed assessment of flooding risk prior to construction works and prepare an action plan. Early warning system. Monitor change in groundwater levels near river.	By others	
D	Construction activities cause damage to exiting buildings and infrastructure	ALL	By others				Conduct ground movement assessment of existing assets Conduct survey of existing infrastructure before construction works Continuous monitoring of sensitive infrastructure	By others	

C. List of Abbreviations

ASTM	American Association of Testing and Materials
ATV	Acoustic Televiewer
AWWA	American Water Works Association
BGS	British Geological Survey
BH	Borehole
BS	British Standard
CBR	California Bearing Ratio
CCTV	Closed Circuit television
CCV	Chalk Crushing Value
CGS	Cambridge Greensand member
CIRIA	Construction industry research and information Association
CU(M)	Consolidated Undrained (Multistage) Triaxial test
CWWTPR(P)	Cambridge Waste Water Treatment Plant Relocation (Project)
DTM	Digital terrain model
ERT	Electrical Resistivity Tomography
FE	Final Effluent
GLT	Gault Clay
GM	Ground Model
HV / HVT	Had Vane Test
IDD	Intact dry density
IP	Inspection Pit
ISO	International organization for standardization

ASTM	American Association of Testing and Materials
LGS	Lower Greensand Formation
LI	Liquidity Index
LL	Liquid Limit
mAOD	Meters above Ordnance Datum
mBGL	Meters below Ground Level
MG	Made Ground
MCV	Moisture Condition Value
NMC / MC	Natural Moisture Content
OCR	Over consolidation ratio
OED	Oedometer
OTV	Optical Televiewer
PI	Plasticity Index
PL	Plastic Limit
PLT	Plate Load Test
PMT	Pressuremeter Test
PSD	Particle Size Distribution
RMSE	Root mean squared error
RTD	River Terrace Deposits
RQD	Rock Quality Designation
SCR	Solid Core Recovery
SEM	Scanning Electron Microscope
SMC	Saturation Moisture Content of Chalk
SoW	Scope of Works report
SPT	Standard Penetration Test
SPZ	Source Protection Zone
STW	Sewer Treatment Works
TCR	Total Core Recovery
TP	Trial Pit

ASTM	American Association of Testing and Materials
TPS	Total Potential Sulphate
TRL	Transport Research Laboratory
TS	Topsoil
TUN	Tunnel (referring to sewer tunnel)
TXL	Triaxial
UCS	Unconfined/Uniaxial Compressive Strength
UU	Unconsolidated Undrained Triaxial test
WMCK	West Melbury Chalk formation
WRC	Water Recycling Center
WWTP	Waste Water Treatment Plant
WWTW	Waste Water Treatment Works
ZOI	Zone of Influence

D. Lab Testing Progress Sheet

The following document was requested from the Engineer and provided by the contractor in order to assist with the monitoring of the progress of lab testing during the period when the lab testing and interpretations for the revisions of this report were ongoing. It is an extract from a spreadsheet that includes information such as all the scheduled test, borehole reference, sample ID and depths along with a status of completed, restricted or outstanding for each item.

LocationID	DepthTop	SampleReference	Sample Type	DepthBase	SampleID	TestName	Status
AMAL1		1	AMAL			K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
AMAL2		1	AMAL			K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
AMAL3		1	AMAL			K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
AMAL4		1	AMAL			K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
AMAL5		1	AMAL			K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
AMAL6		1	AMAL			K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
AMAL7		1	AMAL			K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
AMAL8		1	AMAL			K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
AMAL8		1	AMAL			K3.10 Extra over Item K3.9 for soaking	COMPLETED
AMAL8		1	AMAL			K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
AMAL8		1	AMAL			K1.9 Particle size distribution by wet sieving	COMPLETED
AMAL8		1	AMAL			K1.11 Sedimentation by pipette	COMPLETED
AMAL8		1	AMAL			K1.1 Moisture content	COMPLETED
BH_FE_001	1.1	8	ES	1.2		L1.8 MML UKWIR suite	COMPLETED
BH_FE_001	3	1	EW			L1.3 MML Groundwater Suite	COMPLETED
BH_FE_001	3	2	EW	3		L1.3 MML Groundwater Suite	COMPLETED
BH_FE_001	0.2	2	ES	0.25		L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_FE_001	5.5	12.1	CS	5.77		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_FE_001	4.35	11.1	CS	4.65		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_FE_001	4.35	11.1	CS	4.65		K8.14 Uniaxial compressive strength	RESTRICTED
BH_FE_001	5.5	12.1	CS	5.77		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_FE_001	0.1	3	B	0.4		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_001	0.4	6	B	0.8		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_001	6	13.1	CS	6.24		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_FE_001	15.29	19.2	CS	15.59		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_FE_001	4.35	11.1	CS	4.65		K4.8 Dispersibility by pinhole method	COMPLETED
BH_FE_001	0.8	9	B	1.2		K4.7 Permeability by constant head method	COMPLETED
BH_FE_001	9.41	15.1	CS	9.7		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_FE_001	7.9	14.1	CS	8.13		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_FE_001	0.4	4	D	0.5		K2.1 Organic matter content	COMPLETED
BH_FE_001	0.4	4	D	0.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_001	0.8	9	B	1.2		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_001	6	13.1	CS	6.24		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_001	9.41	15.1	CS	9.7		K1.5 Density by linear measurement	COMPLETED
BH_FE_001	0.1	3	B	0.4		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_001	0.4	4	D	0.5		K1.2 Liquid limit, plastic limit and plasticity index	RESTRICTED
BH_FE_001	7.9	14.1	CS	8.13		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_001	0.4	4	D	0.5		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_001	0.8	9	B	1.2		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_001	6	13.1	CS	6.24		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_001	0.1	3	B	0.4		K1.1 Moisture content	COMPLETED
BH_FE_001	0.4	4	D	0.5		K1.1 Moisture content	COMPLETED
BH_FE_001	7.9	14.1	CS	8.13		K1.1 Moisture content	COMPLETED
BH_FE_001	10.7	16.1	CS	10.9		K1.1 Moisture content	COMPLETED
BH_FE_001	12.2	17.1	CS	12.5		K1.1 Moisture content	COMPLETED
BH_FE_001	14.4	19.1	CS	14.6		K1.1 Moisture content	COMPLETED
BH_FE_001	15.29	19.2	CS	15.59		K1.1 Moisture content	COMPLETED
BH_FE_002	0.5	5	ES	0.55	MD01210812005	L1.8 MML UKWIR suite	COMPLETED
BH_FE_002	4	1	EW			L1.3 MML Groundwater Suite	COMPLETED
BH_FE_002	5	2	EW	5		L1.3 MML Groundwater Suite	COMPLETED
BH_FE_002	0.2	2	ES	0.25	MD01210812002	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_FE_002	5.76	14.1	CS	6.06		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_FE_002	7	15.1	CS	7.3		K8.15 Deformability in uniaxial compression	COMPLETED
BH_FE_002	7	15.1	CS	7.3		K8.14 Uniaxial compressive strength	COMPLETED
BH_FE_002	0.4	6	B	0.8	MD01210812006	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_002	0.8	9	B	1.2	MD01210812009	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_002	5.76	14.1	CS	6.06		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED

BH_FE_002	8.1	15.2	CS	8.3		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_FE_002	5.76	14.1	CS	6.06		K4.8 Dispersibility by pinhole method	RESTRICTED
BH_FE_002	9.3	16.1	CS	9.6		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_FE_002	5.76	14.1	CS	6.06		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_FE_002	1.2	10.1	CD	1.38		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_002	3.88	13.1	CD	3.99		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_002	2.42	21.1	CD	2.52		K1.8 Particle density by gas jar or pycnometer	COMPLETED
BH_FE_002	2.08	11.1	CD	2.18		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_002	9.3	16.1	CS	9.6		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_002	1.2	10.1	CD	1.38		K1.12 Sedimentation by hydrometer	COMPLETED
BH_FE_002	3.88	13.1	CD	3.99		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_002	2.08	11.1	CD	2.18		K1.1 Moisture content	COMPLETED
BH_FE_002	9.3	16.1	CS	9.6		K1.1 Moisture content	COMPLETED
BH_FE_002	5.76	14.1	CS	6.06		Dispersibility by crumb method	COMPLETED
BH_FE_003	0.5	5	ES	0.55	MD01210813005	L1.8 MML UKWIR suite	COMPLETED
BH_FE_003	0.2	2	ES	0.25	MD01210813002	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_FE_003	6.73	14.2	CS	7.03		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_FE_003	7.78	15.1	CS	8.08		K8.15 Deformability in uniaxial compression	COMPLETED
BH_FE_003	7.78	15.1	CS	8.08		K8.14 Uniaxial compressive strength	COMPLETED
BH_FE_003	5	13.1	CS	5.3		K6.16 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression without the measurement of pore pressure	COMPLETED
BH_FE_003	0.4	6	B	0.8	MD01210813006	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_003	0.8	9	B	1.2	MD01210813009	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_003	3.87	12.1	CS	4.17		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_FE_003	8.5	15.2	CS	8.69		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_FE_003	3.87	12.1	CS	4.17		K4.8 Dispersibility by pinhole method	RESTRICTED
BH_FE_003	6	14.1	CS	6.3		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_FE_003	6	14.1	CS	6.3		K2.14 Redox potential	COMPLETED
BH_FE_003	3.87	12.1	CS	4.17		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_003	7.78	15.1	CS	8.08		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_003	9.21	16.1	CS	9.35		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_003	2.04	11.1	CD	2.14		K1.5 Density by linear measurement	COMPLETED
BH_FE_003	2.04	11.1	CD	2.14		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_003	6.73	14.2	CS	7.03		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_003	8.5	15.2	CS	8.69		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_003	3.87	12.1	CS	4.17		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_003	7.78	15.1	CS	8.08		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_003	9.21	16.1	CS	9.35		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_004A	4.5	13.1	CS	4.82		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_FE_004A	12.64	18.1	CS	12.8		K8.15 Deformability in uniaxial compression	COMPLETED
BH_FE_004A	12.64	18.1	CS	12.8		K8.14 Uniaxial compressive strength	COMPLETED
BH_FE_004A	5.8	13.2	CS	6		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_FE_004A	1.51	10.1	CS	1.69		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_FE_004A	0.4	5	B	0.8		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_004A	0.8	7	B	1.2		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_004A	6.5	14.1	CS	6.82		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_FE_004A	9.25	16.1	CS	9.56		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_FE_004A	11.12	17.1	CS	11.27		K4.9 Dispersibility by crumb method	COMPLETED
BH_FE_004A	11.12	17.1	CS	11.27		K4.8 Dispersibility by pinhole method	COMPLETED
BH_FE_004A	13.5	19.1	CS	13.8		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_FE_004A	4.5	13.1	CS	4.82		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_004A	6.5	14.1	CS	6.82		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_004A	7	14.2	CS	7.27		K1.6 Density by immersion in water or water displacement	RESTRICTED
BH_FE_004A	3.5	12.1	CD	3.61		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_004A	4.5	13.1	CS	4.82		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_004A	9.25	16.1	CS	9.56		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_004A	4.5	13.1	CS	4.82		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_004A	6.5	14.1	CS	6.82		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_005	8.45	15.1	CS	8.65		X-ray diffraction BS EN 13925-3:2005	COMPLETED

BH_FE_005	0.5	5	ES	0.55	MD01210810007	L1.8 MML UKWIR suite	COMPLETED
BH_FE_005	0.2	2	ES	0.25	MD01210810004	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_FE_005	8.45	15.1	CS	8.65		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_FE_005	2.52	11.1	CS	2.82		K8.15 Deformability in uniaxial compression	COMPLETED
BH_FE_005	2.52	11.1	CS	2.82		K8.14 Uniaxial compressive strength	COMPLETED
BH_FE_005	5	13.1	CS	5.18		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_FE_005	4.1	12.2	CS	4.32		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_FE_005	3.87	12.1	CS	4		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_FE_005	0.4	6	B	0.8	MD01210810008	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_005	0.4	7	B	0.8	MD01210810009	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_005	0.8	9	B	1.2	MD01210810011	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_005	9.05	16.1	CS	9.24		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_FE_005	13.41	19.1	CS	13.89		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_005	12.08	18.1	CS	12.26		K4.9 Dispersibility by crumb method	COMPLETED
BH_FE_005	12.08	18.1	CS	12.26		K4.8 Dispersibility by pinhole method	COMPLETED
BH_FE_005	8.45	15.1	CS	8.65		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_FE_005	0.1	3	B	0.4	MD01210810005	K2.2 Mass loss on ignition	COMPLETED
BH_FE_005	0.4	6	B	0.8	MD01210810008	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_005	1	8	D	1.1	MD01210810010	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_005	6.4	13.2	CD	6.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_005	0.4	4	D	0.5	MD01210810006	K1.6 Density by immersion in water or water displacement	COMPLETED
BH_FE_005	10.76	17.1	CS	11		K1.6 Density by immersion in water or water displacement	COMPLETED
BH_FE_005	0.05	1	D	0.1	MD01210810003	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_005	0.1	3	B	0.4	MD01210810005	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_005	0.4	6	B	0.8	MD01210810008	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_005	1.3	10.1	CD	1.4		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_005	7.8	14.1	CD	7.9		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_005	9.05	16.1	CS	9.24		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_005	0.4	6	B	0.8	MD01210810008	K1.11 Sedimentation by pipette	COMPLETED
BH_FE_005	1	8	D	1.1	MD01210810010	K1.11 Sedimentation by pipette	COMPLETED
BH_FE_005	6.4	13.2	CD	6.5		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_005	0.05	1	D	0.1	MD01210810003	K1.1 Moisture content	COMPLETED
BH_FE_005	0.1	3	B	0.4	MD01210810005	K1.1 Moisture content	COMPLETED
BH_FE_005	0.4	6	B	0.8	MD01210810008	K1.1 Moisture content	COMPLETED
BH_FE_005	1.3	10.1	CD	1.4		K1.1 Moisture content	COMPLETED
BH_FE_005	7.8	14.1	CD	7.9		K1.1 Moisture content	COMPLETED
BH_FE_005	9.05	16.1	CS	9.24		K1.1 Moisture content	COMPLETED
BH_FE_005	13.41	19.1	CS	13.89		K1.1 Moisture content	COMPLETED
BH_FE_005	14.5	20.1	CS	14.7		K1.1 Moisture content	COMPLETED
BH_FE_006	4.49	12.1	CS	4.72		K8.15 Deformability in uniaxial compression	COMPLETED
BH_FE_006	4.49	12.1	CS	4.72		K8.14 Uniaxial compressive strength	COMPLETED
BH_FE_006	7.3	14.1	CS	7.5		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_FE_006	5.6	13.1	CS	5.9		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_FE_006	8.26	15.1	CS	8.56		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_FE_006	0.1	3	B	0.4	MD01210809003	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_006	0.4	6	B	0.8	MD01210809006	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_006	0.8	9	B	1.2	MD01210809009	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_FE_006	3.1	11.2	CS	3.38		K4.8 Dispersibility by pinhole method	RESTRICTED
BH_FE_006	3.1	11.2	CS	3.38		K4.10 Dispersibility by dispersion method	COMPLETED
BH_FE_006	2.4	11.1	CS	2.62		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_FE_006	1.5	10.1	CD	1.6		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_FE_006	0.1	3	B	0.4	MD01210809003	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_FE_006	0.4	6	B	0.8	MD01210809006	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_FE_006	0.8	9	B	1.2	MD01210809009	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_FE_006	1.5	10.1	CD	1.6		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_FE_006	1.5	10.1	CD	1.6		K1.11 Sedimentation by pipette	COMPLETED
BH_FE_006	1.5	10.1	CD	1.6		K1.1 Moisture content	COMPLETED
BH_OUT_001	1.1	8	ES	1.2		L1.8 MML UKWIR suite	COMPLETED

BH_OUT_001	0.5	5	ES	0.55		L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_OUT_001	4.1	12.1	CD	4.2		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_OUT_001	10.36	17.1	CS	10.66		K8.15 Deformability in uniaxial compression	COMPLETED
BH_OUT_001	10.36	17.1	CS	10.66		K8.14 Uniaxial compressive strength	COMPLETED
BH_OUT_001	12.55	18.1	CS	12.85		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_OUT_001	0.4	6	B	0.8		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_OUT_001	0.8	9	B	1.2		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_OUT_001	5.91	14.1	CS	6.21		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_OUT_001	10.36	17.1	CS	10.66		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_OUT_001	16.25	21.1	CS	16.5		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_OUT_001	5.91	14.1	CS	6.21		K4.9 Dispersibility by crumb method	COMPLETED
BH_OUT_001	5.91	14.1	CS	6.21		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_OUT_001	16.25	21.1	CS	16.5		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_OUT_001	2.2	10.1	CD	2.3		K2.6 Carbonate content by rapid titration	COMPLETED
BH_OUT_001	0.4	6	B	0.8		K2.1 Organic matter content	COMPLETED
BH_OUT_001	0.8	9	B	1.2		K2.1 Organic matter content	COMPLETED
BH_OUT_001	2.2	10.1	CD	2.3		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001	3.2	11.1	CD	3.3		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001	7.2	15.1	CD	7.3		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001	18	22.1	CD	18.1		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001	4.1	12.1	CD	4.2		K1.6 Density by immersion in water or water displacement	COMPLETED
BH_OUT_001	8.7	16.1	CD	8.8		K1.6 Density by immersion in water or water displacement	COMPLETED
BH_OUT_001	0.4	6	B	0.8		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001	0.8	9	B	1.2		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001	2.2	10.1	CD	2.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001	3.2	11.1	CD	3.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001	5	13.1	CD	5.1		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001	7.2	15.1	CD	7.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001	18	22.1	CD	18.1		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001	2.2	10.1	CD	2.3		K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001	3.2	11.1	CD	3.3		K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001	7.2	15.1	CD	7.3		K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001	18	22.1	CD	18.1		K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001	2.2	10.1	CD	2.3		K1.1 Moisture content	COMPLETED
BH_OUT_001	3.2	11.1	CD	3.3		K1.1 Moisture content	COMPLETED
BH_OUT_001	5	13.1	CD	5.1		K1.1 Moisture content	COMPLETED
BH_OUT_001	7.2	15.1	CD	7.3		K1.1 Moisture content	COMPLETED
BH_OUT_001	18	22.1	CD	18.1		K1.1 Moisture content	COMPLETED
BH_STW_001	8	1	EW	8		L1.3 MML Groundwater Suite	COMPLETED
BH_STW_001	0.3	1	ES	0.35	SE31210719001	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_001	3	9.1	CD	3.13		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_001	7.34	13.1	CD	7.44		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_001	4.54	10.1	CS	4.7		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_003A	0.5	5	ES	0.55	SE36210827005	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_003A	1.34	10.1	CS	1.46		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_003A	1.34	10.1	CS	1.46		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_003A	4.84	13.1	CS	5		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_STW_003A	3.59	12.1	CS	3.92		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_003A	5.78	14.1	CS	6		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_003A	1.9	11.1	CS	2.03		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_003A	4.84	13.1	CS	5		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_STW_003A	8.02	15.1	CS	8.19		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_003A	1.9	11.1	CS	2.03		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_003A	4.84	13.1	CS	5		K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_003A	4.84	13.1	CS	5		K2.4 Sulphate content of water extract from soil	RESTRICTED
BH_STW_003A	4.84	13.1	CS	5		K2.3 Sulphate content of acid extract from soil	RESTRICTED
BH_STW_003A	4.84	13.1	CS	5		K2.10 Total sulphur content	RESTRICTED
BH_STW_003A	9.9	16.1	CS	10		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED

BH_STW_003A	6.84	14.2	CS	7		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_003A	9.9	16.1	CS	10		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_003A	6.84	14.2	CS	7		K1.1 Moisture content	COMPLETED
BH_STW_004	0.2	2	ES	0.25	SE36210805031	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_004	4.55	13.1	CS	4.85		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_004	6.45	14.1	CS	6.75		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_004	9.25	16.1	CS	9.47		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_004	4.55	13.1	CS	4.85		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_004	6.45	14.1	CS	6.75		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_004	9.25	16.1	CS	9.47		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_004	8.4	15.2	CS	8.62		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_004	10.32	17.1	CS	10.5		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
BH_STW_004	5.21	13.2	CS	5.45		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_004	10.32	17.1	CS	10.5		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_STW_004	11.1	17.2	CS	11.4		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_004	12.9	19.1	CS	13.14		K4.9 Dispersibility by crumb method	COMPLETED
BH_STW_004	7.44	15.1	CS	7.58		K4.8 Dispersibility by pinhole method	COMPLETED
BH_STW_004	12.9	19.1	CS	13.14		K4.8 Dispersibility by pinhole method	COMPLETED
BH_STW_004	7.44	15.1	CS	7.58		K4.10 Dispersibility by dispersion method	COMPLETED
BH_STW_004	1.9	11.1	CS	2.08		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_004	4.55	13.1	CS	4.85		K2.6 Carbonate content by rapid titration	RESTRICTED
BH_STW_004	3.2	12.1	CS	3.3		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_004	3.2	12.1	CD	3.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_004	4.55	13.1	CS	4.85		K1.2 Liquid limit, plastic limit and plasticity index	RESTRICTED
BH_STW_004	14.6	20.1	CS	14.9		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_004	3.2	12.1	CS	3.3		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_005A	5.85	13.1	CS	6.04		Uniaxial compressive strength	COMPLETED
BH_STW_005A	21.9	24.1	CS	22.2		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_005A	2.58	11.1	CS	2.9		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_005A	8.02	14.2	CS	8.17		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_005A	2.58	11.1	CS	2.9		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_005A	8.02	14.2	CS	8.17		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_005A	5.85	13.1	CS	6.04		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_STW_005A	12.75	18.1	CS	13		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_005A	9.2	15.1	CS	9.4		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_005A	4.84	12.2	CS	5.11		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_STW_005A	15.2	19.2	CS	15.5		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_005A	4.84	12.2	CS	5.11		K4.9 Dispersibility by crumb method	COMPLETED
BH_STW_005A	11.2	17.1	CS	11.3		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_STW_005A	3.92	12.1	CS	4.2		K4.10 Dispersibility by dispersion method	COMPLETED
BH_STW_005A	3.92	12.1	CS	4.2		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_005A	6.92	14.1	CS	7.2		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_005A	18.2	21.2	CS	18.48		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_005A	6.92	14.1	CS	7.2		K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_005A	16.05	20.1	CS	16.2		K2.14 Redox potential	COMPLETED
BH_STW_005A	20.38	23.1	CS	20.64		K2.14 Redox potential	COMPLETED
BH_STW_005A	25.28	26.1	CS	25.6		K2.12 pH values	COMPLETED
BH_STW_005A	0.8	6	B	1.2		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_005A	11.2	17.1	CS	11.3		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_005A	17.2	21.1	CS	17.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_005A	26.99	27.1	CS	27.2		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_005A	6.92	14.1	CS	7.2		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_005A	17.2	21.1	CS	17.5		K1.6 Density by immersion in water or water displacement	COMPLETED
BH_STW_005A	10.36	16.1	CS	10.53		K1.5 Density by linear measurement	COMPLETED
BH_STW_005A	12.75	18.1	CS	13		K1.5 Density by linear measurement	COMPLETED
BH_STW_005A	0.8	6	B	1.2		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_005A	2.58	11.1	CS	2.9		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_005A	14.3	19.1	CS	14.56		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED

BH_STW_005A	19.25	22.1	CS	19.38		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_005A	23.65	25.1	CS	23.95		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_005A	28.4	28.1	CS	28.7		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_005A	0.8	6	B	1.2		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_005A	11.2	17.1	CS	11.3		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_005A	17.2	21.1	CS	17.5		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_005A	26.99	27.1	CS	27.2		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_005A	1	5	D	1.1		K1.1 Moisture content	COMPLETED
BH_STW_005A	12.75	18.1	CS	13		K1.1 Moisture content	COMPLETED
BH_STW_005A	16.05	20.1	CS	16.2		K1.1 Moisture content	COMPLETED
BH_STW_005A	18.2	21.2	CS	18.48		K1.1 Moisture content	COMPLETED
BH_STW_005A	21.9	24.1	CS	22.2		K1.1 Moisture content	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K3.8 Chalk crushing value	RESTRICTED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K3.8 Chalk crushing value	RESTRICTED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K2.12 pH values	COMPLETED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K2.12 pH values	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_005B	0.9	7	D	0.9	SE26210906007	K1.1 Moisture content	COMPLETED
BH_STW_005B	1	9	B	1.2	SE26210906009	K1.1 Moisture content	COMPLETED
BH_STW_005B	1.2	10	D	1.65	SE26210906010	K1.1 Moisture content	COMPLETED
BH_STW_005B	1.2	11	B	1.7	SE26210906011	K1.1 Moisture content	COMPLETED
BH_STW_005B	2	12	D	2	SE26210906012	K1.1 Moisture content	COMPLETED
BH_STW_005B	2.2	13	D	2.65	SE26210906013	K1.1 Moisture content	COMPLETED
BH_STW_005B	2.2	14	B	2.7	SE26210906014	K1.1 Moisture content	COMPLETED
BH_STW_005B	3	15	D	3	SE26210906015	K1.1 Moisture content	COMPLETED
BH_STW_005B	3.2	16	D	3.65	SE26210906016	K1.1 Moisture content	COMPLETED
BH_STW_005B	3.2	17	B	3.7	SE26210906017	K1.1 Moisture content	RESTRICTED
BH_STW_005B	4.2	19	D	4.65	SE26210906019	K1.1 Moisture content	COMPLETED
BH_STW_005B	4.2	20	B	4.7	SE26210906020	K1.1 Moisture content	COMPLETED
BH_STW_005B	5	21	D	5	SE26210906021	K1.1 Moisture content	COMPLETED
BH_STW_005B	5.2	22	D	5.65	SE26210906022	K1.1 Moisture content	COMPLETED
BH_STW_005B	5.2	23	B	5.7	SE26210906023	K1.1 Moisture content	COMPLETED
BH_STW_006	5.65	13.1	CS	5.8		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_006	9.48	15.2	CS	9.73		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_006	5.65	13.1	CS	5.8		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_006	9.48	15.2	CS	9.73		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_006	3.2	11.1	CS	3.5		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_006	10.14	16.1	CS	10.36		K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_006	1.8	10.1	CS	1.98		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_006	4.15	12.1	CS	4.45		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_006	9	15.1	CS	9.16		K1.5 Density by linear measurement	COMPLETED
BH_STW_007	9.1	16.2	CS	9.29		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED

BH_STW_007	8.3	16.1	CS	8.5		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_007	6	14.2	CD	6.1		K4.8 Dispersibility by pinhole method	COMPLETED
BH_STW_007	10.6	17.1	CS	10.94		K4.8 Dispersibility by pinhole method	COMPLETED
BH_STW_007	0.8	9	B	1.2		K4.7 Permeability by constant head method	COMPLETED
BH_STW_007	6	14.2	CD	6.1		K4.10 Dispersibility by dispersion method	COMPLETED
BH_STW_007	10.6	17.1	CS	10.94		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_007	0.8	9	B	1.2		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_007	4.15	13.1	CD	4.29		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_007	2.1	12.1	CD	2.2		K1.6 Density by immersion in water or water displacement	COMPLETED
BH_STW_007	10.6	17.1	CS	10.94		K1.6 Density by immersion in water or water displacement	COMPLETED
BH_STW_007	14.17	20.1	CS	14.53		K1.5 Density by linear measurement	COMPLETED
BH_STW_007	3.16	12.2	CD	3.25		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_007	8.3	16.1	CS	8.5		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_007	12.17	18.1	CS	12.35		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_007	0.8	9	B	1.2		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_007	4.15	13.1	CD	4.29		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_007	3.16	12.2	CD	3.25		K1.1 Moisture content	COMPLETED
BH_STW_007	8.3	16.1	CS	8.5		K1.1 Moisture content	COMPLETED
BH_STW_007	12.17	18.1	CS	12.35		K1.1 Moisture content	COMPLETED
BH_STW_009	10	1	EW	10		L1.3 MML Groundwater Suite	COMPLETED
BH_STW_009	1.1	8	ES	1.2	SE38210729008	L1.2 MML Leachate Suite	COMPLETED
BH_STW_009	1.1	8	ES	1.2	SE38210729008	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_009	29.47	28.1	CS	29.82		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_009	2.5	10.1	CS	2.7		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_009	15.43	19.1	CS	15.73		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_009	2.5	10.1	CS	2.7		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_009	15.43	19.1	CS	15.73		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_009	7.98	14.1	CS	8.12		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_009	5.71	12.1	CS	5.91		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_009	3.7	11.1	CS	3.85		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_STW_009	13.24	17.1	CS	13.5		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_009	26.78	26.1	CS	27		K4.8 Dispersibility by pinhole method	COMPLETED
BH_STW_009	2	9.1	CS	2.2		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_009	11.86	16.1	CS	12.1		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_009	15.43	19.1	CS	15.73		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_009	27.79	27.1	CS	28.09		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_009	4.53	11.2	CS	4.66		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_009	8.67	14.2	CS	8.88		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_009	10.57	15.2	CS	10.7		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_009	24.9	25.1	CS	25.2		K2.14 Redox potential	COMPLETED
BH_STW_009	6.95	13.1	CS	7.2		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_009	23.5	24.2	CS	23.8		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_009	4.53	11.2	CS	4.66		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_009	8.67	14.2	CS	8.88		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_009	16.94	20.1	CS	17.2		K1.6 Density by immersion in water or water displacement	COMPLETED
BH_STW_009	15.43	19.1	CS	15.73		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_009	20.2	22.1	CS	20.5		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_009	22.9	24.1	CS	23.2		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_009	29.47	28.1	CS	29.82		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_009	6.95	13.1	CS	7.2		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_009	23.5	24.2	CS	23.8		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_009	6.95	13.1	CS	7.2		K1.1 Moisture content	COMPLETED
BH_STW_009	10.57	15.2	CS	10.7		K1.1 Moisture content	COMPLETED
BH_STW_009	13.24	17.1	CS	13.5		K1.1 Moisture content	COMPLETED
BH_STW_009	17.46	21.1	CS	17.76		K1.1 Moisture content	COMPLETED
BH_STW_009	21.55	23.1	CS	21.8		K1.1 Moisture content	COMPLETED
BH_STW_009	24.9	25.1	CS	25.2		K1.1 Moisture content	COMPLETED
BH_STW_010A	21.95	21.1	CS	22.2		X-ray diffraction BS EN 13925-3:2005	COMPLETED

BH_STW_010A	25.2	23.1	CS	25.38		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_010A	17.49	18.1	CS	17.78		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_010A	28.54	25.1	CS	28.7		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_010A	17.49	18.1	CS	17.78		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_010A	28.54	25.1	CS	28.7		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_010A	3.42	9.1	CS	3.73		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_010A	12.94	15.1	CS	13.2		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_010A	15.88	17.1	CS	16.16		K7.1 Consolidated undrained triaxial compression test with measurement of pore pressure (set of three 38 mm specimens), test duration not exceeding 4 days per specime	COMPLETED
BH_STW_010A	9.41	13.1	CS	9.73		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_010A	23.81	22.1	CS	24.03		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_010A	5.95	10.2	CS	6.2		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_010A	11.53	14.1	CS	11.62		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_010A	14.71	16.2	CS	14.91		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_010A	29.73	26.1	CS	29.97		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_010A	26.61	24.1	CS	26.95		K4.9 Dispersibility by crumb method	COMPLETED
BH_STW_010A	18.82	19.1	CS	19.06		K4.8 Dispersibility by pinhole method	COMPLETED
BH_STW_010A	20.65	20.1	CS	20.95		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_STW_010A	6.87	11.1	CS	7.05		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_010A	29.73	26.1	CS	29.97		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_010A	25.2	23.1	CS	25.38		K2.14 Redox potential	COMPLETED
BH_STW_010A	21.95	21.1	CS	22.2		K2.12 pH values	COMPLETED
BH_STW_010A	28.54	25.1	CS	28.7		K2.12 pH values	COMPLETED
BH_STW_010A	8.5	12.2	CS	8.66		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_010A	14.71	16.2	CS	14.91		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_010A	8.5	12.2	CS	8.66		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_STW_010A	10.7	13.2	CS	10.81		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_STW_010A	7.61	12.1	CD	7.7		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_010A	10.7	13.2	CS	10.81		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_010A	13.89	16.1	CS	14.21		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_010A	8.5	12.2	CS	8.66		K1.11 Sedimentation by pipette	RESTRICTED
BH_STW_010A	14.71	16.2	CS	14.91		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_010A	7.61	12.1	CD	7.7		K1.1 Moisture content	COMPLETED
BH_STW_010A	12.94	15.1	CS	13.2		K1.1 Moisture content	COMPLETED
BH_STW_010B	22.5	46	B	23	SE26211005009	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
BH_STW_010B	22.5	46	B	23	SE26211005009	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_010B	5.5	18	B	6	SE24211001018	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_STW_010B	11.4	29	D	11.4	SE26211004009	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_STW_010B	13.5	34	B	14	SE26211004014	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_010B	28.5	54	B	29	SE26211005018	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_010B	5.5	18	B	6	SE24211001018	K3.9 California Bearing Ratio on recompacted disturbed sample	RESTRICTED
BH_STW_010B	13.5	34	B	14	SE26211004014	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
BH_STW_010B	5.5	18	B	6	SE24211001018	K3.8 Chalk crushing value	RESTRICTED
BH_STW_010B	11.4	29	D	11.4	SE26211004009	K3.8 Chalk crushing value	RESTRICTED
BH_STW_010B	18	40	B	18.5	SE26211005003	K3.7 Moisture Condition Value/moisture content relationship	COMPLETED
BH_STW_010B	25.5	50	B	26	SE26211005014	K3.7 Moisture Condition Value/moisture content relationship	COMPLETED
BH_STW_010B	18	40	B	18.5	SE26211005003	K3.6 Moisture Condition Value at natural moisture content	COMPLETED
BH_STW_010B	25.5	50	B	26	SE26211005014	K3.6 Moisture Condition Value at natural moisture content	COMPLETED
BH_STW_010B	5.5	18	B	6	SE24211001018	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	RESTRICTED
BH_STW_010B	13.5	34	B	14	SE26211004014	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
BH_STW_010B	22.5	46	B	23	SE26211005009	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
BH_STW_010B	5.5	18	B	6	SE24211001018	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_STW_010B	11.4	29	D	11.4	SE26211004009	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
BH_STW_010B	13.5	34	B	14	SE26211004014	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_STW_010B	28.5	54	B	29	SE26211005018	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_STW_010B	5.5	18	B	6	SE24211001018	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_010B	11.4	29	D	11.4	SE26211004009	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_010B	13.5	34	B	14	SE26211004014	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_010B	22.5	46	B	23	SE26211005009	K1.9 Particle size distribution by wet sieving	COMPLETED

BH_STW_010B	28.5	54	B	29	SE26211005018	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_010B	5.5	18	B	6	SE24211001018	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_010B	11.4	29	D	11.4	SE26211004009	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_010B	13.5	34	B	14	SE26211004014	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_010B	22.5	46	B	23	SE26211005009	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_010B	28.5	54	B	29	SE26211005018	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_010B	5.5	18	B	6	SE24211001018	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_010B	11.4	29	D	11.4	SE26211004009	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_010B	13.5	34	B	14	SE26211004014	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_010B	22.5	46	B	23	SE26211005009	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_010B	28.5	54	B	29	SE26211005018	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_010B	5.5	18	B	6	SE24211001018	K1.1 Moisture content	COMPLETED
BH_STW_010B	11.4	29	D	11.4	SE26211004009	K1.1 Moisture content	COMPLETED
BH_STW_010B	13.5	34	B	14	SE26211004014	K1.1 Moisture content	COMPLETED
BH_STW_010B	22.5	46	B	23	SE26211005009	K1.1 Moisture content	COMPLETED
BH_STW_010B	28.5	54	B	29	SE26211005018	K1.1 Moisture content	COMPLETED
BH_STW_011A	10.97	17.1	CS	11.27		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_011A	19.18	22.1	CS	19.5		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_011A	10.97	17.1	CS	11.27		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_011A	19.18	22.1	CS	19.5		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_011A	4.75	13.1	CS	5.05		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_011A	16.9	21.1	CS	17.28		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_011A	9.3	16.1	CS	9.58		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
BH_STW_011A	1.65	10.1	CS	1.8		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_STW_011A	20.3	23.1	CS	20.59		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_011A	6.43	14.1	CS	6.63		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_011A	0.8	9	B	1.2	SE38210901009	K3.8 Chalk crushing value	RESTRICTED
BH_STW_011A	7.45	14.2	CS	7.7		K3.8 Chalk crushing value	RESTRICTED
BH_STW_011A	1	7	D	1.1	SE38210901007	K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_011A	9.3	16.1	CS	9.58		K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_011A	14.9	19.1	CS	15.2		K2.14 Redox potential	COMPLETED
BH_STW_011A	7.45	14.2	CS	7.7		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_011A	8.72	15.1	CD	8.82		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_011A	9.94	16.2	CS	10.13		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_011A	11.84	17.2	CS	12.2		K1.5 Density by linear measurement	COMPLETED
BH_STW_011A	26.2	27.1	CS	26.5		K1.5 Density by linear measurement	COMPLETED
BH_STW_011A	22.4	24.1	CS	22.6		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_011A	29.83	29.1	CS	30.09		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_011A	7.45	14.2	CS	7.7		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_011A	24.2	26.1	CS	24.38		K1.1 Moisture content	COMPLETED
BH_STW_011A	27.7	28.1	CS	27.99		K1.1 Moisture content	COMPLETED
BH_STW_011B	7.2	26	B	7.7	SE26210916017	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
BH_STW_011B	7.2	26	B	7.7	SE26210916017	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_011B	4.2	17	B	4.7	SE26210916008	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_STW_011B	4.2	17	B	4.7	SE26210916008	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
BH_STW_011B	4.2	17	B	4.7	SE26210916008	K3.8 Chalk crushing value	RESTRICTED
BH_STW_011B	7.2	26	B	7.7	SE26210916017	K3.8 Chalk crushing value	COMPLETED
BH_STW_011B	4.2	17	B	4.7	SE26210916008	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
BH_STW_011B	7.2	26	B	7.7	SE26210916017	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
BH_STW_011B	4.2	17	B	4.7	SE26210916008	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_STW_011B	4.2	17	B	4.7	SE26210916008	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_011B	7.2	26	B	7.7	SE26210916017	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_011B	4.2	17	B	4.7	SE26210916008	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_011B	7.2	26	B	7.7	SE26210916017	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_011B	4.2	17	B	4.7	SE26210916008	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_011B	7.2	26	B	7.7	SE26210916017	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_011B	4.2	17	B	4.7	SE26210916008	K1.1 Moisture content	COMPLETED
BH_STW_011B	7.2	26	B	7.7	SE26210916017	K1.1 Moisture content	COMPLETED

BH_STW_012A	0.2	2	ES	0.2	SE38210810002	L2.1 MML full WAC Suite	COMPLETED
BH_STW_012A	0.2	2	ES	0.2	SE38210810002	L1.2 MML Leachate Suite	COMPLETED
BH_STW_012A	0.2	2	ES	0.2	SE38210810002	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_012A	5.2	13.1	CS	5.4		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_012A	15.5	20.1	CS	15.7		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_012A	5.2	13.1	CS	5.4		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_012A	15.5	20.1	CS	15.7		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_012A	3.35	11.2	CS	3.57		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_012A	11.5	17.1	CS	11.8		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_012A	2.43	11.1	CS	2.64		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_012A	8.83	15.1	CS	9.01		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_012A	14	19.1	CS	14.3		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_012A	19.5	22.1	CS	19.74		K4.8 Dispersibility by pinhole method	COMPLETED
BH_STW_012A	1.7	10.1	CS	2		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_012A	6.2	14.1	CS	6.5		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_012A	17.56	21.1	CS	17.8		K2.14 Redox potential	COMPLETED
BH_STW_012A	3.9	12.1	CS	4.07		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_012A	11.5	17.1	CS	11.8		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_012A	17.56	21.1	CS	17.8		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_012A	1.7	10.1	CS	2		K1.5 Density by linear measurement	COMPLETED
BH_STW_012A	3.35	11.2	CS	3.57		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_012A	10.2	16.2	CS	10.35		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_012A	14	19.1	CS	14.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_012A	20.85	23.1	CS	21.08		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_012A	3.9	12.1	CS	4.07		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_012A	11.5	17.1	CS	11.8		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_012A	17.56	21.1	CS	17.8		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_012A	3.9	12.1	CS	4.07		K1.1 Moisture content	COMPLETED
BH_STW_012A	9.8	16.1	CS	10		K1.1 Moisture content	COMPLETED
BH_STW_012A	22.5	24.1	CS	22.8		K1.1 Moisture content	COMPLETED
BH_STW_013A	0.5	4	ES	0.5	SE36210813005	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_013A	11.2	15.1	CS	11.5		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_013A	22.6	23.1	CS	22.87		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_013A	2.85	9.1	CS	3		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_013A	8.4	13.1	CS	8.57		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_013A	16.22	19.1	CS	16.44		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_013A	23.94	24.1	CS	24.24		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_013A	32.65	30.1	CS	32.95		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_013A	2.85	9.1	CS	3		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_013A	8.4	13.1	CS	8.57		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_013A	16.22	19.1	CS	16.44		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_013A	23.94	24.1	CS	24.24		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_013A	32.65	30.1	CS	32.95		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_013A	1.7	8.1	CS	1.91		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_013A	9.78	14.2	CS	10.01		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_013A	34.58	31.1	CS	34.88		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_013A	41.45	37.1	CS	41.75		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_013A	34.58	31.1	CS	34.88		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_013A	3.8	10.1	CS	3.9		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_STW_013A	14.94	18.1	CS	15.17		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_013A	31.03	29.1	CS	31.25		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_013A	12.17	16.1	CS	12.38		K4.9 Dispersibility by crumb method	COMPLETED
BH_STW_013A	5.48	11.1	CS	5.58		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_013A	40.38	36.1	CS	40.6		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_013A	4.35	10.2	CS	4.55		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_013A	5.9	11.2	CS	6.2		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_013A	2.85	9.1	CS	3		K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_013A	2.85	9.1	CS	3		K2.4 Sulphate content of water extract from soil	COMPLETED

BH_STW_013A	2.85	9.1	CS	3	K2.3 Sulphate content of acid extract from soil	COMPLETED
BH_STW_013A	27.75	27.1	CS	28.04	K2.14 Redox potential	COMPLETED
BH_STW_013A	41.9	38.1	CS	43.1	K2.14 Redox potential	COMPLETED
BH_STW_013A	2.85	9.1	CS	3	K2.1 Organic matter content	COMPLETED
BH_STW_013A	8.74	14.1	CD	8.84	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_013A	24.8	25.1	CS	25.1	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_013A	44.95	40.1	CS	45.19	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_013A	45.19	40.3	CB	46.95	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_013A	46.95	41.3	CB	48.45	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_013A	4.35	10.2	CS	4.55	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_013A	5.9	11.2	CS	6.2	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_013A	27.75	27.1	CS	28.04	K1.6 Density by immersion in water or water displacement	RESTRICTED
BH_STW_013A	5.48	11.1	CS	5.58	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_013A	20.51	22.1	CS	20.69	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_013A	38.2	34.1	CS	38.42	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_013A	8.74	14.1	CD	8.84	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_013A	24.8	25.1	CS	25.1	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_013A	44.95	40.1	CS	45.19	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_013A	7.6	12.2	CS	7.8	K1.1 Moisture content	COMPLETED
BH_STW_013A	14.94	18.1	CS	15.17	K1.1 Moisture content	COMPLETED
BH_STW_013A	25.75	26.1	CS	26.05	K1.1 Moisture content	COMPLETED
BH_STW_013A	36.36	32.1	CS	36.59	K1.1 Moisture content	COMPLETED
BH_STW_013A	41.9	38.1	CS	43.1	K1.1 Moisture content	COMPLETED
BH_STW_013A	46.41	40.2	CS	46.71	K1.1 Moisture content	COMPLETED
BH_STW_014	10.6	16.1	CS	10.9	K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_014	27.8	28.1	CS	28.1	K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_014	10.6	16.1	CS	10.9	K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_014	27.8	28.1	CS	28.1	K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_014	5.9	13.1	CS	6.15	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_014	18.93	22.1	CS	19.1	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_014	4.8	12.2	CS	5.13	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_014	22.3	24.1	CS	22.49	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_014	1.5	10.1	CD	1.6	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_STW_014	7.34	14.2	CS	7.5	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_014	17.2	21.1	CS	17.5	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_014	3.82	12.1	CS	3.99	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_014	6.75	14.1	CS	6.9	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_014	23.7	25.1	CS	24	K2.14 Redox potential	COMPLETED
BH_STW_014	8.5	15.1	CS	8.7	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_014	12.9	18.1	CS	13.2	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_014	18.93	22.1	CS	19.1	K1.9 Particle size distribution by wet sieving	RESTRICTED
BH_STW_014	26.9	27.1	CS	27.2	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_014	12.9	18.1	CS	13.2	K1.6 Density by immersion in water or water displacement	COMPLETED
BH_STW_014	2.4	11.1	CD	2.5	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_014	9.5	15.2	CS	9.7	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_014	11.8	17.1	CS	11.88	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_014	15.88	20.1	CS	16.16	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_014	20.6	23.1	CS	20.9	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_014	25.43	26.1	CD	25.53	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_014	8.5	15.1	CS	8.7	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_014	12.9	18.1	CS	13.2	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_014	18.93	22.1	CS	19.1	K1.11 Sedimentation by pipette	RESTRICTED
BH_STW_014	26.9	27.1	CS	27.2	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_014	1.5	10.1	CD	1.6	K1.1 Moisture content	COMPLETED
BH_STW_014	9.5	15.2	CS	9.7	K1.1 Moisture content	COMPLETED
BH_STW_014	11.8	17.1	CS	11.88	K1.1 Moisture content	COMPLETED
BH_STW_014	14.4	19.1	CS	14.7	K1.1 Moisture content	COMPLETED
BH_STW_014	18.93	22.1	CS	19.1	K1.1 Moisture content	COMPLETED

BH_STW_014	25.43	26.1	CD	25.53		K1.1 Moisture content	COMPLETED
BH_STW_015	12.75	19.1	CS	13.05		X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_STW_015	0.5	5	ES	0.5	SE38210723005	L2.1 MML full WAC Suite	COMPLETED
BH_STW_015	10	1	EW	10		L1.3 MML Groundwater Suite	COMPLETED
BH_STW_015	0.2	2	ES	0.2	SE38210723002	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_015	26.4	29.1	CS	26.62		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_015	29.9	31.1	CS	30.2		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_015	12.75	19.1	CS	13.05		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_015	15.45	21.1	CS	15.75		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_015	28.4	30.1	CS	28.7		K6.16 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression without the measurement of pore pressure	COMPLETED
BH_STW_015	1.8	10.1	CS	1.98		K6.14 Unconfined compressive strength of 38 mm diameter specimen	COMPLETED
BH_STW_015	4	13.1	CS	4.28		K6.14 Unconfined compressive strength of 38 mm diameter specimen	COMPLETED
BH_STW_015	8.1	16.1	CS	8.3		K6.14 Unconfined compressive strength of 38 mm diameter specimen	RESTRICTED
BH_STW_015	16.37	21.2	CS	16.8		K6.14 Unconfined compressive strength of 38 mm diameter specimen	COMPLETED
BH_STW_015	17.48	22.1	CS	17.8		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_015	21.3	25.1	CS	21.6		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_STW_015	21.3	25.1	CS	21.6		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_015	4	13.1	CS	4.28		K3.8 Chalk crushing value	RESTRICTED
BH_STW_015	5.94	14.2	CS	6.17		K3.8 Chalk crushing value	COMPLETED
BH_STW_015	7	15.1	CS	7.2		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_015	9	16.2	CD	9.1		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_015	12.75	19.1	CS	13.05		K2.14 Redox potential	COMPLETED
BH_STW_015	15.45	21.1	CS	15.75		K2.14 Redox potential	COMPLETED
BH_STW_015	4	13.1	CS	4.28		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_015	5.94	14.2	CS	6.17		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_015	8.1	16.1	CS	8.3		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_015	3	12.1	CD	3.12		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_015	4.92	14.1	CS	5.12		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_015	7	15.1	CS	7.2		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_015	10.8	18.1	CS	10.96		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_015	4.92	14.1	CS	5.12		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_015	7	15.1	CS	7.2		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_015	12.75	19.1	CS	13.05		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_015	15.45	21.1	CS	15.75		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_015	19	23.1	CD	19.1		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_015	22.84	26.1	CS	23.14		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_015	26.4	29.1	CS	26.62		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_015	28.4	30.1	CS	28.7		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_015	12.75	19.1	CS	13.05		K1.10 Particle size distribution by dry sieving	COMPLETED
BH_STW_015	15.45	21.1	CS	15.75		K1.10 Particle size distribution by dry sieving	COMPLETED
BH_STW_015	20.5	24.1	CD	20.6		K1.10 Particle size distribution by dry sieving	COMPLETED
BH_STW_015	12.75	19.1	CS	13.05		K1.1 Moisture content	COMPLETED
BH_STW_015	15.45	21.1	CS	15.75		K1.1 Moisture content	COMPLETED
BH_STW_015	21.3	25.1	CS	21.6		K1.1 Moisture content	COMPLETED
BH_STW_015	24.75	28.1	CS	25.02		K1.1 Moisture content	COMPLETED
BH_STW_015	29.9	31.1	CS	30.2		K1.1 Moisture content	COMPLETED
BH_STW_016	0.6	5	ES	0.6	SE36210811005	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_016	25.07	26.1	CS	25.37		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_016	9.8	15.2	CS	10.08		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_016	23.39	25.1	CS	23.65		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_016	9.8	15.2	CS	10.08		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_016	23.39	25.1	CS	23.65		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_016	4.8	12.1	CS	5.04		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_016	12.25	17.1	CS	12.44		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_016	7.52	14.1	CS	7.73		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
BH_STW_016	21.9	23.1	CS	22.21		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_016	3.88	11.2	CS	4.19		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_016	15.5	19.1	CS	15.75		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED

BH_STW_016	2.84	11.1	CS	3.13	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_016	5.42	12.2	CS	5.58	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_016	20	22.1	CS	20.17	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_016	16.58	20.1	CS	16.82	K2.14 Redox potential	COMPLETED
BH_STW_016	8.4	14.2	CS	8.55	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_016	11.29	16.1	CD	11.4	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_016	12.25	17.1	CS	12.44	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_016	18.31	21.1	CS	18.51	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_016	27.6	28.1	CS	27.88	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_016	2.84	11.1	CS	3.13	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_016	6.82	13.2	CD	6.9	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_STW_016	18.31	21.1	CS	18.51	K1.6 Density by immersion in water or water displacement	COMPLETED
BH_STW_016	11.29	16.1	CD	11.4	K1.5 Density by linear measurement	COMPLETED
BH_STW_016	29.12	29.1	CS	29.4	K1.5 Density by linear measurement	COMPLETED
BH_STW_016	1.9	10.1	CS	2.1	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_016	4.8	12.1	CS	5.04	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_016	9.25	15.1	CS	9.45	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_016	13.75	18.1	CS	13.91	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_016	21.9	23.1	CS	22.21	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_016	25.9	27.1	CS	26.09	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_016	8.4	14.2	CS	8.55	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_016	11.29	16.1	CD	11.4	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_016	12.25	17.1	CS	12.44	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_016	18.31	21.1	CS	18.51	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_016	27.6	28.1	CS	27.88	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_016	9.25	15.1	CS	9.45	K1.1 Moisture content	COMPLETED
BH_STW_016	16.58	20.1	CS	16.82	K1.1 Moisture content	COMPLETED
BH_STW_016	25.07	26.1	CS	25.37	K1.1 Moisture content	COMPLETED
BH_STW_016	29.99	29.2	CS	30.16	K1.1 Moisture content	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_STW_017	13.62	28.1	CS	13.88	K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K4.9 Dispersibility by crumb method	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K4.8 Dispersibility by pinhole method	COMPLETED
BH_STW_017	3.5	13.1	CS	3.8	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_017	7.48	19.1	CS	7.66	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K2.9 Acid soluble chloride content	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K2.8 Water soluble chloride content	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_017	3.5	13.1	CS	3.8	K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_017	9.35	22.1	CS	9.58	K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K2.3 Sulphate content of acid extract from soil	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K2.12 pH values	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K2.10 Total sulphur content	COMPLETED
BH_STW_017	9.35	22.1	CS	9.58	K2.1 Organic matter content	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K2.1 Organic matter content	COMPLETED
BH_STW_017	3.5	13.1	CS	3.8	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_017	7.48	19.1	CS	7.66	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_017	1.43	10.1	CS	1.73	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_017	6.9	18.1	CD	7	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_017	3.5	13.1	CS	3.8	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_017	7.48	19.1	CS	7.66	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_017	10.22	24.1	CS	10.4	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_017	11.38	25.1	CS	11.6	K1.1 Moisture content	COMPLETED
BH_STW_017	14.74	29.1	CS	14.89	K1.1 Moisture content	COMPLETED

BH_STW_018	2.3	10.1	CS	2.6	X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_STW_018	16.3	19.1	CS	16.6	X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_STW_018	13.45	17.2	CES	13.65	L1.1 MML Comprehensive Soil Suite	RESTRICTED
BH_STW_018	16.3	19.1	CS	16.6	K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_018	4.74	11.1	CS	5.04	K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_018	12.27	16.1	CS	12.5	K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_018	4.74	11.1	CS	5.04	K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_018	12.27	16.1	CS	12.5	K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_018	9.36	14.2	CS	9.65	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_STW_018	5.36	12.1	CS	5.5	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_018	8.56	14.1	CS	8.85	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_018	7.42	13.1	CS	7.6	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_STW_018	17.75	20.1	CS	18.05	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_018	20.8	22.1	CS	21.09	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_018	16.3	19.1	CS	16.6	K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_STW_018	6.2	12.2	CS	6.46	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_018	10.75	15.1	CS	11.04	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_018	14.8	18.1	CS	15.13	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_018	6.2	12.2	CS	6.46	K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_018	10.75	15.1	CS	11.04	K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_018	13.35	17.1	CD	13.45	K2.14 Redox potential	COMPLETED
BH_STW_018	14.8	18.1	CS	15.13	K2.12 pH values	COMPLETED
BH_STW_018	3.33	10.2	CD	3.43	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_018	19.3	21.2	CB	19.55	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_018	29.4	28.1	CS	29.65	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_018	6.2	12.2	CS	6.46	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_018	9.36	14.2	CS	9.65	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_018	10.75	15.1	CS	11.04	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_018	2.3	10.1	CS	2.6	K1.5 Density by linear measurement	RESTRICTED
BH_STW_018	17.75	20.1	CS	18.05	K1.5 Density by linear measurement	COMPLETED
BH_STW_018	25.35	25.1	CS	25.65	K1.5 Density by linear measurement	COMPLETED
BH_STW_018	3.33	10.2	CD	3.43	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_018	7.42	13.1	CS	7.6	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_018	13.35	17.1	CD	13.45	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_018	17.75	20.1	CS	18.05	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_018	23.9	24.1	CS	24.18	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_018	28.2	27.1	CS	28.5	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_018	3.33	10.2	CD	3.43	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_018	19.3	21.2	CB	19.55	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_018	29.4	28.1	CS	29.65	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_018	5.36	12.1	CS	5.5	K1.1 Moisture content	COMPLETED
BH_STW_018	8.56	14.1	CS	8.85	K1.1 Moisture content	COMPLETED
BH_STW_018	19.2	21.1	CD	19.3	K1.1 Moisture content	COMPLETED
BH_STW_018	22.52	23.1	CS	22.82	K1.1 Moisture content	COMPLETED
BH_STW_018	26.86	26.1	CS	27.2	K1.1 Moisture content	COMPLETED
BH_STW_019A	27.73	27.1	CS	28	K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_019A	10.2	16.1	CS	10.38	K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_019A	26	26.1	CS	26.33	K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_019A	10.2	16.1	CS	10.38	K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_019A	26	26.1	CS	26.33	K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_019A	5.18	13.2	CS	5.43	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_STW_019A	13.3	18.1	CS	13.5	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_STW_019A	11.65	17.1	CS	11.8	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_019A	4.8	13.1	CS	5.1	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_019A	16.3	20.1	CS	16.5	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_019A	3.8	12.1	CS	4.1	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_019A	7.66	15.1	CS	7.85	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_019A	20.75	23.1	CS	21	K4.1 One-dimensional consolidation properties, test period 5 days	RESTRICTED

BH_STW_019A	3.8	12.1	CS	4.1		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_019A	7.66	15.1	CS	7.85		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_019A	17.83	21.1	CS	18		K2.14 Redox potential	COMPLETED
BH_STW_019A	20.75	23.1	CS	21		K2.14 Redox potential	COMPLETED
BH_STW_019A	13.3	18.1	CS	13.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_019A	19	22.1	CS	19.31		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_019A	3.8	12.1	CS	4.1		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_019A	7.66	15.1	CS	7.85		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_019A	19	22.1	CS	19.31		K1.6 Density by immersion in water or water displacement	COMPLETED
BH_STW_019A	2.1	10.1	CD	2.2		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_019A	14.61	19.1	CS	14.94		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_019A	24.17	25.1	CS	24.5		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_019A	29.63	28.1	CS	29.81		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_019A	13.3	18.1	CS	13.5		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_019A	19	22.1	CS	19.31		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_019A	13.3	18.1	CS	13.5		K1.1 Moisture content	COMPLETED
BH_STW_019A	17.83	21.1	CS	18		K1.1 Moisture content	COMPLETED
BH_STW_019A	20.75	23.1	CS	21		K1.1 Moisture content	COMPLETED
BH_STW_019A	27.73	27.1	CS	28		K1.1 Moisture content	COMPLETED
BH_STW_020	0.2	2	ES	0.25	SE38210906002	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_020	17.2	22.1	CS	17.44		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_020	5.64	13.1	CS	5.95		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_020	13.5	18.1	CS	13.7		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_020	5.64	13.1	CS	5.95		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_020	13.5	18.1	CS	13.7		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_020	9.58	16.1	CS	9.75		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_020	12.38	17.1	CS	12.65		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_020	6.92	14.1	CS	7.2		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_020	20.29	24.1	CS	20.53		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_020	23.43	26.1	CS	23.71		K4.9 Dispersibility by crumb method	COMPLETED
BH_STW_020	21.92	25.1	CS	22.25		K4.8 Dispersibility by pinhole method	COMPLETED
BH_STW_020	30.04	30.2	CS	30.2		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_STW_020	2.2	11.1	CS	2.46		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_020	14.83	20.1	CS	15.1		K2.14 Redox potential	COMPLETED
BH_STW_020	2.78	11.2	CS	3.1		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_020	10.44	16.2	CS	10.6		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_020	1.55	10.1	CS	1.72		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_020	10.44	16.2	CS	10.6		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_020	18.38	23.1	CS	18.7		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_020	24.79	27.1	CS	25.01		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_020	28.8	30.1	CS	29.13		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_020	28.8	30.1	CS	29.13		K1.10 Particle size distribution by dry sieving	COMPLETED
BH_STW_020	26.88	28.1	CS	27.16		K1.1 Moisture content	COMPLETED
BH_STW_021	4.66	13.3	CS	4.85		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_021	10.5	17.2	CS	10.8		K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_021	4.66	13.3	CS	4.85		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_021	10.5	17.2	CS	10.8		K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_021	5	14.1	CS	5.3		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_021	6.89	15.1	CS	7.1		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_021	2.5	11.1	CS	2.7		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_021	3.5	13.1	CS	3.7		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_021	3.5	13.1	CS	3.7		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_021	7.5	15.2	CS	7.72		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_021	13.72	19.2	CS	14		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_021	13.24	19.1	CS	13.41		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_021	2.5	11.1	CS	2.7		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_021	10.19	17.1	CS	10.49		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_021	13.24	19.1	CS	13.41		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED

BH_STW_021	14.15	20.1	CS	14.39	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_021	7.5	15.2	CS	7.72	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_021	13.72	19.2	CS	14	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_021	10.19	17.1	CS	10.49	K1.1 Moisture content	COMPLETED
BH_STW_021	13.72	19.2	CS	14	K1.1 Moisture content	COMPLETED
BH_STW_021	14.15	20.1	CS	14.39	K1.1 Moisture content	COMPLETED
BH_STW_022A	45	40.1	CS	45.23	X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_STW_022A	8.39	16.1	CS	8.66	Uniaxial compressive strength	COMPLETED
BH_STW_022A	1.1	8	ES	1.2	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_022A	34.7	33.1	CS	35	K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_022A	40.63	37.1	CS	40.93	K8.15 Deformability in uniaxial compression	COMPLETED
BH_STW_022A	34.7	33.1	CS	35	K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_022A	40.63	37.1	CS	40.93	K8.14 Uniaxial compressive strength	COMPLETED
BH_STW_022A	8.39	16.1	CS	8.66	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_STW_022A	36.1	34.1	CS	36.4	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_STW_022A	31.7	31.1	CS	32	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_022A	9.12	16.2	CS	9.37	K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_STW_022A	24.18	26.1	CS	24.41	K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_STW_022A	6.98	15.1	CS	7.18	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_022A	39.2	36.1	CS	39.5	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_STW_022A	9.12	16.2	CS	9.37	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_022A	24.18	26.1	CS	24.41	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_022A	29.66	30.1	CS	29.96	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_STW_022A	2.98	12.1	CS	3.33	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_022A	25.7	27.1	CS	26	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_STW_022A	2.98	12.1	CS	3.33	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_022A	48.02	42.1	CS	48.32	K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_022A	13.48	19.1	CS	13.6	K2.14 Redox potential	COMPLETED
BH_STW_022A	43.6	39.1	CS	43.84	K2.14 Redox potential	COMPLETED
BH_STW_022A	16.3	21.1	CS	16.55	K2.12 pH values	COMPLETED
BH_STW_022A	46.7	41.1	CD	46.8	K2.12 pH values	COMPLETED
BH_STW_022A	49.2	43.1	CB	50	K2.1 Organic matter content	COMPLETED
BH_STW_022A	4.06	13.1	CS	4.24	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_022A	11.6	18.1	CS	11.88	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_022A	22.65	25.1	CS	22.82	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_022A	33.19	32.1	CS	33.46	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_022A	37.65	35.1	CS	37.95	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_022A	49.2	43.1	CB	50	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_022A	48.02	42.1	CS	48.32	K1.5 Density by linear measurement	COMPLETED
BH_STW_022A	2.28	11.1	CS	2.4	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_022A	6.09	14.2	CD	6.17	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_022A	10.64	17.1	CS	10.77	K1.2 Liquid limit, plastic limit and plasticity index	RESTRICTED
BH_STW_022A	13.48	19.1	CS	13.6	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_022A	34.7	33.1	CS	35	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_022A	42.05	38.1	CS	42.35	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_022A	45	40.1	CS	45.23	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_022A	48.02	42.1	CS	48.32	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_022A	4.06	13.1	CS	4.24	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_022A	11.6	18.1	CS	11.88	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_022A	22.65	25.1	CS	22.82	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_022A	33.19	32.1	CS	33.46	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_022A	37.65	35.1	CS	37.95	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_022A	49.2	43.1	CB	50	K1.11 Sedimentation by pipette	COMPLETED
BH_STW_022A	6.09	14.2	CD	6.17	K1.1 Moisture content	COMPLETED
BH_STW_022A	10.64	17.1	CS	10.77	K1.1 Moisture content	RESTRICTED
BH_STW_022A	16.3	21.1	CS	16.55	K1.1 Moisture content	COMPLETED
BH_STW_022A	21	24.1	CS	21.3	K1.1 Moisture content	COMPLETED
BH_STW_022A	26.75	28.1	CS	27	K1.1 Moisture content	COMPLETED

BH_STW_022A	34.7	33.1	CS	35		K1.1 Moisture content	COMPLETED
BH_STW_022A	42.05	38.1	CS	42.35		K1.1 Moisture content	COMPLETED
BH_STW_023	10	1	EW	10		L1.3 MML Groundwater Suite	COMPLETED
BH_STW_023	0.6	5	ES	0.6	SE38210721005	L1.2 MML Leachate Suite	COMPLETED
BH_STW_023	0.6	5	ES	0.6	SE38210721005	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_023	3.48	10.1	CS	3.6		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_023	11.16	16.1	CD	11.29		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_023	1.84	9.1	CS	2		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_023	3.48	10.1	CS	3.6		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_023	13.6	17.1	CS	13.8		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_024	10	1	EW	10		L1.3 MML Groundwater Suite	COMPLETED
BH_STW_024	2.8	12.1	CD	2.88		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
BH_STW_024	4.7	14.1	CD	4.95		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
BH_STW_024	2.8	12.1	CD	2.88		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_024	5.6	17.1	CS	5.85		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_024	8.8	20.1	CD	8.88		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_024	1.95	10.1	CS	2.2		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_024	6.5	18.1	CS	6.97		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_024	9.9	20.2	CS	10.15		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_025	8	1	EW	8		L1.3 MML Groundwater Suite	COMPLETED
BH_STW_025	12	19.1	CS	12.25		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_STW_025	2.43	12.1	CS	2.68		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_025	5.13	14.1	CS	5.47		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_025	10.25	18.1	CS	10.55		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_025	2.43	12.1	CS	2.68		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_025	5.13	14.1	CS	5.47		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_025	3.78	13.1	CS	4.08		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_025	8	16.2	CS	8.17		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_025	9.25	17.1	CS	9.6		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_025	10.25	18.1	CS	10.55		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_025	7.35	16.1	CS	7.55		K1.1 Moisture content	COMPLETED
BH_STW_025	10.25	18.1	CS	10.55		K1.1 Moisture content	COMPLETED
BH_STW_025	12	19.1	CS	12.25		K1.1 Moisture content	COMPLETED
BH_STW_025	13.53	20.1	CS	13.79		K1.1 Moisture content	COMPLETED
BH_STW_025	14.5	21.1	CS	14.8		K1.1 Moisture content	COMPLETED
BH_STW_026	8	1	EW	8		L1.3 MML Groundwater Suite	COMPLETED
BH_STW_026	0.2	2	ES	0.25	SE36210729002	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_026	2.8	11.1	CS	3		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_026	6.9	15.1	CD	7		K2.7 Carbonate content by gravimetric method	RESTRICTED
BH_STW_026	12.43	22.1	CS	12.65		K2.7 Carbonate content by gravimetric method	COMPLETED
BH_STW_026	5.4	12.2	CD	5.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_026	8.14	17.1	CD	8.24		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_026	4.3	12.1	CS	4.5		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_026	9.5	20.1	CS	9.7		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_026	10.56	21.1	CS	10.78		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_026	5.9	13.1	CD	6		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_026	8.85	18.1	CS	9		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_026	5.4	12.2	CD	5.5		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_026	8.14	17.1	CD	8.24		K1.11 Sedimentation by pipette	COMPLETED
BH_STW_026	1.43	9.1	CS	1.75		K1.1 Moisture content	COMPLETED
BH_STW_026	6.9	15.1	CD	7		K1.1 Moisture content	COMPLETED
BH_STW_031A	0.5	5	ES	0.55		L1.2 MML Leachate Suite	COMPLETED
BH_STW_031A	0.5	5	ES	0.55		L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_STW_031A	4.28	13.1	CS	4.55		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_STW_031A	4.28	13.1	CS	4.55		K8.14 Uniaxial compressive strength	RESTRICTED
BH_STW_031A	14.62	21.1	CS	14.92		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_STW_031A	4.28	13.1	CS	4.55		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_STW_031A	5.4	14.1	CS	5.6		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED

BH_STW_031A	3.1	12.1	CD	3.2		K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_031A	9.5	17.2	CD	9.6		K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_031A	11.4	18.2	CD	11.5		K2.6 Carbonate content by rapid titration	COMPLETED
BH_STW_031A	2.1	11.1	CD	2.2		K2.1 Organic matter content	COMPLETED
BH_STW_031A	11.4	18.2	CD	11.5		K2.1 Organic matter content	COMPLETED
BH_STW_031A	13.4	20.2	CD	13.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_STW_031A	6.3	14.2	CS	6.6		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_031A	8.62	17.1	CS	8.87		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_STW_031A	7.5	16.1	CD	7.6		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_031A	10.3	18.1	CD	10.4		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_STW_031A	13.4	20.2	CD	13.5		K1.11 Sedimentation by pipette	COMPLETED
BH_TPS_004	1.1	8	ES	1.2	SE38210827008	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_001A	16	11.1	CS	16.19		X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_TUN_001A	2.2	2.1	CB	3.2		Particle size distribution by wet sieving	COMPLETED
BH_TUN_001A	4	1	EW			L1.3 MML Groundwater Suite	COMPLETED
BH_TUN_001A	0.2	2	ES	0.25		L1.2 MML Leachate Suite	COMPLETED
BH_TUN_001A	0.2	2	ES	0.25		L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_001A	0.5	5	ES	0.55		L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_001A	4.2	4.1	CD	4.3		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_001A	26.04	15.1	CS	26.34		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_001A	14.7	10.2	CS	15		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_001A	21.37	13.1	CS	21.68		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_001A	19.74	12.2	CS	20		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_001A	0.1	3	B	0.4		K6.2 Shear strength by hand vane (set of 3)	RESTRICTED
BH_TUN_001A	18.2	12.1	CS	18.5		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_001A	10	9.1	CS	10.2		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_001A	27.64	15.2	CS	27.94		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_001A	13.28	10.1	CS	13.46		K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_001A	24.6	14.1	CS	24.9		K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_001A	0.8	9	B	1.2		K4.7 Permeability by constant head method	RESTRICTED
BH_TUN_001A	2.2	2.1	CB	3.2		K4.7 Permeability by constant head method	RESTRICTED
BH_TUN_001A	8.1	8.1	CS	8.41		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_001A	16	11.1	CS	16.19		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_001A	23.24	13.2	CS	23.38		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_001A	23.24	13.2	CS	23.38		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_001A	4.2	4.1	CD	4.3		K2.14 Redox potential	COMPLETED
BH_TUN_001A	14.7	10.2	CS	15		K2.14 Redox potential	COMPLETED
BH_TUN_001A	6.5	6.1	CS	6.8		K2.12 pH values	COMPLETED
BH_TUN_001A	18.2	12.1	CS	18.5		K2.12 pH values	COMPLETED
BH_TUN_001A	0.1	3	B	0.4		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_001A	11.46	9.3	CS	11.69		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_001A	24.6	14.1	CS	24.9		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_001A	34.89	18.1	CD	35		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_001A	34.89	18.1	CD	35		K1.6 Density by immersion in water or water displacement	RESTRICTED
BH_TUN_001A	13.28	10.1	CS	13.46		K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_001A	0.4	4	D	0.5		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_001A	4.2	4.1	CD	4.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_001A	23.24	13.2	CS	23.38		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_001A	34.89	18.1	CD	35		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_001A	0.1	3	B	0.4		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_001A	11.46	9.3	CS	11.69		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_001A	24.6	14.1	CS	24.9		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_001A	34.89	18.1	CD	35		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_001A	0.4	4	D	0.5		K1.1 Moisture content	COMPLETED
BH_TUN_001A	5.2	5.1	CD	5.3		K1.1 Moisture content	COMPLETED
BH_TUN_001A	21.37	13.1	CS	21.68		K1.1 Moisture content	COMPLETED
BH_TUN_001A	34.89	18.1	CD	35		K1.1 Moisture content	COMPLETED
BH_TUN_001B	12	26	B	12.5	SE24210929002	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED

BH_TUN_001B	12	26	B	12.5	SE24210929002	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_001B	4.5	12	B	5	SE24210928012	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_001B	24.5	42	B	25	SE24210929018	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_001B	24.5	42	B	25	SE24210929018	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
BH_TUN_001B	15	30	B	15.5	SE24210929006	K3.7 Moisture Condition Value/moisture content relationship	COMPLETED
BH_TUN_001B	15	30	B	15.5	SE24210929006	K3.6 Moisture Condition Value at natural moisture content	COMPLETED
BH_TUN_001B	12	26	B	12.5	SE24210929002	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
BH_TUN_001B	4.5	12	B	5	SE24210928012	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_TUN_001B	24.5	42	B	25	SE24210929018	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_TUN_001B	4.5	12	B	5	SE24210928012	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_001B	12	26	B	12.5	SE24210929002	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_001B	24.5	42	B	25	SE24210929018	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_001B	4.5	12	B	5	SE24210928012	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_001B	12	26	B	12.5	SE24210929002	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_001B	24.5	42	B	25	SE24210929018	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_001B	4.5	12	B	5	SE24210928012	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_001B	12	26	B	12.5	SE24210929002	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_001B	24.5	42	B	25	SE24210929018	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_001B	4.5	12	B	5	SE24210928012	K1.1 Moisture content	COMPLETED
BH_TUN_001B	12	26	B	12.5	SE24210929002	K1.1 Moisture content	COMPLETED
BH_TUN_001B	24.5	42	B	25	SE24210929018	K1.1 Moisture content	COMPLETED
BH_TUN_002	18.4	14.1	CS	18.7		X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_TUN_002	16.7	13.1	CS	17		Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_002	16.7	13.1	CS	17		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_002	16.7	13.1	CS	17		K8.14 Uniaxial compressive strength	COMPLETED
BH_TUN_002	12.36	10.1	CS	12.66		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_002	14.67	12.1	CS	14.97		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_002	20.73	16.1	CS	21		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_002	9.96	8.2	CS	10.2		K6.16 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression without the measurement of pore pressure	COMPLETED
BH_TUN_002	16.7	13.1	CS	17		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_TUN_002	18.4	14.1	CS	18.7		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_002	18.4	14.1	CS	18.7		K4.9 Dispersibility by crumb method	COMPLETED
BH_TUN_002	16.7	13.1	CS	17		K4.8 Dispersibility by pinhole method	RESTRICTED
BH_TUN_002	2.2	2.1	CB	3.2		K4.7 Permeability by constant head method	COMPLETED
BH_TUN_002	18.4	14.1	CS	18.7		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_002	0.4	4	D	0.5		K2.12 pH values	COMPLETED
BH_TUN_002	1	7	D	1.1		K2.12 pH values	COMPLETED
BH_TUN_002	0.1	3	B	0.4		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_002	2.2	2.1	CB	3.2		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_002	8.7	8.1	CS	9		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_002	22.43	17.1	CS	22.68		K1.5 Density by linear measurement	COMPLETED
BH_TUN_002	5.56	5.1	CS	5.86		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_002	14.67	12.1	CS	14.97		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_002	20.73	16.1	CS	21		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_002	29.66	22.1	CS	29.96		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_002	0.1	3	B	0.4		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_002	2.2	2.1	CB	3.2		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_002	8.7	8.1	CS	9		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_002	5.56	5.1	CS	5.86		K1.1 Moisture content	COMPLETED
BH_TUN_002	14.67	12.1	CS	14.97		K1.1 Moisture content	COMPLETED
BH_TUN_002	20.73	16.1	CS	21		K1.1 Moisture content	COMPLETED
BH_TUN_002	29.66	22.1	CS	29.96		K1.1 Moisture content	COMPLETED
BH_TUN_002	1.1	8	ES	1.2		C.1: Comprehensive Soil Suite	COMPLETED
BH_TUN_003	12.75	18.1	CS	12.97		X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_TUN_003	10.3	16.3	CES	10.38		L2.1 MML full WAC Suite	RESTRICTED
BH_TUN_003	0.2	2	ES	0.25		L1.2 MML Leachate Suite	COMPLETED
BH_TUN_003	0.2	2	ES	0.25		L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_003	10.3	16.3	CES	10.38		L1.1 MML Comprehensive Soil Suite	RESTRICTED

BH_TUN_003	18.41	23.1	CS	18.71		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_003	15.55	21.1	CS	15.85		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_003	18.41	23.1	CS	18.71		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_003	16.8	22.1	CS	17.1		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_003	0.4	6	B	0.8		K6.2 Shear strength by hand vane (set of 3)	RESTRICTED
BH_TUN_003	19.2	24.1	CS	19.5		K6.16 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression without the measurement of pore pressure	COMPLETED
BH_TUN_003	6.2	14.1	CS	6.5		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_003	10	16.2	CS	10.3		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_003	20.15	25.1	CS	20.34		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_003	15.55	21.1	CS	15.85		K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_003	4.1	13.2	CB	5		K4.7 Permeability by constant head method	COMPLETED
BH_TUN_003	12.75	18.1	CS	12.97		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_003	21.1	25.2	CS	21.4		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_003	21.1	25.2	CS	21.4		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_003	11.2	17.4	CS	11.4		K2.14 Redox potential	COMPLETED
BH_TUN_003	1.2	10.1	CD	1.3		K2.1 Organic matter content	COMPLETED
BH_TUN_003	0.4	4	D	0.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_003	1.3	10.2	CB	2.2		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_003	4.1	13.2	CB	5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_003	0.4	4	D	0.5		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_003	1	7	D	1.1		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_003	4	13.1	CD	4.1		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_003	16.8	22.1	CS	17.1		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_003	0.4	4	D	0.5		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_003	1.3	10.2	CB	2.2		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_003	4.1	13.2	CB	5		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_003	0.4	4	D	0.5		K1.1 Moisture content	COMPLETED
BH_TUN_003	15.55	21.1	CS	15.85		K1.1 Moisture content	COMPLETED
BH_TUN_003	16.8	22.1	CS	17.1		K1.1 Moisture content	COMPLETED
BH_TUN_004c	16.43	21.1	CS	16.55		X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_TUN_004c	22.34	23.1	CS	22.68		Unconfined compressive strength of 38 mm diameter specimen	COMPLETED
BH_TUN_004c	0.2	2	ES	0.25	SE31210916002	L1.1 MML Comprehensive Soil Suite	RESTRICTED
BH_TUN_004c	13.09	20.1	CD	13.18		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_004c	22.34	23.1	CS	22.68		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_004c	5.65	14.1	CS	5.95		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_004c	19.21	22.1	CS	19.5		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_004c	5.03	13.1	CS	5.2		K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_004c	23.95	23.2	CS	24.2		K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_004c	13.4	20.2	CS	13.72		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_004c	5.03	13.1	CS	5.2		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_004c	12.1	19.1	CD	12.2		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_TUN_004c	23.95	23.2	CS	24.2		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_004c	12.1	19.1	CD	12.2		K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_004c	0.8	9	B	1.2	SE31210916009	K4.7 Permeability by constant head method	COMPLETED
BH_TUN_004c	9.02	17.1	CS	9.32		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_004c	16.43	21.1	CS	16.55		K2.14 Redox potential	COMPLETED
BH_TUN_004c	10.15	18.2	CD	10.3		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_004c	17.7	21.2	CS	17.87		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_004c	17.7	21.2	CS	17.87		K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_004c	10.15	18.2	CD	10.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_004c	13.09	20.1	CD	13.18		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_004c	17.7	21.2	CS	17.87		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_004c	0.8	9	B	1.2	SE31210916009	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_004c	10.15	18.2	CD	10.3		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_004c	17.7	21.2	CS	17.87		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_004c	0.8	9	B	1.2	SE31210916009	K1.10 Particle size distribution by dry sieving	COMPLETED
BH_TUN_004c	13.09	20.1	CD	13.18		K1.1 Moisture content	COMPLETED
BH_TUN_004c	17.7	21.2	CS	17.87		K1.1 Moisture content	COMPLETED

BH_TUN_005Ab	15.4	13.1	CS	15.5		X-ray diffraction BS EN 13925-3:2005	RESTRICTED
BH_TUN_005Ab	21.32	21.1	CS	21.47		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_005Ab	24.12	23.1	CS	24.45		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_005Ab	9.2	9.1	CS	9.5		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_005Ab	6.25	6.1	CS	6.43		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
BH_TUN_005Ab	20.2	20.1	CS	20.5		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_005Ab	0.4	6	B	0.8		K6.2 Shear strength by hand vane (set of 3)	RESTRICTED
BH_TUN_005Ab	10.7	10.1	CS	10.98		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_005Ab	15.4	13.1	CS	15.5		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_TUN_005Ab	29.82	26.1	CS	30		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_005Ab	19	19.1	CS	19.3		K4.8 Dispersibility by pinhole method	RESTRICTED
BH_TUN_005Ab	2.2	2.1	CB	2.6		K4.7 Permeability by constant head method	COMPLETED
BH_TUN_005Ab	15.4	13.1	CS	15.5		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_005Ab	19	19.1	CS	19.3		K2.14 Redox potential	COMPLETED
BH_TUN_005Ab	0.4	4	D	0.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_005Ab	2.2	2.1	CB	2.6		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_005Ab	12.48	11.1	CS	12.64		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_005Ab	23.1	22.1	CS	23.23		K1.5 Density by linear measurement	COMPLETED
BH_TUN_005Ab	15.4	13.1	CS	15.5		K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_005Ab	0.4	4	D	0.5		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_005Ab	6.25	6.1	CS	6.43		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_005Ab	13.57	12.1	CD	13.71		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_005Ab	17	17.1	CS	17.2		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_005Ab	24.12	23.1	CS	24.45		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_005Ab	0.4	4	D	0.5		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_005Ab	2.2	2.1	CB	2.6		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_005Ab	12.48	11.1	CS	12.64		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_005Ab	0.4	4	D	0.5		K1.1 Moisture content	COMPLETED
BH_TUN_005Ab	17	17.1	CS	17.2		K1.1 Moisture content	COMPLETED
BH_TUN_005Ab	23.1	22.1	CS	23.23		K1.1 Moisture content	COMPLETED
BH_TUN_005Ab	19	19.1	CS	19.3		Dispersibility by crumb method	COMPLETED
BH_TUN_005B	16.7	34	B	17.2	SE26210923010	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
BH_TUN_005B	16.7	34	B	17.2	SE26210923010	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_005B	7.2	20	B	7.7	SE26210922021	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_005B	7.2	20	B	7.7	SE26210922021	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
BH_TUN_005B	12.2	28	B	12.7	SE26210923004	K3.7 Moisture Condition Value/moisture content relationship	COMPLETED
BH_TUN_005B	12.2	28	B	12.7	SE26210923004	K3.6 Moisture Condition Value at natural moisture content	COMPLETED
BH_TUN_005B	7.2	20	B	7.7	SE26210922021	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
BH_TUN_005B	16.7	34	B	17.2	SE26210923010	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
BH_TUN_005B	7.2	20	B	7.7	SE26210922021	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_TUN_005B	7.2	20	B	7.7	SE26210922021	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_005B	16.7	34	B	17.2	SE26210923010	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_005B	7.2	20	B	7.7	SE26210922021	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_005B	16.7	34	B	17.2	SE26210923010	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_005B	7.2	20	B	7.7	SE26210922021	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_005B	16.7	34	B	17.2	SE26210923010	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_005B	7.2	20	B	7.7	SE26210922021	K1.1 Moisture content	COMPLETED
BH_TUN_005B	16.7	34	B	17.2	SE26210923010	K1.1 Moisture content	COMPLETED
BH_TUN_006	19.48	26.2	CS	19.65		X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_TUN_006	2	1	EW			L1.3 MML Groundwater Suite	COMPLETED
BH_TUN_006	1.5	10	ES	1.5	SE26210921020	L1.1 MML Comprehensive Soil Suite	RESTRICTED
BH_TUN_006	4.5	16	ES	4.5	SE26210921026	L1.1 MML Comprehensive Soil Suite	RESTRICTED
BH_TUN_006	10.62	22.2	CES	10.7		L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_006	26.05	31.1	CD	26.1		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_006	12.6	23.1	CS	12.86		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_006	28.5	32.1	CS	28.85		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_006	18.19	26.1	CS	18.42		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_TUN_006	22.7	28.1	CS	23		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED

BH_TUN_006	0.8	9	B	1.2		K6.2 Shear strength by hand vane (set of 3)	RESTRICTED
BH_TUN_006	2.5	13	B	3	SE26210921023	K6.2 Shear strength by hand vane (set of 3)	RESTRICTED
BH_TUN_006	0.1	3	B	0.4		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_006	0.4	6	B	0.8		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_006	21.7	27.1	CD	21.8		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_TUN_006	10.7	22.3	CS	11		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_006	35	34.1	CS	35.3		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_006	9.1	22.1	CS	9.4		K4.9 Dispersibility by crumb method	COMPLETED
BH_TUN_006	18.19	26.1	CS	18.42		K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_006	19.48	26.2	CS	19.65		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_006	30	32.2	CS	30.3		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_006	30	32.2	CS	30.3		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_006	0.1	3	B	0.4		K3.7 Moisture Condition Value/moisture content relationship	COMPLETED
BH_TUN_006	0.4	6	B	0.8		K3.7 Moisture Condition Value/moisture content relationship	COMPLETED
BH_TUN_006	0.1	3	B	0.4		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_TUN_006	0.4	6	B	0.8		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_TUN_006	7.5	20.1	CS	7.8		K2.14 Redox potential	COMPLETED
BH_TUN_006	18.19	26.1	CS	18.42		K2.14 Redox potential	COMPLETED
BH_TUN_006	26.05	31.1	CD	26.1		K2.12 pH values	COMPLETED
BH_TUN_006	0.4	4	D	0.5		K2.1 Organic matter content	COMPLETED
BH_TUN_006	1	7	D	1.1		K2.1 Organic matter content	COMPLETED
BH_TUN_006	15.3	25.1	CD	15.4		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_006	27.2	31.2	CS	27.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_006	0.8	9	B	1.2		K1.6 Density by immersion in water or water displacement	COMPLETED
BH_TUN_006	13.7	24.1	CS	14		K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_006	0.8	9	B	1.2		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_006	2.5	13	B	3	SE26210921023	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_006	16.9	25.2	CD	17		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_006	26.05	31.1	CD	26.1		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_006	0.8	9	B	1.2		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_006	2.5	13	B	3	SE26210921023	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_006	15.3	25.1	CD	15.4		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_006	27.2	31.2	CS	27.5		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_006	0.8	9	B	1.2		K1.10 Particle size distribution by dry sieving	COMPLETED
BH_TUN_006	2.5	13	B	3	SE26210921023	K1.10 Particle size distribution by dry sieving	COMPLETED
BH_TUN_006	0.8	9	B	1.2		K1.1 Moisture content	COMPLETED
BH_TUN_006	2.5	13	B	3	SE26210921023	K1.1 Moisture content	COMPLETED
BH_TUN_006	16.9	25.2	CD	17		K1.1 Moisture content	COMPLETED
BH_TUN_006	24.66	30.1	CS	24.93		K1.1 Moisture content	COMPLETED
BH_TUN_006	32.15	33.1	CS	32.32		K1.1 Moisture content	COMPLETED
BH_TUN_006	33.2	33.2	CS	33.5		K1.1 Moisture content	COMPLETED
BH_TUN_006	35	34.1	CS	35.3		K1.1 Moisture content	COMPLETED
BH_TUN_006	36.5	34.2	CS	36.65		K1.1 Moisture content	COMPLETED
BH_TUN_006	38.37	36.1	CS	38.67		K1.1 Moisture content	COMPLETED
BH_TUN_007	10	16.1	CES	10		L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_007	10.2	16.2	CS	10.5		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_007	2.7	11.1	CS	3		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_007	12.85	18.1	CS	13.05		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_007	15.71	20.1	CS	15.9		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_TUN_007	18.7	22.1	CS	19		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_007	1.46	10.1	CS	1.76		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_007	12.85	18.1	CS	13.05		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_TUN_007	4.2	12.1	CS	4.5		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_007	10.2	16.2	CS	10.5		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_007	17.5	21.1	CS	17.8		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_007	21.67	24.1	CS	21.86		K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_007	18.7	22.1	CS	19		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_007	14.42	19.1	CS	14.6		K2.14 Redox potential	COMPLETED

BH_TUN_007	15.71	20.1	CS	15.9	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_007	14.42	19.1	CS	14.6	K1.5 Density by linear measurement	COMPLETED
BH_TUN_007	15.71	20.1	CS	15.9	K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_007	1.46	10.1	CS	1.76	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_007	11.9	17.1	CD	11.97	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_007	17.5	21.1	CS	17.8	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_007	20.4	23.1	CD	20.5	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_007	15.71	20.1	CS	15.9	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_007	1.46	10.1	CS	1.76	K1.1 Moisture content	COMPLETED
BH_TUN_007	11.9	17.1	CD	11.97	K1.1 Moisture content	COMPLETED
BH_TUN_007	17.5	21.1	CS	17.8	K1.1 Moisture content	COMPLETED
BH_TUN_007	20.4	23.1	CD	20.5	K1.1 Moisture content	COMPLETED
BH_TUN_011	15.2	18.1	CS	15.38	X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_TUN_011	2	1	EW		L1.3 MML Groundwater Suite	COMPLETED
BH_TUN_011	4	2	EW	4	L1.3 MML Groundwater Suite	COMPLETED
BH_TUN_011	12	16.1	CS	12.2	K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_011	7.7	13.1	CS	8	K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_011	26.63	26.1	CS	26.83	K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_011	16.8	19.1	CS	17.1	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_011	13.6	17.1	CS	13.8	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
BH_TUN_011	6.5	11.1	CS	6.7	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_011	21.43	23.1	CS	21.63	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_011	4.64	9.3	CS	4.84	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_011	22.8	24.1	CS	23.1	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_011	39.25	35.1	CS	39.35	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_011	4.64	9.3	CS	4.84	K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_011	7.7	13.1	CS	8	K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_011	16.8	19.1	CS	17.1	K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_011	24.4	25.1	CS	24.7	K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_011	24.4	25.1	CS	24.7	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_011	0.9	5	B	1.2	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_011	3.83	9.1	CS	4.03	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_011	12	16.1	CS	12.2	K2.14 Redox potential	COMPLETED
BH_TUN_011	19.87	22.1	CS	20.11	K2.14 Redox potential	COMPLETED
BH_TUN_011	27.2	27.1	CS	27.4	K2.12 pH values	COMPLETED
BH_TUN_011	0.9	5	B	1.2	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_011	4.07	9.2	CD	4.17	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_011	21.43	23.1	CS	21.63	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_011	41.35	37.1	CS	41.55	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_011	0.9	5	B	1.2	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_011	2.65	8.1	CS	2.85	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_011	19.87	22.1	CS	20.11	K1.6 Density by immersion in water or water displacement	COMPLETED
BH_TUN_011	41.65	37.2	CS	41.8	K1.6 Density by immersion in water or water displacement	COMPLETED
BH_TUN_011	4.07	9.2	CD	4.17	K1.5 Density by linear measurement	RESTRICTED
BH_TUN_011	9.2	14.1	CS	9.4	K1.5 Density by linear measurement	COMPLETED
BH_TUN_011	31.6	30.1	CS	31.9	K1.5 Density by linear measurement	COMPLETED
BH_TUN_011	26.63	26.1	CS	26.83	K1.4 Linear shrinkage	COMPLETED
BH_TUN_011	13.6	17.1	CS	13.8	K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_011	26.63	26.1	CS	26.83	K1.3 Volumetric shrinkage	RESTRICTED
BH_TUN_011	4.07	9.2	CD	4.17	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_011	6.5	11.1	CS	6.7	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_011	13.6	17.1	CS	13.8	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_011	37.65	34.1	CS	37.8	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_011	41.35	37.1	CS	41.55	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_011	0.9	5	B	1.2	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_011	4.07	9.2	CD	4.17	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_011	21.43	23.1	CS	21.63	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_011	41.35	37.1	CS	41.55	K1.11 Sedimentation by pipette	COMPLETED

BH_TUN_011	4.07	9.2	CD	4.17	K1.1 Moisture content	COMPLETED
BH_TUN_011	11	15.1	CD	11.1	K1.1 Moisture content	COMPLETED
BH_TUN_011	36.5	33.1	CS	36.7	K1.1 Moisture content	COMPLETED
BH_TUN_011	41.65	37.2	CS	41.8	K1.1 Moisture content	COMPLETED
BH_TUN_015	10.3	13.2	CES	10.5	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_015	14.72	16.1	CD	14.82	K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_015	23.9	22.1	CS	24.2	K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_015	20.9	20.1	CS	21.2	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_015	2.85	8.1	CS	3	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
BH_TUN_015	16.4	17.1	CS	16.7	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_015	4.95	9.2	CS	5.2	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_015	19.5	19.1	CS	19.8	K6.16 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression without the measurement of pore pressure	COMPLETED
BH_TUN_015	18	18.1	CS	18.2	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_015	18	18.1	CS	18.2	K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_015	13.2	15.2	CS	13.38	K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_015	22.39	21.1	CS	22.6	K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_015	22.39	21.1	CS	22.6	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_015	4.95	9.2	CS	5.2	K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_015	11.3	14.1	CS	11.6	K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_015	18	18.1	CS	18.2	K2.14 Redox potential	COMPLETED
BH_TUN_015	14.72	16.1	CD	14.82	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_015	25.4	23.1	CS	25.7	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_015	6.28	10.1	CS	6.48	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_015	18	18.1	CS	18.2	K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_015	19.5	19.1	CS	19.8	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_015	14.72	16.1	CD	14.82	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_015	25.4	23.1	CS	25.7	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_015	2.85	8.1	CS	3	K1.1 Moisture content	COMPLETED
BH_TUN_015	4.95	9.2	CS	5.2	K1.1 Moisture content	COMPLETED
BH_TUN_015	7.65	11.2	CS	7.88	K1.1 Moisture content	COMPLETED
BH_TUN_015	19.5	19.1	CS	19.8	K1.1 Moisture content	COMPLETED
BH_TUN_015	20.9	20.1	CS	21.2	K1.1 Moisture content	COMPLETED
BH_TUN_016	21.82	21.1	CS	22.07	Unconfined compressive strength of 38 mm diameter specimen	COMPLETED
BH_TUN_016	14.5	16.1	CS	14.8	Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_016	21.82	21.1	CS	22.07	K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_016	16.86	18.1	CS	17.17	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_016	18.6	19.1	CS	18.9	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_016	26.45	24.1	CS	26.75	K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_016	2.43	8.1	CS	2.67	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_TUN_016	6.64	11.1	CS	6.86	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_016	20.2	20.1	CS	20.45	K6.16 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression without the measurement of pore pressure	COMPLETED
BH_TUN_016	14.5	16.1	CS	14.8	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_TUN_016	26.45	24.1	CS	26.75	K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_016	18.6	19.1	CS	18.9	K4.9 Dispersibility by crumb method	COMPLETED
BH_TUN_016	18.6	19.1	CS	18.9	K4.8 Dispersibility by pinhole method	RESTRICTED
BH_TUN_016	15.65	17.1	CS	15.95	K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_016	23.2	22.1	CS	23.5	K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_016	23.2	22.1	CS	23.5	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_016	14.5	16.1	CS	14.8	K2.14 Redox potential	COMPLETED
BH_TUN_016	6.64	11.1	CS	6.86	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_016	15.65	17.1	CS	15.95	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_016	1.34	7.1	CS	1.47	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_016	3.61	9.1	CS	3.85	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_016	16.86	18.1	CS	17.17	K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_016	2.43	8.1	CS	2.67	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_016	8.49	12.1	CD	8.6	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_016	20.2	20.1	CS	20.45	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_016	6.64	11.1	CS	6.86	K1.11 Sedimentation by pipette	COMPLETED

BH_TUN_016	15.65	17.1	CS	15.95		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_016	18.6	19.1	CS	18.9		K1.1 Moisture content	COMPLETED
BH_TUN_016	20.2	20.1	CS	20.45		K1.1 Moisture content	COMPLETED
BH_TUN_017	17.7	19.1	CS	17.97		X-ray diffraction BS EN 13925-3:2005	RESTRICTED
BH_TUN_017	22	22.1	CS	22.2		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_017	11.7	15.1	CS	12.02		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_017	17.7	19.1	CS	17.97		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_017	22	22.1	CS	22.2		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_TUN_017	20.85	21.1	CS	21.08		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
BH_TUN_017	14.43	17.1	CS	14.62		K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_017	19.25	20.1	CS	19.5		K6.16 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression without the measurement of pore pressure	COMPLETED
BH_TUN_017	14.43	17.1	CS	14.62		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_017	25.2	24.1	CB	25.5		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_017	19.25	20.1	CS	19.5		K4.9 Dispersibility by crumb method	COMPLETED
BH_TUN_017	19.25	20.1	CS	19.5		K4.8 Dispersibility by pinhole method	RESTRICTED
BH_TUN_017	15.9	18.1	CB	16.17		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_017	23.7	23.1	CS	24		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_017	23.7	23.1	CS	24		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_017	2.5	8.1	CB	2.8		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_017	14.43	17.1	CS	14.62		K2.14 Redox potential	COMPLETED
BH_TUN_017	3.53	9.1	CS	3.78		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_017	10.18	14.3	CB	10.5		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_017	15.9	18.1	CB	16.17		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_017	1.45	7.1	CB	1.75		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_TUN_017	7.2	12.2	CB	7.45		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_017	1.45	7.1	CB	1.75		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_017	10.18	14.3	CB	10.5		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_017	20.85	21.1	CS	21.08		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_017	3.53	9.1	CS	3.78		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_017	10.18	14.3	CB	10.5		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_017	15.9	18.1	CB	16.17		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_017	19.25	20.1	CS	19.5		K1.1 Moisture content	COMPLETED
BH_TUN_017	20.85	21.1	CS	21.08		K1.1 Moisture content	COMPLETED
BH_TUN_018	30.5	27.1	CS	30.72		X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_TUN_018	44.1	36.1	CS	44.4		X-ray diffraction BS EN 13925-3:2005	COMPLETED
BH_TUN_018	0.4	4	B	0.8	SE38210921004	Particle size distribution by wet sieving	COMPLETED
BH_TUN_018	1.1	8	ES	1.2		L1.1 MML Comprehensive Soil Suite	RESTRICTED
BH_TUN_018	1.1	8	ES	1.2		L1.1 MML Comprehensive Soil Suite	RESTRICTED
BH_TUN_018	10.2	13.2	CES	10.3		L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_018	12.3	15.1	CS	12.6		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_018	31.87	28.1	CS	32		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_018	41.4	34.1	CS	41.6		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_018	45.5	37.1	CS	45.8		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
BH_TUN_018	2.6	8.1	CS	2.9		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_018	21	21.1	CS	21.11		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_018	33.74	29.1	CS	33.98		K8.15 Deformability in uniaxial compression	COMPLETED
BH_TUN_018	2.6	8.1	CS	2.9		K8.14 Uniaxial compressive strength	COMPLETED
BH_TUN_018	21	21.1	CS	21.11		K8.14 Uniaxial compressive strength	RESTRICTED
BH_TUN_018	33.74	29.1	CS	33.98		K8.14 Uniaxial compressive strength	COMPLETED
BH_TUN_018	1.6	7.1	CS	1.9		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_TUN_018	27.4	25.1	CS	27.7		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_018	31.87	28.1	CS	32		K7.1 Consolidated undrained triaxial compression test with measurement of pore pressure (set of three 38 mm specimens), test duration not exceeding 4 days per specime	RESTRICTED
BH_TUN_018	6.35	11.1	CS	6.6		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
BH_TUN_018	7.45	11.2	CS	7.65		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
BH_TUN_018	26	24.1	CS	26.22		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_018	39.5	33.1	CS	39.8		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_018	7.45	11.2	CS	7.65		K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_018	8.45	12.1	CS	8.75		K6.2 Shear strength by hand vane (set of 3)	COMPLETED

BH_TUN_018	3.45	91	CS	3.7		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_TUN_018	10.84	14.1	CS	11.02		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
BH_TUN_018	29	26.1	CS	29.28		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_TUN_018	7.45	11.2	CS	7.65		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_TUN_018	16.5	18.1	CS	16.76		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_018	19.5	20.1	CS	19.8		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_018	30.5	27.1	CS	30.72		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_018	45.5	37.1	CS	45.8		K6.1 Shear strength by laboratory vane method (set of 3)	COMPLETED
BH_TUN_018	13.73	16.1	CS	14		K4.9 Dispersibility by crumb method	COMPLETED
BH_TUN_018	42.5	35.1	CS	42.8		K4.9 Dispersibility by crumb method	COMPLETED
BH_TUN_018	21.42	21.2	CS	21.72		K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_018	35.26	30.1	CS	35.5		K4.8 Dispersibility by pinhole method	COMPLETED
BH_TUN_018	24.6	23.1	CS	24.9		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_018	35.26	30.1	CS	35.5		K4.3 Measurements of swelling pressure, test period 2 days	COMPLETED
BH_TUN_018	4.4	9.2	CS	4.7		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_018	23	22.1	CS	23.3		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_018	38.2	32.1	CS	38.5		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_018	0.4	4	B	0.8	SE38210921004	K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_018	1	5	D	1.1	SE38210921005	K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_018	11.1	14.2	CD	11.2		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_018	48.2	39.1	CS	48.4		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_018	12.3	15.1	CS	12.6		K2.14 Redox potential	COMPLETED
BH_TUN_018	21.42	21.2	CS	21.72		K2.14 Redox potential	COMPLETED
BH_TUN_018	42.5	35.1	CS	42.8		K2.14 Redox potential	COMPLETED
BH_TUN_018	15.13	17.1	CS	15.43		K2.12 pH values	COMPLETED
BH_TUN_018	24.6	23.1	CS	24.9		K2.12 pH values	COMPLETED
BH_TUN_018	36.6	31.1	CS	36.72		K2.12 pH values	COMPLETED
BH_TUN_018	44.1	36.1	CS	44.4		K2.12 pH values	COMPLETED
BH_TUN_018	11.1	14.2	CD	11.2		K2.1 Organic matter content	COMPLETED
BH_TUN_018	47.45	38.1	CS	47.75		K2.1 Organic matter content	COMPLETED
BH_TUN_018	0.4	4	B	0.8	SE38210921004	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_018	0.8	6	B	1.2	SE38210921006	K1.9 Particle size distribution by wet sieving	RESTRICTED
BH_TUN_018	5.3	10.1	CS	5.6		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_018	11.1	14.2	CD	11.2		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_018	19.5	20.1	CS	19.8		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_018	30.5	27.1	CS	30.72		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_018	47.45	38.1	CS	47.75		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_018	0.4	4	B	0.8	SE38210921004	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_TUN_018	0.8	6	B	1.2	SE38210921006	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_TUN_018	5.3	10.1	CS	5.6		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_018	8.45	12.1	CS	8.75		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_018	11.1	14.2	CD	11.2		K1.5 Density by linear measurement	RESTRICTED
BH_TUN_018	48.2	39.1	CS	48.4		K1.5 Density by linear measurement	COMPLETED
BH_TUN_018	0.4	4	B	0.8	SE38210921004	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_018	0.8	6	B	1.2	SE38210921006	K1.2 Liquid limit, plastic limit and plasticity index	RESTRICTED
BH_TUN_018	1	5	D	1.1	SE38210921005	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_018	7.45	11.2	CS	7.65		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_018	11.1	14.2	CD	11.2		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_018	18	19.1	CS	18.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_018	29	26.1	CS	29.28		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_018	47.45	38.1	CS	47.75		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_018	48.2	39.1	CS	48.4		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_018	0.4	4	B	0.8	SE38210921004	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_018	0.8	6	B	1.2	SE38210921006	K1.11 Sedimentation by pipette	RESTRICTED
BH_TUN_018	5.3	10.1	CS	5.6		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_018	11.1	14.2	CD	11.2		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_018	19.5	20.1	CS	19.8		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_018	30.5	27.1	CS	30.72		K1.11 Sedimentation by pipette	COMPLETED

BH_TUN_018	47.45	38.1	CS	47.75		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_018	1	5	D	1.1	SE38210921005	K1.1 Moisture content	COMPLETED
BH_TUN_018	11.1	14.2	CD	11.2		K1.1 Moisture content	COMPLETED
BH_TUN_018	27.4	25.1	CS	27.7		K1.1 Moisture content	COMPLETED
BH_TUN_018	47.45	38.1	CS	47.75		K1.1 Moisture content	COMPLETED
IP_TUN_004	0.5	5	ES	0.55		L2.1 MML full WAC Suite	COMPLETED
IP_TUN_004	1.1	8	ES	1.2		L1.2 MML Leachate Suite	COMPLETED
IP_TUN_004	1.1	8	ES	1.2		L1.1 MML Comprehensive Soil Suite	COMPLETED
IP_TUN_005A	0.5	5	ES	0.55		L1.1 MML Comprehensive Soil Suite	COMPLETED
IP_TUN_006	1.15	2	LB	1.2		K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
IP_TUN_006	0.5	1	LB	0.55		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
IP_TUN_006	0.5	1	LB	0.55		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
IP_TUN_006	0.5	1	LB	0.55		K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
IP_TUN_006	1.15	2	LB	1.2		K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
IP_TUN_006	0.5	1	LB	0.55		K3.7 Moisture Condition Value/moisture content relationship	COMPLETED
IP_TUN_006	1.15	2	LB	1.2		K3.7 Moisture Condition Value/moisture content relationship	COMPLETED
IP_TUN_006	0.5	1	LB	0.55		K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
IP_TUN_006	1.15	2	LB	1.2		K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
IP_TUN_006	1.15	2	LB	1.2		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
IP_TUN_006	0.5	1	LB	0.55		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
IP_TUN_006	0.5	1	LB	0.55		K1.9 Particle size distribution by wet sieving	COMPLETED
IP_TUN_006	1.15	2	LB	1.2		K1.9 Particle size distribution by wet sieving	COMPLETED
IP_TUN_006	0.5	1	LB	0.55		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
IP_TUN_006	1.15	2	LB	1.2		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
IP_TUN_006	0.5	1	LB	0.55		K1.11 Sedimentation by pipette	COMPLETED
IP_TUN_006	1.15	2	LB	1.2		K1.11 Sedimentation by pipette	COMPLETED
IP_TUN_006	0.5	1	LB	0.55		K1.1 Moisture content	COMPLETED
IP_TUN_006	1.15	2	LB	1.2		K1.1 Moisture content	COMPLETED
SW01	0	1	EW	0		L1.3 MML Groundwater Suite	COMPLETED
SW02	0	1	EW	0		L1.3 MML Groundwater Suite	COMPLETED
SW03	0	1	EW	0		L1.3 MML Groundwater Suite	COMPLETED
TP_FE_001	2.2	4	B	2.3		K4.7 Permeability by constant head method	COMPLETED
TP_FE_001	0.3	1	B	0.35		K2.2 Mass loss on ignition	COMPLETED
TP_FE_001	0.3	1	B	0.35		K2.1 Organic matter content	COMPLETED
TP_FE_001	1	2	B	1.1		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_001	2.2	4	B	2.3		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_001	1	2	B	1.1		K1.5 Density by linear measurement	COMPLETED
TP_FE_001	2.2	4	B	2.3		K1.5 Density by linear measurement	COMPLETED
TP_FE_001	0.3	1	B	0.35		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_001	1	2	B	1.1		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_001	1.2	3	B	1.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_001	2.2	4	B	2.3		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_001	2.4	5	LB	2.5		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_001	1	2	B	1.1		K1.11 Sedimentation by pipette	COMPLETED
TP_FE_001	2.2	4	B	2.3		K1.11 Sedimentation by pipette	COMPLETED
TP_FE_001	0.3	1	B	0.35		K1.1 Moisture content	COMPLETED
TP_FE_001	1	2	B	1.1		K1.1 Moisture content	COMPLETED
TP_FE_001	1.2	3	B	1.3		K1.1 Moisture content	COMPLETED
TP_FE_001	2.2	4	B	2.3		K1.1 Moisture content	COMPLETED
TP_FE_001	2.4	5	LB	2.5		K1.1 Moisture content	COMPLETED
TP_FE_002	2	4	LB	2.05		X-ray diffraction BS EN 13925-3:2005	COMPLETED
TP_FE_002	2	4	LB	2.05		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
TP_FE_002	2	4	LB	2.05		K8.20 Swelling pressure test	COMPLETED
TP_FE_002	2	4	LB	2.05		K4.9 Dispersibility by crumb method	COMPLETED
TP_FE_002	2	4	LB	2.05		K4.8 Dispersibility by pinhole method	COMPLETED
TP_FE_002	1	3	B	1.05		K4.7 Permeability by constant head method	COMPLETED
TP_FE_002	2	4	LB	2.05		K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_FE_002	2	4	LB	2.05		K3.6 Moisture Condition Value at natural moisture content	COMPLETED

TP_FE_002	2	4	LB	2.05	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_FE_002	2	4	LB	2.05	K3.10 Extra over Item K3.9 for soaking	COMPLETED
TP_FE_002	2	4	LB	2.05	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_FE_002	0.3	1	B	0.55	K2.2 Mass loss on ignition	COMPLETED
TP_FE_002	2	4	LB	2.05	K2.14 Redox potential	COMPLETED
TP_FE_002	0.3	1	B	0.55	K2.1 Organic matter content	COMPLETED
TP_FE_002	0.3	1	B	0.55	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_002	0.7	2	B	0.75	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_002	1	3	B	1.05	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_002	2	4	LB	2.05	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_002	2	4	LB	2.05	K1.8 Particle density by gas jar or pycnometer	COMPLETED
TP_FE_002	2	4	LB	2.05	K1.6 Density by immersion in water or water displacement	COMPLETED
TP_FE_002	2	4	LB	2.05	K1.3 Volumetric shrinkage	COMPLETED
TP_FE_002	0.3	1	B	0.55	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_002	0.7	2	B	0.75	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_002	1	3	B	1.05	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_002	2	4	LB	2.05	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_002	0.3	1	B	0.55	K1.11 Sedimentation by pipette	COMPLETED
TP_FE_002	0.7	2	B	0.75	K1.11 Sedimentation by pipette	COMPLETED
TP_FE_002	1	3	B	1.05	K1.11 Sedimentation by pipette	COMPLETED
TP_FE_002	2	4	LB	2.05	K1.11 Sedimentation by pipette	COMPLETED
TP_FE_002	0.3	1	B	0.55	K1.1 Moisture content	COMPLETED
TP_FE_002	0.7	2	B	0.75	K1.1 Moisture content	COMPLETED
TP_FE_002	1	3	B	1.05	K1.1 Moisture content	COMPLETED
TP_FE_002	2	4	LB	2.05	K1.1 Moisture content	COMPLETED
TP_FE_003	0.25	2	B		K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
TP_FE_003	1	5	B		K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
TP_FE_003	1	5	B		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
TP_FE_003	0.5	4	B		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_FE_003	0.5	4	B		K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_FE_003	0.5	4	B		K3.8 Chalk crushing value	RESTRICTED
TP_FE_003	1	5	B		K3.8 Chalk crushing value	COMPLETED
TP_FE_003	2	7	B		K3.8 Chalk crushing value	COMPLETED
TP_FE_003	1	5	B		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
TP_FE_003	0.5	4	B		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_FE_003	0.5	4	B		K2.6 Carbonate content by rapid titration	COMPLETED
TP_FE_003	1	5	B		K2.6 Carbonate content by rapid titration	COMPLETED
TP_FE_003	0.25	2	B		K2.2 Mass loss on ignition	COMPLETED
TP_FE_003	0.25	2	B		K2.1 Organic matter content	COMPLETED
TP_FE_003	0.5	4	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_003	2	7	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_003	0.5	4	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_FE_003	1	5	B		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_FE_003	2.8	9	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_FE_003	0.25	2	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_003	1	5	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_003	2.8	9	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_003	0.5	4	B		K1.11 Sedimentation by pipette	COMPLETED
TP_FE_003	2	7	B		K1.11 Sedimentation by pipette	COMPLETED
TP_FE_003	0.25	2	B		K1.1 Moisture content	COMPLETED
TP_FE_003	0.5	4	B		K1.1 Moisture content	COMPLETED
TP_FE_003	1	5	B		K1.1 Moisture content	COMPLETED
TP_FE_003	2	7	B		K1.1 Moisture content	COMPLETED
TP_FE_004	2	3	B		K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
TP_FE_004	2	3	B		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
TP_FE_004	3	4	B		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_FE_004	3	4	B		K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_FE_004	2	3	B		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED

TP_FE_004	3	4	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_FE_004	0.4	1	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_004	1	2	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_004	2	3	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_FE_004	3	4	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_FE_004	0.4	1	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_004	1	2	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_004	2	3	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_004	3	4	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_004	0.4	1	B	K1.11 Sedimentation by pipette	COMPLETED
TP_FE_004	1	2	B	K1.11 Sedimentation by pipette	COMPLETED
TP_FE_004	0.4	1	B	K1.1 Moisture content	COMPLETED
TP_FE_004	1	2	B	K1.1 Moisture content	COMPLETED
TP_FE_004	2	3	B	K1.1 Moisture content	COMPLETED
TP_FE_004	3	4	B	K1.1 Moisture content	COMPLETED
TP_FE_005	3	8	B	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
TP_FE_005	2	7	B	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_FE_005	2	7	B	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_FE_005	1	5	B	K3.8 Chalk crushing value	RESTRICTED
TP_FE_005	2	7	B	K3.8 Chalk crushing value	RESTRICTED
TP_FE_005	3	8	B	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_FE_005	2	7	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_FE_005	2	7	B	K2.6 Carbonate content by rapid titration	COMPLETED
TP_FE_005	2	7	B	K2.6 Carbonate content by rapid titration	RESTRICTED
TP_FE_005	3	8	B	K2.6 Carbonate content by rapid titration	RESTRICTED
TP_FE_005	2	7	B	K2.4 Sulphate content of water extract from soil	COMPLETED
TP_FE_005	2	7	B	K2.3 Sulphate content of acid extract from soil	COMPLETED
TP_FE_005	2	7	B	K2.10 Total sulphur content	COMPLETED
TP_FE_005	0.5	3	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_005	1	5	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_005	3	8	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_005	1	5	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_FE_005	2	7	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_FE_005	0.5	3	B	K1.6 Density by immersion in water or water displacement	RESTRICTED
TP_FE_005	0.5	3	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_005	1	5	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_005	3	8	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_005	0.5	3	B	K1.11 Sedimentation by pipette	COMPLETED
TP_FE_005	1	5	B	K1.11 Sedimentation by pipette	COMPLETED
TP_FE_005	3	8	B	K1.11 Sedimentation by pipette	COMPLETED
TP_FE_005	0.5	3	B	K1.1 Moisture content	COMPLETED
TP_FE_005	1	5	B	K1.1 Moisture content	COMPLETED
TP_FE_005	2	7	B	K1.1 Moisture content	COMPLETED
TP_FE_005	3	8	B	K1.1 Moisture content	COMPLETED
TP_FE_006	0.5	1	B	K1.9 Particle size distribution by wet sieving	RESTRICTED
TP_FE_006	1.2	2	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_FE_006	1.2	2	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_FE_006	2	3	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_FE_006	0.5	1	B	K1.2 Liquid limit, plastic limit and plasticity index	RESTRICTED
TP_FE_006	1.2	2	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_006	3	4	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_FE_006	0.5	1	B	K1.1 Moisture content	RESTRICTED
TP_FE_006	1.2	2	B	K1.1 Moisture content	COMPLETED
TP_FE_006	2	3	B	K1.1 Moisture content	COMPLETED
TP_FE_006	3	4	B	K1.1 Moisture content	COMPLETED
TP_STW_003	0.4	1	B	K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
TP_STW_003	2	3	B	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_003	2	3	B	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED

TP_STW_003	3	4	LB	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_003		1	AMAL	K4.11 Frost heave of soil	RESTRICTED
TP_STW_003	3	4	LB	K4.11 Frost heave of soil	RESTRICTED
TP_STW_003	1	2	B	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_003	1	2	B	K3.8 Chalk crushing value	COMPLETED
TP_STW_003	2	3	B	K3.8 Chalk crushing value	COMPLETED
TP_STW_003	3	4	LB	K3.8 Chalk crushing value	COMPLETED
TP_STW_003	1	2	B	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_003	2	3	B	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_003	1	2	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_003	3	4	LB	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_003	2	3	B	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_003	3	4	LB	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_003	0.4	1	B	K2.2 Mass loss on ignition	COMPLETED
TP_STW_003	0.4	1	B	K2.1 Organic matter content	COMPLETED
TP_STW_003	1	2	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_003	3	4	LB	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_003	1	2	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_003	2	3	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_003	3	4	LB	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_003	0.4	1	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_003	2	3	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_003	3	4	LB	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_003	1	2	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_003	3	4	LB	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_003	0.4	1	B	K1.1 Moisture content	COMPLETED
TP_STW_003	1	2	B	K1.1 Moisture content	COMPLETED
TP_STW_003	2	3	B	K1.1 Moisture content	COMPLETED
TP_STW_003	3	4	LB	K1.1 Moisture content	COMPLETED
TP_STW_004	1	2	B	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_004	1	2	B	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
TP_STW_004	3	4	LB	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_004		1	AMAL	K4.11 Frost heave of soil	RESTRICTED
TP_STW_004	3	4	LB	K4.11 Frost heave of soil	RESTRICTED
TP_STW_004	2	3	B	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_004	1	2	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_004	2	3	B	K3.8 Chalk crushing value	COMPLETED
TP_STW_004	3	4	LB	K3.8 Chalk crushing value	COMPLETED
TP_STW_004	2	3	B	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_004	1	2	B	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_004	2	3	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_004	3	4	LB	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_004	2	3	B	K2.6 Carbonate content by rapid titration	RESTRICTED
TP_STW_004	0.4	1	B	K2.2 Mass loss on ignition	COMPLETED
TP_STW_004	0.4	1	B	K2.1 Organic matter content	COMPLETED
TP_STW_004	0.4	1	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_004	1	2	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_004	1	2	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_004	2	3	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_004	3	4	LB	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_004	1	2	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_004	3	4	LB	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_004	0.4	1	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_004	1	2	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_004	0.4	1	B	K1.1 Moisture content	COMPLETED
TP_STW_004	1	2	B	K1.1 Moisture content	COMPLETED
TP_STW_004	2	3	B	K1.1 Moisture content	COMPLETED
TP_STW_004	3	4	LB	K1.1 Moisture content	COMPLETED

TP_STW_005	0.5	1	B		K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_005	0.5	1	B		K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
TP_STW_005	2	3	B		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_005		1	AMAL		K4.11 Frost heave of soil	RESTRICTED
TP_STW_005	3	4	LB		K4.11 Frost heave of soil	RESTRICTED
TP_STW_005	3	4	LB		K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_005	0.5	1	B		K3.8 Chalk crushing value	COMPLETED
TP_STW_005	2	3	B		K3.8 Chalk crushing value	COMPLETED
TP_STW_005	3	4	LB		K3.8 Chalk crushing value	COMPLETED
TP_STW_005	3	4	LB		K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_005	0.5	1	B		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_005	3	4	LB		K3.10 Extra over Item K3.9 for soaking	COMPLETED
TP_STW_005	2	3	B		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_005	3	4	LB		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_005	0.5	1	B		K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_005	0.5	1	B		K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_005	2	3	B		K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_005	0.5	1	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_005	3	4	LB		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_005	0.5	1	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_005	1	2	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_005	2	3	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_005	3	4	LB		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_005	0.5	1	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_005	2	3	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_005	0.5	1	B		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_005	3	4	LB		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_005	0.5	1	B		K1.1 Moisture content	COMPLETED
TP_STW_005	1	2	B		K1.1 Moisture content	COMPLETED
TP_STW_005	2	3	B		K1.1 Moisture content	COMPLETED
TP_STW_005	3	4	LB		K1.1 Moisture content	COMPLETED
TP_STW_006	3	4	LB		K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_006	1	2	B		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
TP_STW_006		1	AMAL		K4.11 Frost heave of soil	RESTRICTED
TP_STW_006	3	4	LB		K4.11 Frost heave of soil	RESTRICTED
TP_STW_006	2	3	B		K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_006	2	3	B		K3.8 Chalk crushing value	COMPLETED
TP_STW_006	3	4	LB		K3.8 Chalk crushing value	COMPLETED
TP_STW_006	3	4	LB		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_006	2	3	B		K3.10 Extra over Item K3.9 for soaking	COMPLETED
TP_STW_006	1	2	B		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_006	2	3	B		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_006	1	2	B		K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_006	0.5	1	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_006	2	3	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_006	1	2	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_006	2	3	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_006	3	4	LB		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_006	0.5	1	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_006	1	2	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_006	2	3	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_006	0.5	1	B		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_006	2	3	B		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_006	0.5	1	B		K1.1 Moisture content	COMPLETED
TP_STW_006	1	2	B		K1.1 Moisture content	COMPLETED
TP_STW_006	2	3	B		K1.1 Moisture content	COMPLETED
TP_STW_006	3	4	LB		K1.1 Moisture content	COMPLETED
TP_STW_007	0.2	1	ES	0.2	L1.1 MML Comprehensive Soil Suite	COMPLETED

TP_STW_007	3	9	LB	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_007	3	9	LB	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	RESTRICTED
TP_STW_007	2	8	B	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_007	1.5	6	B	K4.7 Permeability by constant head method	COMPLETED
TP_STW_007		1	AMAL	K4.11 Frost heave of soil	RESTRICTED
TP_STW_007	3	9	LB	K4.11 Frost heave of soil	RESTRICTED
TP_STW_007	2	8	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_007	3	9	LB	K3.8 Chalk crushing value	RESTRICTED
TP_STW_007	3	9	LB	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_007	2	8	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_007	2	8	B	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_007	3	9	LB	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_007	1.5	6	B	K2.2 Mass loss on ignition	COMPLETED
TP_STW_007	1.5	6	B	K2.1 Organic matter content	COMPLETED
TP_STW_007	1.5	6	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_007	2	8	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_007	3	9	LB	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_007	0.5	2	B	K1.6 Density by immersion in water or water displacement	RESTRICTED
TP_STW_007	0.5	2	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_007	1.5	6	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_007	2	8	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_007	1.5	6	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_007	0.5	2	B	K1.1 Moisture content	COMPLETED
TP_STW_007	1.5	6	B	K1.1 Moisture content	COMPLETED
TP_STW_007	2	8	B	K1.1 Moisture content	COMPLETED
TP_STW_007	3	9	LB	K1.1 Moisture content	COMPLETED
TP_STW_010	0.5	1	B	K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
TP_STW_010	2	3	B	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_010	3	4	LB	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
TP_STW_010		1	AMAL	K4.11 Frost heave of soil	COMPLETED
TP_STW_010	3	4	LB	K4.11 Frost heave of soil	COMPLETED
TP_STW_010	1	2	B	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_010	1	2	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_010	2	3	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_010	3	4	LB	K3.8 Chalk crushing value	COMPLETED
TP_STW_010	1	2	B	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_010	2	3	B	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_010	3	4	LB	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_010	1	2	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_010	3	4	LB	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
TP_STW_010	1	2	B	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_010	0.5	1	B	K2.2 Mass loss on ignition	COMPLETED
TP_STW_010	0.5	1	B	K2.1 Organic matter content	COMPLETED
TP_STW_010	1	2	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_010	3	4	LB	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_010	1	2	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_010	2	3	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_010	3	4	LB	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_010	0.5	1	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_010	2	3	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_010	1	2	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_010	3	4	LB	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_010	0.5	1	B	K1.1 Moisture content	COMPLETED
TP_STW_010	1	2	B	K1.1 Moisture content	COMPLETED
TP_STW_010	2	3	B	K1.1 Moisture content	COMPLETED
TP_STW_010	3	4	LB	K1.1 Moisture content	COMPLETED
TP_STW_011	3	4	LB	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_011	1	2	B	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED

TP_STW_011		1	AMAL	K4.11 Frost heave of soil	COMPLETED
TP_STW_011	3	4	LB	K4.11 Frost heave of soil	COMPLETED
TP_STW_011	2	3	B	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_011	1	2	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_011	2	3	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_011	3	4	LB	K3.8 Chalk crushing value	COMPLETED
TP_STW_011	2	3	B	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_011	3	4	LB	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_011	2	3	B	K3.10 Extra over Item K3.9 for soaking	COMPLETED
TP_STW_011	1	2	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_011	2	3	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_011	1	2	B	K2.7 Carbonate content by gravimetric method	COMPLETED
TP_STW_011	2	3	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_011	1	2	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_011	2	3	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_011	3	4	LB	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_011	0.5	1	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_011	1	2	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_011	3	4	LB	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_011	2	3	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_011	0.5	1	B	K1.1 Moisture content	COMPLETED
TP_STW_011	1	2	B	K1.1 Moisture content	COMPLETED
TP_STW_011	2	3	B	K1.1 Moisture content	COMPLETED
TP_STW_011	3	4	LB	K1.1 Moisture content	COMPLETED
TP_STW_012	3	5	LB	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_012	1.2	3	B	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_012	0.8	2	B	K4.7 Permeability by constant head method	RESTRICTED
TP_STW_012		1	AMAL	K4.11 Frost heave of soil	COMPLETED
TP_STW_012	3	5	LB	K4.11 Frost heave of soil	COMPLETED
TP_STW_012	2	4	B	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_012	1.2	3	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_012	2	4	B	K3.8 Chalk crushing value	COMPLETED
TP_STW_012	3	5	LB	K3.8 Chalk crushing value	COMPLETED
TP_STW_012	2	4	B	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_012	3	5	LB	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	RESTRICTED
TP_STW_012	1.2	3	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_012	2	4	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_012	0.5	1	B	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_012	1.2	3	B	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_012	3	5	LB	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_012	3	5	LB	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_012	0.5	1	B	K2.4 Sulphate content of water extract from soil	COMPLETED
TP_STW_012	0.5	1	B	K2.3 Sulphate content of acid extract from soil	COMPLETED
TP_STW_012	0.8	2	B	K2.2 Mass loss on ignition	COMPLETED
TP_STW_012	0.5	1	B	K2.10 Total sulphur content	COMPLETED
TP_STW_012	0.8	2	B	K2.1 Organic matter content	COMPLETED
TP_STW_012	2	4	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_012	1.2	3	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_012	2	4	B	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_012	3	5	LB	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_012	0.5	1	B	K1.6 Density by immersion in water or water displacement	RESTRICTED
TP_STW_012	0.5	1	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_012	1.2	3	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_012	2	4	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_012	0.5	1	B	K1.1 Moisture content	COMPLETED
TP_STW_012	0.8	2	B	K1.1 Moisture content	COMPLETED
TP_STW_012	1.2	3	B	K1.1 Moisture content	COMPLETED
TP_STW_012	2	4	B	K1.1 Moisture content	COMPLETED

TP_STW_012	3	5	LB		K1.1 Moisture content	COMPLETED
TP_STW_013	2	4	B	2.5	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_013	0.5	2	B	1	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_013		1	AMAL		K4.11 Frost heave of soil	RESTRICTED
TP_STW_013	2.8	5	LB	3	K4.11 Frost heave of soil	RESTRICTED
TP_STW_013	1.5	3	B	2	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_013	0.5	2	B	1	K3.8 Chalk crushing value	RESTRICTED
TP_STW_013	1.5	3	B	2	K3.8 Chalk crushing value	COMPLETED
TP_STW_013	2	4	B	2.5	K3.8 Chalk crushing value	COMPLETED
TP_STW_013	2.8	5	LB	3	K3.8 Chalk crushing value	COMPLETED
TP_STW_013	2.8	5	LB	3	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_013	2	4	B	2.5	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_013	0.5	2	B	1	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_013	1.5	3	B	2	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_013	2.8	5	LB	3	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_013	0.5	2	B	1	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_013	2.8	5	LB	3	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_013	0.1	1	B	0.4	K2.1 Organic matter content	COMPLETED
TP_STW_013	1.5	3	B	2	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_013	2.8	5	LB	3	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_013	0.5	2	B	1	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_013	1.5	3	B	2	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_013	2	4	B	2.5	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_013	2.8	5	LB	3	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_013	0.1	1	B	0.4	K1.6 Density by immersion in water or water displacement	COMPLETED
TP_STW_013	0.1	1	B	0.4	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_013	2.8	5	LB	3	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_013	1.5	3	B	2	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_013	2.8	5	LB	3	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_013	0.1	1	B	0.4	K1.1 Moisture content	COMPLETED
TP_STW_013	0.5	2	B	1	K1.1 Moisture content	COMPLETED
TP_STW_013	1.5	3	B	2	K1.1 Moisture content	COMPLETED
TP_STW_013	2	4	B	2.5	K1.1 Moisture content	COMPLETED
TP_STW_013	2.8	5	LB	3	K1.1 Moisture content	COMPLETED
TP_STW_014	1.2	5	B		K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_014	3	7	LB		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	RESTRICTED
TP_STW_014		1	AMAL		K4.11 Frost heave of soil	COMPLETED
TP_STW_014	3	7	LB		K4.11 Frost heave of soil	COMPLETED
TP_STW_014	2	6	B		K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_014	1.2	5	B		K3.8 Chalk crushing value	RESTRICTED
TP_STW_014	2	6	B		K3.8 Chalk crushing value	COMPLETED
TP_STW_014	3	7	LB		K3.8 Chalk crushing value	COMPLETED
TP_STW_014	2	6	B		K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_014	1.2	5	B		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_014	3	7	LB		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_014	2	6	B		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_014	3	7	LB		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
TP_STW_014	0.5	2	B		K2.2 Mass loss on ignition	COMPLETED
TP_STW_014	0.5	2	B		K2.1 Organic matter content	COMPLETED
TP_STW_014	0.5	2	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_014	2	6	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_014	1.2	5	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_014	2	6	B		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_014	3	7	LB		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_014	2	6	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_014	0.5	2	B		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_014	2	6	B		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_014	0.5	2	B		K1.1 Moisture content	COMPLETED

TP_STW_014	1.2	5	B		K1.1 Moisture content	COMPLETED
TP_STW_014	2	6	B		K1.1 Moisture content	COMPLETED
TP_STW_014	3	7	LB		K1.1 Moisture content	COMPLETED
TP_STW_015	1	2	B		K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_015	2	3	B		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_015		1	AMAL		K4.11 Frost heave of soil	COMPLETED
TP_STW_015	3	4	LB		K4.11 Frost heave of soil	COMPLETED
TP_STW_015	3	4	LB		K3.9 California Bearing Ratio on recompacted disturbed sample	RESTRICTED
TP_STW_015	1	2	B		K3.8 Chalk crushing value	RESTRICTED
TP_STW_015	2	3	B		K3.8 Chalk crushing value	COMPLETED
TP_STW_015	3	4	LB		K3.8 Chalk crushing value	COMPLETED
TP_STW_015	3	4	LB		K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_015	1	2	B		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_015	3	4	LB		K3.10 Extra over Item K3.9 for soaking	COMPLETED
TP_STW_015	2	3	B		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_015	3	4	LB		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
TP_STW_015	3	4	LB		K2.7 Carbonate content by gravimetric method	COMPLETED
TP_STW_015	2	3	B		K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_015	0.5	1	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_015	2	3	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_015	1	2	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_015	2	3	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_015	3	4	LB		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_015	1	2	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_015	3	4	LB		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_015	0.5	1	B		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_015	2	3	B		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_015	0.5	1	B		K1.1 Moisture content	COMPLETED
TP_STW_015	1	2	B		K1.1 Moisture content	COMPLETED
TP_STW_015	2	3	B		K1.1 Moisture content	COMPLETED
TP_STW_015	3	4	LB		K1.1 Moisture content	COMPLETED
TP_STW_016	2	3	B		K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_016	3	4	LB		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_016	1.1	2	B		K4.7 Permeability by constant head method	COMPLETED
TP_STW_016		1	AMAL		K4.11 Frost heave of soil	COMPLETED
TP_STW_016	3	4	LB		K4.11 Frost heave of soil	COMPLETED
TP_STW_016	2	3	B		K3.8 Chalk crushing value	RESTRICTED
TP_STW_016	3	4	LB		K3.8 Chalk crushing value	RESTRICTED
TP_STW_016	2	3	B		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_016	3	4	LB		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_016	3	4	LB		K2.7 Carbonate content by gravimetric method	COMPLETED
TP_STW_016	1.1	2	B		K2.2 Mass loss on ignition	COMPLETED
TP_STW_016	1.1	2	B		K2.1 Organic matter content	COMPLETED
TP_STW_016	3	4	LB		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_016	2	3	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_016	3	4	LB		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_016	0.5	1	B	0.5	K1.6 Density by immersion in water or water displacement	RESTRICTED
TP_STW_016	0.5	1	B	0.5	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_016	2	3	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_016	3	4	LB		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_016	3	4	LB		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_016	1.1	2	B		K1.1 Moisture content	COMPLETED
TP_STW_016	2	3	B		K1.1 Moisture content	COMPLETED
TP_STW_016	3	4	LB		K1.1 Moisture content	COMPLETED
TP_STW_017	3	4	LB		K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_017	1	2	B		K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_017		1	AMAL		K4.11 Frost heave of soil	COMPLETED
TP_STW_017	3	4	LB		K4.11 Frost heave of soil	COMPLETED

TP_STW_017	2	3	B	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_017	1	2	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_017	2	3	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_017	3	4	LB	K3.8 Chalk crushing value	RESTRICTED
TP_STW_017	2	3	B	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_017	3	4	LB	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_017	2	3	B	K3.10 Extra over Item K3.9 for soaking	COMPLETED
TP_STW_017	1	2	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_017	2	3	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_017	1	2	B	K2.7 Carbonate content by gravimetric method	COMPLETED
TP_STW_017	0.5	1	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_017	2	3	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_017	1	2	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_017	2	3	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_017	3	4	LB	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_017	0.5	1	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_017	1	2	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_017	2	3	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_017	0.5	1	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_017	2	3	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_017	0.5	1	B	K1.1 Moisture content	COMPLETED
TP_STW_017	1	2	B	K1.1 Moisture content	COMPLETED
TP_STW_017	2	3	B	K1.1 Moisture content	COMPLETED
TP_STW_017	3	4	LB	K1.1 Moisture content	COMPLETED
TP_STW_018	0.5	2	B	K9.2 Suite B (Greenfield site - pyrite present Schedule 1.19.6)	COMPLETED
TP_STW_018	2	7	B	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_018	3	8	LB	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_018		1	AMAL	K4.11 Frost heave of soil	RESTRICTED
TP_STW_018	3	8	LB	K4.11 Frost heave of soil	RESTRICTED
TP_STW_018	1	4	B	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_018	1	4	B	K3.8 Chalk crushing value	COMPLETED
TP_STW_018	2	7	B	K3.8 Chalk crushing value	RESTRICTED
TP_STW_018	3	8	LB	K3.8 Chalk crushing value	COMPLETED
TP_STW_018	1	4	B	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_018	2	7	B	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_018	1	4	B	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_018	3	8	LB	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_018	0.5	2	B	K2.2 Mass loss on ignition	COMPLETED
TP_STW_018	0.5	2	B	K2.1 Organic matter content	COMPLETED
TP_STW_018	1	4	B	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_018	3	8	LB	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_018	1	4	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_018	2	7	B	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_018	3	8	LB	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_018	0.5	2	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_018	2	7	B	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_018	1	4	B	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_018	3	8	LB	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_018	0.5	2	B	K1.1 Moisture content	COMPLETED
TP_STW_018	1	4	B	K1.1 Moisture content	COMPLETED
TP_STW_018	2	7	B	K1.1 Moisture content	COMPLETED
TP_STW_018	3	8	LB	K1.1 Moisture content	COMPLETED
TP_STW_019	1	2	B	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_019	3	4	LB	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_019		1	AMAL	K4.11 Frost heave of soil	COMPLETED
TP_STW_019	3	4	LB	K4.11 Frost heave of soil	COMPLETED
TP_STW_019	2	3	B	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_019	1	2	B	K3.8 Chalk crushing value	RESTRICTED

TP_STW_019	2	3	B		K3.8 Chalk crushing value	RESTRICTED
TP_STW_019	3	4	LB		K3.8 Chalk crushing value	RESTRICTED
TP_STW_019	2	3	B		K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_019	1	2	B		K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_019	2	3	B		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_019	3	4	LB		K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_019	1	2	B		K2.7 Carbonate content by gravimetric method	COMPLETED
TP_STW_019	0.4	1	B		K2.2 Mass loss on ignition	COMPLETED
TP_STW_019	0.4	1	B		K2.1 Organic matter content	COMPLETED
TP_STW_019	0.4	1	B		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_019	3	4	LB		K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_019	1	2	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_019	2	3	B		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_019	3	4	LB		K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_019	2	3	B		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_019	3	4	LB		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_019	0.4	1	B		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_019	3	4	LB		K1.11 Sedimentation by pipette	COMPLETED
TP_STW_019	0.4	1	B		K1.1 Moisture content	COMPLETED
TP_STW_019	1	2	B		K1.1 Moisture content	COMPLETED
TP_STW_019	2	3	B		K1.1 Moisture content	COMPLETED
TP_STW_019	3	4	LB		K1.1 Moisture content	COMPLETED
TP_STW_020	1.2	3	B	1.25	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_020	2.95	6	LB	3	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_020		1	AMAL		K4.11 Frost heave of soil	COMPLETED
TP_STW_020	2.95	6	LB	3	K4.11 Frost heave of soil	COMPLETED
TP_STW_020	1.5	4	B	1.55	K3.9 California Bearing Ratio on recompacted disturbed sample	RESTRICTED
TP_STW_020	1.2	3	B	1.25	K3.8 Chalk crushing value	RESTRICTED
TP_STW_020	1.5	4	B	1.55	K3.8 Chalk crushing value	RESTRICTED
TP_STW_020	2.95	6	LB	3	K3.8 Chalk crushing value	RESTRICTED
TP_STW_020	1.5	4	B	1.55	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	RESTRICTED
TP_STW_020	1.2	3	B	1.25	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_020	1.5	4	B	1.55	K3.10 Extra over Item K3.9 for soaking	RESTRICTED
TP_STW_020	1.5	4	B	1.55	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
TP_STW_020	2.95	6	LB	3	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_020	1.5	4	B	1.55	K2.7 Carbonate content by gravimetric method	COMPLETED
TP_STW_020	0.4	1	B	0.45	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_020	1.5	4	B	1.55	K1.9 Particle size distribution by wet sieving	RESTRICTED
TP_STW_020	2.5	5	B	2.55	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_020	0.5	2	B	0.55	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_020	1.2	3	B	1.25	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_020	1.5	4	B	1.55	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_020	2.5	5	B	2.55	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_020	0.5	2	B	0.55	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_020	2.5	5	B	2.55	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_020	0.4	1	B	0.45	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_020	1.5	4	B	1.55	K1.11 Sedimentation by pipette	RESTRICTED
TP_STW_020	2.5	5	B	2.55	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_020	0.4	1	B	0.45	K1.1 Moisture content	COMPLETED
TP_STW_020	0.5	2	B	0.55	K1.1 Moisture content	COMPLETED
TP_STW_020	1.2	3	B	1.25	K1.1 Moisture content	COMPLETED
TP_STW_020	1.5	4	B	1.55	K1.1 Moisture content	RESTRICTED
TP_STW_020	2.5	5	B	2.55	K1.1 Moisture content	COMPLETED
TP_STW_020	2.95	6	LB	3	K1.1 Moisture content	COMPLETED
TP_STW_021	1.5	3	B	1.55	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_021	1.5	3	B	1.55	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
TP_STW_021	2.95	5	LB	3	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_021		1	AMAL		K4.11 Frost heave of soil	RESTRICTED

TP_STW_021	2.95	5	LB	3	K4.11 Frost heave of soil	RESTRICTED
TP_STW_021	2	4	B	2.05	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_021	1.5	3	B	1.55	K3.8 Chalk crushing value	RESTRICTED
TP_STW_021	2	4	B	2.05	K3.8 Chalk crushing value	RESTRICTED
TP_STW_021	2.95	5	LB	3	K3.8 Chalk crushing value	RESTRICTED
TP_STW_021	2	4	B	2.05	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_021	1.5	3	B	1.55	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_021	2	4	B	2.05	K3.10 Extra over Item K3.9 for soaking	COMPLETED
TP_STW_021	2	4	B	2.05	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_021	2.95	5	LB	3	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_021	2	4	B	2.05	K2.7 Carbonate content by gravimetric method	COMPLETED
TP_STW_021	0.8	2	B	0.85	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_021	2.95	5	LB	3	K2.6 Carbonate content by rapid titration	RESTRICTED
TP_STW_021	0.3	1	B	0.35	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_021	0.8	2	B	0.85	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_021	2	4	B	2.05	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_021	0.8	2	B	0.85	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_021	1.5	3	B	1.55	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_021	2	4	B	2.05	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_021	1.5	3	B	1.55	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_021	2	4	B	2.05	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_021	2.95	5	LB	3	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_021	0.3	1	B	0.35	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_021	0.8	2	B	0.85	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_021	2	4	B	2.05	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_021	0.3	1	B	0.35	K1.1 Moisture content	COMPLETED
TP_STW_021	0.8	2	B	0.85	K1.1 Moisture content	COMPLETED
TP_STW_021	1.5	3	B	1.55	K1.1 Moisture content	COMPLETED
TP_STW_021	2	4	B	2.05	K1.1 Moisture content	COMPLETED
TP_STW_021	2.95	5	LB	3	K1.1 Moisture content	COMPLETED
TP_STW_022	0.6	2	B	0.65	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
TP_STW_022	0.6	2	B	0.65	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
TP_STW_022	2	4	B	2.05	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_022		1	AMAL		K4.11 Frost heave of soil	RESTRICTED
TP_STW_022	2.95	5	LB	3	K4.11 Frost heave of soil	RESTRICTED
TP_STW_022	1.5	3	B	1.55	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_022	1.5	3	B	1.55	K3.8 Chalk crushing value	RESTRICTED
TP_STW_022	2	4	B	2.05	K3.8 Chalk crushing value	RESTRICTED
TP_STW_022	1.5	3	B	1.55	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_022	0.6	2	B	0.65	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_022	1.5	3	B	1.55	K3.10 Extra over Item K3.9 for soaking	COMPLETED
TP_STW_022	1.5	3	B	1.55	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_022	2	4	B	2.05	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_022	1.5	3	B	1.55	K2.7 Carbonate content by gravimetric method	COMPLETED
TP_STW_022	0.6	2	B	0.65	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_022	2.95	5	LB	3	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_022	0.4	1	B	0.45	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_022	0.6	2	B	0.65	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_022	2	4	B	2.05	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_022	0.6	2	B	0.65	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_022	1.5	3	B	1.55	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_022	2	4	B	2.05	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_022	2.95	5	LB	3	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_022	0.6	2	B	0.65	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_022	2	4	B	2.05	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_022	0.4	1	B	0.45	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_022	0.6	2	B	0.65	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_022	2	4	B	2.05	K1.11 Sedimentation by pipette	COMPLETED

TP_STW_022	0.4	1	B	0.45	K1.1 Moisture content	COMPLETED
TP_STW_022	0.6	2	B	0.65	K1.1 Moisture content	COMPLETED
TP_STW_022	1.5	3	B	1.55	K1.1 Moisture content	COMPLETED
TP_STW_022	2	4	B	2.05	K1.1 Moisture content	COMPLETED
TP_STW_031	2	4	B	2.05	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
TP_STW_031	0.5	2	B	0.55	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_031		1	AMAL		K4.11 Frost heave of soil	RESTRICTED
TP_STW_031	2.95	5	LB	3	K4.11 Frost heave of soil	RESTRICTED
TP_STW_031	1.4	3	B	1.45	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_031	0.5	2	B	0.55	K3.8 Chalk crushing value	COMPLETED
TP_STW_031	1.4	3	B	1.45	K3.8 Chalk crushing value	COMPLETED
TP_STW_031	2	4	B	2.05	K3.8 Chalk crushing value	COMPLETED
TP_STW_031	1.4	3	B	1.45	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_031	2	4	B	2.05	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_031	0.5	2	B	0.55	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_031	1.4	3	B	1.45	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_031	0.5	2	B	0.55	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_031	2.95	5	LB	3	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_031	0.3	1	B	0.35	K2.1 Organic matter content	COMPLETED
TP_STW_031	1.4	3	B	1.45	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_031	2.95	5	LB	3	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_031	0.5	2	B	0.55	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_031	1.4	3	B	1.45	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_031	2	4	B	2.05	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_031	2.95	5	LB	3	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
TP_STW_031	0.3	1	B	0.35	K1.6 Density by immersion in water or water displacement	COMPLETED
TP_STW_031	0.3	1	B	0.35	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_031	0.5	2	B	0.55	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_031	2.95	5	LB	3	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_031	1.4	3	B	1.45	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_031	2.95	5	LB	3	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_031	0.3	1	B	0.35	K1.1 Moisture content	COMPLETED
TP_STW_031	0.5	2	B	0.55	K1.1 Moisture content	COMPLETED
TP_STW_031	1.4	3	B	1.45	K1.1 Moisture content	COMPLETED
TP_STW_031	2	4	B	2.05	K1.1 Moisture content	COMPLETED
TP_STW_031	2.95	5	LB	3	K1.1 Moisture content	COMPLETED
TP_STW_032	1	2	B	1.05	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
TP_STW_032	1	2	B	1.05	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
TP_STW_032	0.3	1	B	0.35	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
TP_STW_032		1	AMAL		K4.11 Frost heave of soil	RESTRICTED
TP_STW_032	2.95	4	LB	3	K4.11 Frost heave of soil	RESTRICTED
TP_STW_032	2	3	B	2.05	K3.9 California Bearing Ratio on recompacted disturbed sample	COMPLETED
TP_STW_032	0.3	1	B	0.35	K3.8 Chalk crushing value	RESTRICTED
TP_STW_032	1	2	B	1.05	K3.8 Chalk crushing value	RESTRICTED
TP_STW_032	2	3	B	2.05	K3.8 Chalk crushing value	RESTRICTED
TP_STW_032	2	3	B	2.05	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	COMPLETED
TP_STW_032	1	2	B	1.05	K3.2 Dry density/moisture content relationship using 4.5 kg rammer	COMPLETED
TP_STW_032	2	3	B	2.05	K3.10 Extra over Item K3.9 for soaking	COMPLETED
TP_STW_032	0.3	1	B	0.35	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_032	2	3	B	2.05	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
TP_STW_032	0.3	1	B	0.35	K2.7 Carbonate content by gravimetric method	COMPLETED
TP_STW_032	0.3	1	B	0.35	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_032	1	2	B	1.05	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_032	2.95	4	LB	3	K2.6 Carbonate content by rapid titration	COMPLETED
TP_STW_032	0.3	1	B	0.35	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_032	2.95	4	LB	3	K1.9 Particle size distribution by wet sieving	COMPLETED
TP_STW_032	0.3	1	B	0.35	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_032	1	2	B	1.05	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED

TP_STW_032	2	3	B	2.05	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_032	2.95	4	LB	3	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
TP_STW_032	0.3	1	B	0.35	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_032	2	3	B	2.05	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_032	2.95	4	LB	3	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
TP_STW_032	0.3	1	B	0.35	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_032	2.95	4	LB	3	K1.11 Sedimentation by pipette	COMPLETED
TP_STW_032	0.3	1	B	0.35	K1.1 Moisture content	COMPLETED
TP_STW_032	1	2	B	1.05	K1.1 Moisture content	COMPLETED
TP_STW_032	2	3	B	2.05	K1.1 Moisture content	COMPLETED
TP_STW_032	2.95	4	LB	3	K1.1 Moisture content	COMPLETED

BH_OUT_001B	0.9	6	B	1.2	SE24220404006	K1.1 Moisture content	COMPLETED
BH_OUT_001B	1.7	10	B	2.2	SE24220404010	K1.1 Moisture content	COMPLETED
BH_OUT_001B	2.2	11	UT	2.65	SE24220404011	K1.1 Moisture content	COMPLETED
BH_OUT_001B	2.7	14	B	3.2	SE24220404014	K1.1 Moisture content	COMPLETED
BH_OUT_001B	3.8	17	B	4.3	SE24220404017	K1.1 Moisture content	COMPLETED
BH_OUT_001B	5	19	D	5	SE24220405002	K1.1 Moisture content	COMPLETED
BH_OUT_001B	5	21	B	5.5	SE24220405004	K1.1 Moisture content	COMPLETED
BH_OUT_001B	6	25	B	6.5	SE24220405008	K1.1 Moisture content	COMPLETED
BH_OUT_001B	7	28	B	7.5	SE24220405011	K1.1 Moisture content	COMPLETED
BH_OUT_001B	8	31	B	8.5	SE24220405014	K1.1 Moisture content	COMPLETED
BH_OUT_001B	0.3	4	B	0.8	SE24220404004	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	0.9	6	B	1.2	SE24220404006	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	1.7	10	B	2.2	SE24220404010	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	2.7	14	B	3.2	SE24220404014	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	3.8	17	B	4.3	SE24220404017	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	5	19	D	5	SE24220405002	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	5	21	B	5.5	SE24220405004	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	6	25	B	6.5	SE24220405008	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	7	28	B	7.5	SE24220405011	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	8	31	B	8.5	SE24220405014	K1.11 Sedimentation by pipette	COMPLETED
BH_OUT_001B	0.9	6	B	1.2	SE24220404006	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001B	1.7	10	B	2.2	SE24220404010	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001B	2.7	14	B	3.2	SE24220404014	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001B	3.8	17	B	4.3	SE24220404017	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001B	5	19	D	5	SE24220405002	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001B	5	21	B	5.5	SE24220405004	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001B	6	25	B	6.5	SE24220405008	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001B	7	28	B	7.5	SE24220405011	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001B	8	31	B	8.5	SE24220405014	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_OUT_001B	1.2	7	UT	1.65	SE24220404007	K1.5 Density by linear measurement	COMPLETED
BH_OUT_001B	1.2	7	UT	1.65	SE24220404007	K1.6 Density by immersion in water or water displacement	COMPLETED
BH_OUT_001B	0.3	4	B	0.8	SE24220404004	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	0.9	6	B	1.2	SE24220404006	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	1.7	10	B	2.2	SE24220404010	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	2.7	14	B	3.2	SE24220404014	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	3.8	17	B	4.3	SE24220404017	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	5	19	D	5	SE24220405002	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	5	21	B	5.5	SE24220405004	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	6	25	B	6.5	SE24220405008	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	7	28	B	7.5	SE24220405011	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	8	31	B	8.5	SE24220405014	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_OUT_001B	0.9	6	B	1.2	SE24220404006	K2.1 Organic matter content	COMPLETED
BH_OUT_001B	1.7	10	B	2.2	SE24220404010	K2.1 Organic matter content	COMPLETED
BH_OUT_001B	2.7	12	D	2.7	SE24220404012	K2.10 Total sulphur content	COMPLETED
BH_OUT_001B	2.7	12	D	2.7	SE24220404012	K2.12 pH values	COMPLETED
BH_OUT_001B	2.7	12	D	2.7	SE24220404012	K2.3 Sulphate content of acid extract from soil	COMPLETED
BH_OUT_001B	2.7	12	D	2.7	SE24220404012	K2.4 Sulphate content of water extract from soil	COMPLETED
BH_OUT_001B	3.8	16	D	3.8	SE24220404016	K2.6 Carbonate content by rapid titration	COMPLETED
BH_OUT_001B	5	21	B	5.5	SE24220405004	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_OUT_001B	6	25	B	6.5	SE24220405008	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
BH_OUT_001B	8	31	B	8.5	SE24220405014	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_OUT_001B	6	25	B	6.5	SE24220405008	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	RESTRICTED
BH_OUT_001B	6	25	B	6.5	SE24220405008	K3.9 California Bearing Ratio on recompacted disturbed sample	RESTRICTED
BH_OUT_001B	5.5	22	U	5.95	SE24220405005	K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_OUT_001B	5.5	22	U	5.95	SE24220405005	K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_OUT_001B	5.5	22	U	5.95	SE24220405005	K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_OUT_001B	5	21	B	5.5	SE24220405004	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_OUT_001B	8	31	B	8.5	SE24220405014	K6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure	COMPLETED
BH_OUT_001B	5.5	22	U	5.95	SE24220405005	K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_OUT_001B	7	28	B	7.5	SE24220405011	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_OUT_001B	5	19	D	5	SE24220405002	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	RESTRICTED
BH_OUT_001B	7	28	B	7.5	SE24220405011	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
BH_OUT_001B	6	25	B	6.5	SE24220405008	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED

BH_OUT_001B	4.5	18	UT	4.95	SE24220405001	K8.14 Uniaxial compressive strength	COMPLETED
BH_OUT_001B	4.5	18	UT	4.95	SE24220405001	K8.15 Deformability in uniaxial compression	RESTRICTED
BH_OUT_001B	5	19	D	5	SE24220405002	K8.20 Swelling pressure test	RESTRICTED
BH_OUT_001B	7	28	B	7.5	SE24220405011	K8.20 Swelling pressure test	COMPLETED
BH_OUT_001B	4.5	18	UT	4.95	SE24220405001	Unconfined compressive strength of 38 mm diameter specimen	RESTRICTED
BH_TUN_008	0.5	6	B	0.7	SE31220425006	K1.1 Moisture content	COMPLETED
BH_TUN_008	1.5	10	D	3	SE31220425010	K1.1 Moisture content	RESTRICTED
BH_TUN_008	0.5	6	B	0.7	SE31220425006	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_008	1	9	B	1.1	SE31220425009	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_008	1.5	10	D	3	SE31220425010	K1.11 Sedimentation by pipette	RESTRICTED
BH_TUN_008	0.5	6	B	0.7	SE31220425006	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_008	1.5	10	D	3	SE31220425010	K1.2 Liquid limit, plastic limit and plasticity index	RESTRICTED
BH_TUN_008	0.5	6	B	0.7	SE31220425006	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_008	1	9	B	1.1	SE31220425009	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_008	1.5	10	D	3	SE31220425010	K1.9 Particle size distribution by wet sieving	RESTRICTED
BH_TUN_008	1.5	10	D	3	SE31220425010	K2.10 Total sulphur content	RESTRICTED
BH_TUN_008	1.5	10	D	3	SE31220425010	K2.12 pH values	RESTRICTED
BH_TUN_008	12	18.1	CS	12.25		K2.12 pH values	COMPLETED
BH_TUN_008	10.5	17.1	CS	10.8		K2.14 Redox potential	COMPLETED
BH_TUN_008	1.5	10	D	3	SE31220425010	K2.3 Sulphate content of acid extract from soil	RESTRICTED
BH_TUN_008	1.5	10	D	3	SE31220425010	K2.4 Sulphate content of water extract from soil	RESTRICTED
BH_TUN_008	12	18.1	CS	12.25		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_008	19.7	24.1	CS	20		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_008	26	28.1	CS	26.3		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_008	12	18.1	CS	12.25		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_008	19.7	24.1	CS	20		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_008	15.1	20.1	CS	15.4		K4.9 Dispersibility by crumb method	COMPLETED
BH_TUN_008	3	11.1	CS	3.3		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_TUN_008	26	28.1	CS	26.3		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_TUN_008	3	11.1	CS	3.3		K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_008	5.2	13.1	CS	5.54		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_008	13.5	19.1	CS	13.8		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_008	18.2	22.1	CS	18.5		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_008	21.5	25.1	CS	21.75		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_008	6.75	14.1	CS	7		K8.20 Swelling pressure test	COMPLETED
BH_TUN_008	24.5	27.1	CS	24.8		K8.20 Swelling pressure test	COMPLETED
BH_TUN_008	0.5	4	ES	0.7	SE31220425004	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_009	0.6	4	B	0.9	SE31220420004	K1.1 Moisture content	COMPLETED
BH_TUN_009	6.5	6	D	8	SE31220420006	K1.1 Moisture content	RESTRICTED
BH_TUN_009	0.6	4	B	0.9	SE31220420004	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_009	2.2	5	D	3.5	SE31220420005	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_009	6.5	6	D	8	SE31220420006	K1.11 Sedimentation by pipette	RESTRICTED
BH_TUN_009	0.6	4	B	0.9	SE31220420004	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_009	6.5	6	D	8	SE31220420006	K1.2 Liquid limit, plastic limit and plasticity index	RESTRICTED
BH_TUN_009	0.6	4	B	0.9	SE31220420004	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_009	2.2	5	D	3.5	SE31220420005	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_009	6.5	6	D	8	SE31220420006	K1.9 Particle size distribution by wet sieving	RESTRICTED
BH_TUN_009	2.2	5	D	3.5	SE31220420005	K2.1 Organic matter content	COMPLETED
BH_TUN_009	6.5	6	D	8	SE31220420006	K2.10 Total sulphur content	RESTRICTED
BH_TUN_009	6.5	6	D	8	SE31220420006	K2.12 pH values	RESTRICTED
BH_TUN_009	10.5	8.1	CS	10.78		K2.12 pH values	COMPLETED
BH_TUN_009	11.75	10.1	CS	12		K2.14 Redox potential	COMPLETED
BH_TUN_009	6.5	6	D	8	SE31220420006	K2.3 Sulphate content of acid extract from soil	RESTRICTED
BH_TUN_009	6.5	6	D	8	SE31220420006	K2.4 Sulphate content of water extract from soil	RESTRICTED
BH_TUN_009	10.5	8.1	CS	10.78		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_009	19.5	15.1	CS	19.8		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_009	10.5	8.1	CS	10.78		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_009	19.5	15.1	CS	19.8		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_009	15	12.1	CS	15.3		K4.9 Dispersibility by crumb method	COMPLETED
BH_TUN_009	13.5	11.1	CS	13.75		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_009	18	14.1	CS	18.3		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_009	21	16.1	CS	21.3		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_009	13.5	11.1	CS	13.75		K8.20 Swelling pressure test	COMPLETED
BH_TUN_009	24	19.1	CS	24.25		K8.20 Swelling pressure test	COMPLETED

BH_TUN_010	1	8	D	1	SE31220411008	K1.1 Moisture content	COMPLETED
BH_TUN_010	2.5	11	D	2.95	SE31220412002	K1.1 Moisture content	COMPLETED
BH_TUN_010	0.5	6	B	0.5	SE31220411006	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_010	1	9	B	1	SE31220411009	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_010	2.5	11	D	2.95	SE31220412002	K1.11 Sedimentation by pipette	RESTRICTED
BH_TUN_010	1	8	D	1	SE31220411008	K1.2 Liquid limit, plastic limit and plasticity index	RESTRICTED
BH_TUN_010	2.5	11	D	2.95	SE31220412002	K1.2 Liquid limit, plastic limit and plasticity index	RESTRICTED
BH_TUN_010	0.5	6	B	0.5	SE31220411006	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_010	1	9	B	1	SE31220411009	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_010	2.5	11	D	2.95	SE31220412002	K1.9 Particle size distribution by wet sieving	RESTRICTED
BH_TUN_010	1	8	D	1	SE31220411008	K2.1 Organic matter content	RESTRICTED
BH_TUN_010	2.5	11	D	2.95	SE31220412002	K2.1 Organic matter content	RESTRICTED
BH_TUN_010	11.5	20.1	CS	11.8		K2.14 Redox potential	COMPLETED
BH_TUN_010	5.8	15.1	CS	6		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_010	22.8	30.1	CS	23		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_010	5.8	15.1	CS	6		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_010	5.8	15.1	CS	6		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_TUN_010	21.3	29.1	CS	21.55		K6.1 Shear strength by laboratory vane method (set of 3)	RESTRICTED
BH_TUN_010	5.8	15.1	CS	6		K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_010	21.3	29.1	CS	21.55		K6.2 Shear strength by hand vane (set of 3)	COMPLETED
BH_TUN_010	7.45	17.1	CS	7.65		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_010	7.45	17.1	CS	7.65		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_010	17.6	25.1	CS	17.86		K8.20 Swelling pressure test	COMPLETED
BH_TUN_010	0.3	1	ES	0.3	SE31220411001	L1.1 MML Comprehensive Soil Suite	COMPLETED
BH_TUN_012A	13.7	16.1	CD	13.8		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_012A	26.4	27.1	CS	26.6		K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_012A	26.4	27.1	CS	26.6		K1.4 Linear shrinkage	COMPLETED
BH_TUN_012A	27.5	28.1	CS	27.74		K2.12 pH values	COMPLETED
BH_TUN_012A	13.7	16.1	CD	13.8		K2.14 Redox potential	RESTRICTED
BH_TUN_012A	13.7	16.1	CD	13.8		K4.1 One-dimensional consolidation properties, test period 5 days	RESTRICTED
BH_TUN_012A	25.5	26.1	CS	25.72		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_012A	17.7	19.1	CS	17.9		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_012A	17.7	19.1	CS	17.9		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	RESTRICTED
BH_TUN_012A	23.2	24.1	CS	23.45		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_012A	26.4	27.1	CS	26.6		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_012A	10.7	14.1	CS	10.95		K8.20 Swelling pressure test	COMPLETED
BH_TUN_012A	20	21.1	CS	20.3		K8.20 Swelling pressure test	COMPLETED
BH_TUN_012B	0.3	3	ES	0.3	SE24220329003	C.1: Comprehensive Soil Suite	COMPLETED
BH_TUN_012B	4.5	19	B	5	SE24220329019	K1.1 Moisture content	COMPLETED
BH_TUN_012B	6.5	25	B	7	SE24220330006	K1.1 Moisture content	COMPLETED
BH_TUN_012B	8.5	31	D	8.95	SE24220330012	K1.1 Moisture content	COMPLETED
BH_TUN_012B	8.9	34	B	9.4	SE24220330015	K1.1 Moisture content	COMPLETED
BH_TUN_012B	11	39	B	11.5	SE24220330020	K1.1 Moisture content	COMPLETED
BH_TUN_012B	1.2	8	D	1.2	SE24220329008	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_012B	4.5	19	B	5	SE24220329019	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_012B	8.9	34	B	9.4	SE24220330015	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_012B	11	39	B	11.5	SE24220330020	K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_012B	4.5	19	B	5	SE24220329019	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_012B	6.5	25	B	7	SE24220330006	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_012B	8.5	31	D	8.95	SE24220330012	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_012B	8.9	34	B	9.4	SE24220330015	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_012B	11	39	B	11.5	SE24220330020	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_012B	2.5	13	B	3	SE24220329013	K1.7 Dry density and saturation moisture content for chalk	RESTRICTED
BH_TUN_012B	5.5	22	B	6	SE24220330003	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_012B	7.5	28	B	8	SE24220330009	K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_012B	1.2	8	D	1.2	SE24220329008	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_012B	4.5	19	B	5	SE24220329019	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_012B	8.9	34	B	9.4	SE24220330015	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_012B	11	39	B	11.5	SE24220330020	K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_012B	0.5	6	B	0.8	SE24220329006	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_012B	1.2	8	D	1.2	SE24220329008	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_012B	1.5	9	D	1.95	SE24220329009	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_012B	2.5	12	D	2.95	SE24220329012	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_012B	3.5	15	D	3.95	SE24220329015	K2.7 Carbonate content by gravimetric method	COMPLETED

BH_TUN_012B	4.5	18	D	4.95	SE24220329018	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_012B	6.2	23	D	6.2	SE24220330004	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_012B	7.5	27	D	7.9	SE24220330008	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_012B	8.2	30	B	8.5	SE24220330011	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_012B	8.5	31	D	8.95	SE24220330012	K2.7 Carbonate content by gravimetric method	COMPLETED
BH_TUN_012B	4.5	19	B	5	SE24220329019	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
BH_TUN_012B	8.9	34	B	9.4	SE24220330015	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	COMPLETED
BH_TUN_012B	11	39	B	11.5	SE24220330020	K3.1 Dry density/moisture content relationship using 2.5 kg rammer	RESTRICTED
BH_TUN_012B	4.5	19	B	5	SE24220329019	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	RESTRICTED
BH_TUN_012B	11	39	B	11.5	SE24220330020	K3.4 Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	RESTRICTED
BH_TUN_012B	9.5	36	B	10	SE24220330017	K3.6 Moisture Condition Value at natural moisture content	COMPLETED
BH_TUN_012B	9.5	36	B	10	SE24220330017	K3.7 Moisture Condition Value/moisture content relationship	COMPLETED
BH_TUN_012B	4.5	19	B	5	SE24220329019	K3.8 Chalk crushing value	RESTRICTED
BH_TUN_012B	5.5	22	B	6	SE24220330003	K3.8 Chalk crushing value	RESTRICTED
BH_TUN_012B	7.5	28	B	8	SE24220330009	K3.8 Chalk crushing value	COMPLETED
BH_TUN_012B	4.5	19	B	5	SE24220329019	K3.9 California Bearing Ratio on recompacted disturbed sample	RESTRICTED
BH_TUN_012B	11	39	B	11.5	SE24220330020	K3.9 California Bearing Ratio on recompacted disturbed sample	RESTRICTED
BH_TUN_012B	8.9	34	B	9.4	SE24220330015	6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressur	COMPLETED
BH_TUN_012B	11	39	B	11.5	SE24220330020	6.17 Undrained shear strength of a single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressur	COMPLETED
BH_TUN_012B	8.5	32	B	9	SE24220330013	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_012B	9.5	36	B	10	SE24220330017	K6.4 Shear strength of a set of three 60 mm x 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen	COMPLETED
BH_TUN_012B	8.5	32	B	9	SE24220330013	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
BH_TUN_012B	9.5	36	B	10	SE24220330017	K6.6 Shear strength of a single 300 mm x 300 mm square specimens by direct shear, test duration not exceeding 1 day	COMPLETED
BH_TUN_012B	3.5	16	B	4	SE24220329016	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_012B	5.5	22	B	6	SE24220330003	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_012B	6.5	25	B	7	SE24220330006	K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_012B	8.5	32	B	9	SE24220330013	K8.20 Swelling pressure test	COMPLETED
BH_TUN_012B	12.5	42	B	13	SE24220330023	K8.20 Swelling pressure test	COMPLETED
BH_TUN_012B	15.5	48	B	16	SE24220330029	K8.20 Swelling pressure test	COMPLETED
BH_TUN_013	1.5	9.1	CD	1.6		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_013	6.1	13.1	CS	6.4		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_013	1.5	9.1	CD	1.6		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_013	6.1	13.1	CS	6.4		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_013	1.5	9.1	CD	1.6		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_013	6.1	13.1	CS	6.4		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_013	16.75	20.1	CS	17		K2.14 Redox potential	COMPLETED
BH_TUN_013	0.3	4	B	0.3	SE31220404004	K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_013	0.5	6	B	0.5	SE31220404006	K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_013	1.5	9.1	CD	1.6		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_013	3.6	11.1	CD	3.7		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_013	6.1	13.1	CS	6.4		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_013	9.2	15.1	CS	9.5		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_013	10.8	16.1	CS	11.05		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_013	11.85	17.1	CS	12.1		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_013	11.85	17.1	CS	12.1		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_013	13.55	18.1	CS	13.78		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_013	13.55	18.1	CS	13.78		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_013	18.5	21.1	CS	18.8		K8.20 Swelling pressure test	COMPLETED
BH_TUN_014	0.3	1	ES	0.3	SE31220329003	C.1: Comprehensive Soil Suite	COMPLETED
BH_TUN_014	11.5	18.1	CS	12		K1.1 Moisture content	COMPLETED
BH_TUN_014	11.5	18.1	CS	12		K1.11 Sedimentation by pipette	COMPLETED
BH_TUN_014	11.5	18.1	CS	12		K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
BH_TUN_014	18.75	22.2	CS	19		K1.3 Volumetric shrinkage	COMPLETED
BH_TUN_014	18.75	22.2	CS	19		K1.4 Linear shrinkage	COMPLETED
BH_TUN_014	3.2	11.2	CS	3.48		K1.7 Dry density and saturation moisture content for chalk	COMPLETED
BH_TUN_014	11.5	18.1	CS	12		K1.9 Particle size distribution by wet sieving	COMPLETED
BH_TUN_014	14.05	18.2	CS	14.3		K2.12 pH values	COMPLETED
BH_TUN_014	16.9	21.1	CS	17.1		K2.14 Redox potential	COMPLETED
BH_TUN_014	1	9	B	1	SE31220329011	K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_014	1.6	10.1	CS	1.85		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_014	3.2	11.2	CS	3.48		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_014	5.5	13.1	CD	5.6		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_014	8.27	15.1	CS	8.5		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_014	9.8	16.1	CS	10		K2.6 Carbonate content by rapid titration	COMPLETED

BH_TUN_014	11.2	17.1	CS	11.5		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_014	11.5	18.1	CS	12		K2.6 Carbonate content by rapid titration	COMPLETED
BH_TUN_014	14.05	18.2	CS	14.3		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_014	21.7	24.2	CS	21.95		K4.1 One-dimensional consolidation properties, test period 5 days	COMPLETED
BH_TUN_014	14.05	18.2	CS	14.3		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_014	21.7	24.2	CS	21.95		K4.4 Measurements of swelling, test period 2 days	COMPLETED
BH_TUN_014	18.75	22.2	CS	19		K4.9 Dispersibility by crumb method	COMPLETED
BH_TUN_014	20.8	24.1	CS	21.05		K7.2 As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen	COMPLETED
BH_TUN_014	23	25.1	CS	23.3		K8.15 Deformability in uniaxial compression	RESTRICTED
BH_TUN_014	17.7	22.1	CS	18		K8.20 Swelling pressure test	COMPLETED
BH_TUN_014		001	EW			L1.3 MML Groundwater Suite	COMPLETED
HDP_OUT_001	0.3	3	ES	0.3	SE24220406003	C.1: Comprehensive Soil Suite	COMPLETED
HDP_OUT_001	0.5	8	ES	0.5	SE24220406008	C.2: VOC Soil Suite Speciated USEPA Method 8260 Target List	COMPLETED
HDP_OUT_001	0.5	8	ES	0.5	SE24220406008	C.3: TPH Soil Suite	COMPLETED
HDP_OUT_001	0.3	4	D	0.3	SE24220406004	K1.1 Moisture content	COMPLETED
HDP_OUT_001	0.4	7	B	0.5	SE24220406007	K1.1 Moisture content	COMPLETED
HDP_OUT_001	0.5	10	B	0.65	SE24220406010	K1.1 Moisture content	COMPLETED
HDP_OUT_001	0.65	12	B	1.1	SE24220406012	K1.1 Moisture content	COMPLETED
HDP_OUT_001	1.1	15	LB	1.3	SE24220406016	K1.1 Moisture content	COMPLETED
HDP_OUT_001	0.3	5	B	0.4	SE24220406005	K1.11 Sedimentation by pipette	COMPLETED
HDP_OUT_001	0.5	10	B	0.65	SE24220406010	K1.11 Sedimentation by pipette	COMPLETED
HDP_OUT_001	1.1	15	LB	1.3	SE24220406016	K1.11 Sedimentation by pipette	COMPLETED
HDP_OUT_001	0.3	4	D	0.3	SE24220406004	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
HDP_OUT_001	0.4	7	B	0.5	SE24220406007	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
HDP_OUT_001	0.5	10	B	0.65	SE24220406010	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
HDP_OUT_001	0.65	12	B	1.1	SE24220406012	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
HDP_OUT_001	1.1	15	LB	1.3	SE24220406016	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
HDP_OUT_001	0.5	10	B	0.65	SE24220406010	K1.8 Particle density by gas jar or pycnometer	COMPLETED
HDP_OUT_001	1.1	15	LB	1.3	SE24220406016	K1.8 Particle density by gas jar or pycnometer	COMPLETED
HDP_OUT_001	0.3	5	B	0.4	SE24220406005	K1.9 Particle size distribution by wet sieving	COMPLETED
HDP_OUT_001	0.5	10	B	0.65	SE24220406010	K1.9 Particle size distribution by wet sieving	COMPLETED
HDP_OUT_001	1.1	15	LB	1.3	SE24220406016	K1.9 Particle size distribution by wet sieving	COMPLETED
HDP_OUT_001	0.4	6	D	0.4	SE24220406006	K2.1 Organic matter content	COMPLETED
HDP_OUT_001	0.5	10	B	0.65	SE24220406010	K2.1 Organic matter content	COMPLETED
HDP_OUT_001	0.65	12	B	1.1	SE24220406012	K2.1 Organic matter content	COMPLETED
HDP_OUT_001	1.1	15	LB	1.3	SE24220406016	K2.1 Organic matter content	COMPLETED
HDP_OUT_001	0.5	10	B	0.65	SE24220406010	K2.6 Carbonate content by rapid titration	COMPLETED
HDP_OUT_002	0.6	4	D	0.6	SE24220406020	K1.1 Moisture content	COMPLETED
HDP_OUT_002	0.8	5	D	0.8	SE24220406021	K1.1 Moisture content	COMPLETED
HDP_OUT_002	0.5	3	B	0.75	SE24220406019	K1.11 Sedimentation by pipette	COMPLETED
HDP_OUT_002	0.8	6	LB	1.3	SE24220406022	K1.11 Sedimentation by pipette	COMPLETED
HDP_OUT_002	0.6	4	D	0.6	SE24220406020	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
HDP_OUT_002	0.8	5	D	0.8	SE24220406021	K1.2 Liquid limit, plastic limit and plasticity index	COMPLETED
HDP_OUT_002	0.8	6	LB	1.3	SE24220406022	K1.8 Particle density by gas jar or pycnometer	COMPLETED
HDP_OUT_002	0.5	3	B	0.75	SE24220406019	K1.9 Particle size distribution by wet sieving	COMPLETED
HDP_OUT_002	0.8	6	LB	1.3	SE24220406022	K1.9 Particle size distribution by wet sieving	COMPLETED
HDP_OUT_002	0.5	3	B	0.75	SE24220406019	K2.1 Organic matter content	COMPLETED
HDP_OUT_002	0.8	6	LB	1.3	SE24220406022	K2.1 Organic matter content	COMPLETED

Get in touch

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You can view all our DCO application documents and updates on the application on The Planning Inspectorate website:

https://infrastructure.planninginspectorate.gov.uk/projects/eastern/cambridge-waste-water-treatment-plant-relocation/