SOCIAL HOUSING DEVELOPMENT

EAST WALL, DUBLIN

Hydrogeological and Flood Risk Assessment Report
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Prepared by: RPS

Prepared for: Dublin City Council
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Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
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</thead>
<tbody>
<tr>
<td>Annual Exceedance Probability</td>
<td>The probability, typically expressed as a percentage, of a flood event of a given magnitude being equalled or exceeded in any given year. For example, a 1% AEP flood event has a 1%, or 1 in a 100, chance of occurring or being exceeded in any given year.</td>
</tr>
<tr>
<td>Flood Zone A</td>
<td>Where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);</td>
</tr>
<tr>
<td>Flood Zone B</td>
<td>Where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding);</td>
</tr>
<tr>
<td>Flood Zone C</td>
<td>Where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.</td>
</tr>
<tr>
<td>Return Period</td>
<td>A term that was used to describe the probability of a flood event, expressed as the interval in the number of years that, on average over a long period of time, a certain magnitude of flood would be expected to occur. This term has been replaced by ‘Annual Exceedance Probability, as Return Period can be misleading.</td>
</tr>
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The Proposed Development
Social Housing Development on the Ready-Mix Site, East Wall, Dublin 3

Vulnerable Development
Classification of the vulnerability to flooding of different types of development as defined in The Planning System and Flood Risk Management – Guidelines for Planning Authorities” (DOEHLG, 2009). Vulnerable development is classified as High, Less or Water Compatible for differing land uses and types of development.

Acronyms

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>AEP</td>
<td>Annual Exceedance Probability</td>
</tr>
<tr>
<td>DHLGH</td>
<td>Department of Housing, Local Government and Heritage</td>
</tr>
<tr>
<td>EC</td>
<td>European Commission</td>
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<td>EU</td>
<td>European Union</td>
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<tr>
<td>FRA</td>
<td>Flood Risk Assessment</td>
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<tr>
<td>FFL</td>
<td>Finished Floor Level</td>
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<td>Flood Relief Scheme</td>
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<td>Flood Studies Update</td>
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<tr>
<td>ICPSS</td>
<td>Irish Coastal Protection Strategy Study</td>
</tr>
<tr>
<td>ICWWS</td>
<td>Irish Coastal Wave and Water Level Modelling Study</td>
</tr>
<tr>
<td>NDFA</td>
<td>National Development Finance Agency</td>
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<td>OPW</td>
<td>Office of Public Works</td>
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Units

<table>
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<th>Unit</th>
<th>Description</th>
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<tbody>
<tr>
<td>ft</td>
<td>feet</td>
</tr>
<tr>
<td>km</td>
<td>Kilometres</td>
</tr>
<tr>
<td>km²</td>
<td>Kilometres squared</td>
</tr>
<tr>
<td>m</td>
<td>Metres (length)</td>
</tr>
<tr>
<td>m/km</td>
<td>Metres per Kilometre (Slope)</td>
</tr>
<tr>
<td>m²</td>
<td>Square metres (Area)</td>
</tr>
<tr>
<td>Symbol</td>
<td>Description</td>
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<tr>
<td>--------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>m³</td>
<td>Cubic metres (Volume)</td>
</tr>
<tr>
<td>m³/s</td>
<td>Cubic metres per second (Discharge)</td>
</tr>
<tr>
<td>mm</td>
<td>Millimetres (length)</td>
</tr>
<tr>
<td>mOD</td>
<td>Metres Ordnance Datum</td>
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<td>s</td>
<td>Seconds</td>
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1 INTRODUCTION

1.1 Background

RPS are the appointed Civil and Structural Engineering advisors to the National Development Finance Agency (NDFA) for the proposed residential development at East Wall, County Dublin. This project will deliver 68 apartments to Dublin City Council Planning Authority. This report focuses on the East Wall site. Figure 1.1 illustrates the location of the subject site.

![Map of Site Location](https://osi.ie/)

Figure 1-1 : Map of Site Location (Source Ordnance Survey Ireland https://osi.ie/)

1.2 Objective

As part of this development RPS has carried out a hydrological assessment of the proposed site. This assessment is required to address the flooding risk for the proposed housing development project as set out in the Government's 2009 Planning System and Flood Risk Management Regulations (hereafter referred to as the FRM Guidelines). The assessment involved a desk study. The study examines all flooding risks to the proposed site and assesses any impacts of the proposed development on the existing flooding/hydrological regimes of the adjacent watercourses and lands.
2 THE SITE AND PROPOSED DEVELOPMENT

2.1 The Site

The site is located in a highly urbanised area approximately 1.5 km north of Dublin City Centre. The North Strand Fire Station abuts the site to the west. The site’s principal frontage to its north is on East Wall Road and faces the Tolka River. The east and south of the site are bounded by the rear gardens of 1&2 storey housing to Hope Avenue and Leinster Avenue respectively. There is an existing entrance via East Wall Road. The principal frontage of the site is facing to the north. The site is approximately 0.63 ha.

2.2 Site Topography and Existing Drainage System

There are no water features within the boundary of the development site (Figure 2-1). The existing site is a brownfield site with an existing surface water network draining the site area. It is likely that all surface water generated on site is infiltrating to ground within the site. There is no evidence of stormwater infrastructure outfalling to the Tolka River. Surface water generated within the proposed development area will drain to a newly proposed surface water system.

Figure 2-1: Extract from IW ArcGIS database
A detailed topographical survey was completed showing that the site is relatively flat with falls from west to east. The levels range from 3.17mOD to 3.78mOD (Figure 2-2).

Ground investigation infiltration tests were undertaken in June 2021 by IGSL and geotechnical specialists to assess the infiltration rate on site. The results indicate that the sub soils in this area are suitable for dispersion of surface water. It is proposed to provide type B (CIRIA C753 SuDS) permeable paving on site to intercept runoff. In a Type B system, the proportion of the rainfall that exceeds the infiltration capacity of the subsoils flows to the receiving drainage system.

2.3 The proposed development

The proposed development (Figure 2-3) involves the construction of storey blocks. Ancillary structures will include for a 2m rendered block wall with piers, or concrete post and panel fence. At the south western corner of the site, to the rear of the proposed three-story block, a concrete retaining wall will be required. The existing levels are approximately 2.6mOD. The single storey refuse and plant building will lend itself to a traditional masonry block construction with a cut timer or concrete slab roof.
2.4 Land uses

Since the preparation of the Draft Development Plan and the making of the Plan by the Council, there have been a number of significant new sources of information and changes to Government policy. Dublin City Council is reviewing the current Dublin City Development Plan 2016-2022 and preparing a new City Development Plan (the Plan) up to 2028. In the Dublin City Development Plan 2016-2022, the subject site was zoned as 'to provide for and improve mixed services facilities' (Figure 2-4), with the majority of the adjacent uses to be residential.

There are several existing structures on the site which are listed below:

- ESB Substation;
- Building in the north east corner;
- High concrete walls;
- Concrete ground slabs, ramps and plinths.

All structures above ground level will have to be demolished and removed off site.
Figure 2-4: Dublin City Development Plan 2016 – 2022 (Source https://www.dublincity.ie/dublin-city-development-plan-2016-2022)
### 2.5 Data Collection

Relevant Information was reviewed and collated from the following sources:

- The historic flood data was obtained from the National Flood Hazard Mapping Website ([Appendix A](#))
  
  https://www.floodinfo.ie/

- The Subsoil and vulnerability data was obtained from the Geological Survey of Ireland website
  
  https://www.gsi.ie/

- The Preliminary Flood Risk Assessment maps were obtained from the Eastern catchment Flood Risk Assessment and Management Study website [http://eastcframstudy.ie/](http://eastcframstudy.ie/) ([Appendix B](#))

- The Strategic Flood Risk Assessment (SFRA) for Dublin City Development Plan 2016-2022 was obtained from the Dublin City Council website [https://www.dublincitydevelopmentplan.ie/](https://www.dublincitydevelopmentplan.ie/) ([Appendix C](#))

- River Tolka Flooding Study which was commissioned by Dublin City Council, in association with Fingal County Council, Meath County Council and the Office of Public Works in 2002;

- The Flood Studies Update (FSU) Web Portal which is a free-to-use suite of online design rainfall and flood estimation tools for Ireland [https://opw.hydronet.com/](https://opw.hydronet.com/)

- Irish Coastal Protection Strategic Study (ICPSS, 2012) ([Appendix D](#)) and Irish Coastal Wave and Water Level Study (ICWWS, 2018) predicted tide levels and coastal flood maps for the Dublin City coast areas.

- FloodResilienCity Project, [https://www.floodinfo.ie/](https://www.floodinfo.ie/) ([Appendix E](#)).

- Site Investigations carried out by IGSL, Ground Investigation & Geotechnical Specialists. ([Appendix F](#))
3 EXISTING HYDROLOGICAL ENVIRONMENT

3.1 Salient Hydrological Features

The most immediate hydrological feature in the vicinity of the proposed development is the Tolka River which is adjacent to the site (Figure 3-1).

Figure 3-1: Main Hydrological features in the vicinity of the proposed development (Source EPA Website https://gis.epa.ie/EPAMaps/)

3.2 Existing Geology and Hydrogeology of the Area

3.2.1 Baseline Information

The Geological Survey of Ireland (GSI) website provides information on their public online mapping service regarding the subsoil and aquifer vulnerability. The maps for the proposed development are presented in Figures 3-2 & 3-3 below. The GSI subsoil mapping indicates that the subsoil within the environs of the proposed development site is made ground, which is described as soil that has been subjected to anthropogenic intervention.

The topography of the site is relatively level with foundations of previous buildings and hardstanding prominent. The online GSI mapping database show the following characteristics:

- Estuarine silts and clays / Till derived from limestone;
- Dark limestone & shale with Alluvium (gravelly) unconsolidated sediments;
- 15 to 20m depth to bedrock.
Site Investigation boreholes and rotary cores showed the following characteristics:

- Made Ground: 0 – 4.5 metres
- Gravel: 4.5 – 7.5 metres
- Fine sand / Silt: 7.5 – 11.0 metres.
- Black Boulder Clay: 11.0 – 27.0 metres
- Limestone Bedrock: 27.0 – 30.0 metres.

![Figure 3-2: GSI Subsoil Mapping (Source Data and maps - Geological Survey Ireland https://www.gsi.ie)](image)

The Groundwater Vulnerability map outlines how susceptible areas are to groundwater contamination. In addition, the map assists to ensure that a groundwater protection scheme is not restrictive on any human economic activity. Lastly, it helps in the decision-making process for preventative measures and enables developments with a potential to contaminate, to be in areas of lower vulnerability.

Dublin Corporation investigations of Fire Station on North Strand Road neighbouring the subject site shows compact gravels / boulder clays and stiff clays at a depth of 10m. Standard penetration tests show medium dense - dense soils with some softer soils closer to the Tolka River.

The GSI Website classifies the aquifer vulnerability in this region as having low vulnerability rating. (Figure 3-3). Observation of Table 3-1 below shows that the existing hydrogeological conditions possess a low subsoil permeability over a depth greater than 10m. An aquifer with low vulnerability means that the fundamental geological and hydrogeological characteristics which determine the ease at which groundwater may be contaminated by human activities is low. However, the contamination on site is deemed possible due to the previous use of site as a ready-mix plant.
Table 3-1: GSI vulnerability classification criteria (Source Data and maps - Geological Survey Ireland [https://www.gsi.ie])

![Table 3-1](image)

Figure 3-3: GSI Aquifer Vulnerability Mapping (Source Data and maps - Geological Survey Ireland [https://www.gsi.ie])

3.2.2 Site Hydrogeology

Based on the review and analysis of the measured concurrent ground water levels in BH9 & BH4 and tide levels at Dublin Port, there does not appear to be a hydraulic connection between groundwater at/in the vicinity of the proposed development site and the Tolka river. Standpipe monitoring shows that the
The observed maximum groundwater levels in BH4 & BH9 are 0.50 and 0.41 mOD respectively, while the maximum tide levels at Dublin port is in the order of 1.4mOD during the recorded period.

This significant level diff. between the Dublin Port / Tolka River Water level and the borehole groundwater level suggests no active direct hydraulic connection between these.

Any temporal variations in the groundwater levels during the recorded period can be considered as imperceptible.

GSI data indicates that the area is underlain by a Locally important Bedrock Aquifer (Dark limestone & shale) within an area of low groundwater vulnerability. Shale aquifers generally have poor permeability. GSI data also shows that the area has low subsoil permeability, i.e. surface water does not easily penetrate the soil layer.

Furthermore, Site Investigation logs (attached) show that there is 12.4m – 27.0m deep overburden of soil within the site, and a water table in the gravel layer underlain by typically low permeability silt/clay. BH refusal is met at between 12.4m and 16.5m bgl. Follow on coring has confirmed Limestone bedrock at a depth of 27.0m bgl.

The bedrock aquifer has a minimum 27.0m thickness soil over bedrock. This and its relatively low permeability, provides a limited means for surface water and groundwater to interact.

Based on the information set out above, it can be concluded that there does not appear to be a hydraulic connection between groundwater at/in the vicinity of the proposed development site and the Tolka river.

Associated documentation can be seen in Appendix F.

### 3.3 Existing Flood Regime of the Area

The National Flood Hazard Mapping Website [www.floodmaps.ie](http://www.floodmaps.ie) shows evidence of historical flood events in the vicinity of the proposed development site. A Summary Local Area Report (SLAR) ([Figure 3-4](#)) was generated for the site which identifies all flooding events which occurred within 2.5 km of the proposed development.
Information from the OPW’s website indicate that the River Tolka has a history of flooding following heavy rainfall, which has been well documented after major flood events in 1954. The river has been the subject of several investigations, and of most significance were those carried out in 1955 and 1986.

Severe flooding from the Tolka River and its tributaries occurred in the Dublin City, Meath and Fingal areas in November 2000 and November 2002.

The nearest flood event to the proposed site is summarised as follows:

**Flooding at Bessborough Avenue, North Strand, Dublin 3 on 24th Oct 2011, No.26 SLAR**

A report of this flood event was prepared by RPS Consulting Engineers and submitted to the Office of Public Works (OPW). The report stated that “The source of the flood waters was surface water after heavy prolonged rainfall. Residents stated that water levels rose from the sewer/drainage system at the rear of their properties. The flood started at 7pm and peaked at approximately 7.30pm. The flood waters were accompanied by a bad smell. It appeared that the source was a combined sewer system, which was overwhelmed by the large amount of rainfall. It is possible that the area may be affected by the tide due to its flat nature and its proximity to the canal and the tidal reaches of the Tolka. Flooding breached the floor levels of the properties (between 20 and 30 residential properties).

**Historical Flooding of the River Tolka, Nov 1965, No.7 SLAR**

The River Tolka has a long, flat, primarily rural catchment with minimal reaction to short duration pluvial (‘monster rain’) storm events. Nevertheless, the river does have a significant history of flooding following long steady rainfalls, resulting in lands adjacent to the river been inundated by flood water many times during the last century. The extent of the flooding during the November 2002 flood event, has intensely confirmed the
flood potential of the river under critical rainfall conditions. The extensive flooding history is reflected in the Tolka's Gaelic name 'An Tulca' which means The Flood.

Prior to the 1960s, most of the development in the Tolka catchment was within the Dublin Corporation (now City Council) area. Accordingly, virtually all historical flood records for the River Tolka are derived from Dublin City Council records. These historical records provide evidence of the periodic extreme flood events which were experienced, particularly on the 8th December 1954 and a lesser documented event which occurred on the 28th October 1880. The 1954 and 1880 were the two major flood events on record which preceded the extreme November 2000 flood event. Further significant floods recorded were considerably smaller regarding flood volumes.

**Dublin Coastal Flooding Protection Project, Tidal Flood of February 2002, No.15 SLAR**

Records focus on the stretch of the River Tolka immediately downstream of Annesley Bridge, which is the upper limit of the study. There were no reports of flooding along this section of the river, except for some very localised flooding around a foot bridge immediately upstream of the railway bridge. However, this was not extensive and did not flood any properties. Based on the records, the river walls are quite high, although it is likely that the February event must have come close to the top.

### 3.4 Existing Flood Studies

#### 3.4.1 Preliminary Flood Risk Assessment (PFRA) Flood Maps

The Tolka River Flooding Study was underway when the November 2002 flood occurred. The consultants were asked to produce Interim Reports for all three local authorities concerned (Dublin City Council, Fingal County Council and Meath County Council) to identify works that could be undertaken straight away to reduce the risk of flooding in the worst affected areas. The Final Report on the Tolka was completed in November 2003 and this brought together many of the recommendations contained in the Interim Reports and much additional information, which provided the basis for further decisions in relation to the catchment.

The River Tolka is located within the Eastern River Basin District (ERBD) of Ireland. The OPW in partnership with RPS, Local Authorities and other stakeholders delivered the Catchment Flood Risk Assessment and Management (CFRAM) study for the ERBD. The OPW also published in the meantime, the Preliminary Flood Risk Assessment (PFRA) flood maps, in the form of 420 maps covering the country. According to the explanatory leaflet published for public consultation on PFRA stage, the PFRA is only a preliminary assessment, based on available or readily derivable information.

The PFRA map is shown in Appendix B and an extract in the following Figure 3-5 indicating that the proposed development site is located inside the 1% AEP (1 in 100 chance in any given year) and 0.1% AEP (1 in 1000 chance in any given year) fluvial flood extents. Consequently, the proposed development is in Flood Zone A (highest risk of fluvial flooding).

Similarly, the PFRA map also indicates that the proposed development is situated inside the 0.5% AEP (1 in 200 chance in any given year) and the 0.1% AEP (1 in 1000 chance in any given year) coastal flooding extents. Consequently, the proposed development is located within Flood Zone A (highest risk of coastal flooding).

The PFRA methodology and outputs revisited in 2012, under Eastern CFRAM Study.
3.4.2 Strategic Flood Risk Assessment (SFRA) for Dublin City Development Plan 2016-2022

This SFRA provided an area-wide assessment of all types of flood risk to inform strategic land use planning decisions. The draft SFRA was prepared and informed by the DEHLG Guidelines for Planning Authorities (DEHLG & OPW, 2009) on “The Planning System and Flood Risk Management”.

Due to the number of flood investigation and management studies that have focused on Dublin City there are a number of datasets which record either historical or predicted flood extents.

One of the key outcomes of the SFRA was the production of a Flood Zone Map which, along with other planning considerations, will inform land zoning decisions. The quality of outline may vary across the study area depending on the origin and quality of available data, but the best available or readily derivable information has been used to form the composite map (Figure 3-6). In all cases, the outlines have been reviewed against each other, any additional available data and against local engineering knowledge and have been refined where appropriate. In particular, the datasets that have been used are the Dodder, Fingal East Meath and draft Eastern CFRAM flood extents/zones, River Tolka and River Wad Flooding Studies, Irish Coastal Protection Strategy Study (ICPSS) tidal flood outlines, records of historical flood events, walkover survey and consultation with local authority area engineers.

The SFRA Composite Flood Zone Map is shown in Appendix C and an extract indicating that the proposed development site is located inside the 1% AEP (1 in 100 chance in any given year) and 0.1% AEP (1 in 1000 chance in any given year) fluvial flood extents. Consequently, the proposed development is in Flood Zone A (highest risk of fluvial flooding).
The Irish Coastal Protection Strategy Study (ICPSS) is a national study that was commissioned in 2003 with the objective of providing information to support decision making about how best to manage risks associated with coastal flooding and coastal erosion. The Study was completed in 2013 and provides strategic current scenario and future scenario (up to 2100) coastal flood hazard maps and strategic coastal erosion maps for the national coastline.

This study used numerical modelling of combined storm surges and tide levels to derive extreme water levels along this stretch of coastline. The application of extreme value analysis and joint probability analysis to both historic recorded tide gauge data and data generated by the numerical model allowed an estimation of the extreme water levels of defined exceedance probability to be established along the relevant sections of coastline.

Based on the various simulations of storms, time series of the water surface elevations were extracted at 29 points (Figure 3.7). It is observed that the proposed development site is in the vicinity of Point NE_22 (Figure 3.8). ICPSS predicted flood level has been further updated under the Irish Coastal Wave and Water Level Study (ICWWS, OPW, 2018).
The ICPSS current scenario flood maps for the 0.5% AEP Indicative flood extent and 0.1% AEP (extreme flood extent) in the vicinity of the study area are presented in Appendix D. The extract from the ICPSS tidal flood extent map (Figure 3-9) indicates that all the proposed development site is located within the 0.5% Annual Exceedance Probability (AEP) coastal flood extent (or 1 in 200 Return Period in any given year). Consequently, all the existing site is situated in Flood Zone A, where the probability of tidal flooding is...
Figure 3-9 illustrates the tidal flood water levels (mOD Malin) for the 10%, 0.5% and 0.1 % AEP flood events at Node Point NE_22 which were updated by the ICWWS, OPW, 2018 (Figure 3-7).

Mid-Range Future Scenario MRFS Coastal Flood Extent Map

Similarly, the ICPSS Mid-Range Future Scenario (MRFS) flood maps for the 0.5% AEP (Indicative flood extent) and 0.1 % AEP (extreme flood extent) in the vicinity of the study area are presented in Appendix D. The extract (see Appendix D for complete map) from the ICPSS tidal flood extent map (Figure 3-10) indicates that the proposed development site is located within the 0.5% Annual Exceedance Probability (AEP) flood extent (or 1 in 200 Return Period In any given year). Consequently, the entire site is situated In Flood Zone A, where the probability of coastal flooding is highest. Figure 3-10 illustrates the tidal flood water levels (mOD Malin) for the 10%, 0.5% and 0.1 % AEP flood events associated with the MRFS at Node Point NE_22.

Current Scenario Coastal Flood Depth Map

Figure 3-11 presents an extract of the ICPSS depth map for the 0.5% AEP (200-year return period) which is currently only available for the current scenario. Depth maps illustrate the estimated flood depths for areas inundated by a flood event of a given probability of occurrence which provides useful information for emergency services and property owners. The map depicts a range of depth bands ranging from 0 - 0.25m to a depth band greater than 2.00m resulting from coastal flooding. The approximate (due to low resolution mapping) depth bands from tidal flooding is predicted to range from 0.25 - 0.50m to 0.50 - 1.00m for the proposed development site.
Figure 3-10: Extract of ICPSS Mid-Range Future Scenario Coastal Flood Extent Map (Source: ICPSS)

Figure 3-11: Extract of ICPSS Depth map at 0.5% AEP (1 in 200 chance in any given year) (Source: ICPSS)
3.4.4 River Tolka Flooding Study

As an extension of the Greater Dublin Strategic Drainage study, the River Tolka Flooding Study was commissioned by Dublin City Council, in association with Fingal County Council, Meath County Council and the Office of Public Works in 2002. The study arose from concerns regarding increased flooding risk to properties along the River Tolka following a significant flood in November 2000, when many properties were inundated particularly in parts of Meath and the Dublin City Council area.

A report was produced that defined the history of flooding in the River Tolka. In order to quantify flood risk, this utilised the relevant historic data available to develop a profile of flood risk for the catchment and summarised the outcome of modelling studies related to previous flood data. It summarised options available for flood alleviation in the catchment and identified an integrated series of measures. These were recommended for implementation in order to manage flood risk, based on technical, environmental and economic assessment.

Within the 2004 Tolka Flooding Study, Flood Zone A was identified, and extents mapped. However, Flood Zones B and C had not been identified. In 2010 additional modelling was carried to map the Flood Zone B for the River. The floodplain mapping project assessed the 0.1% AEP floodplain extents by hydraulic modelling using the proposed defences as modelled in the original Tolka Flooding Study, i.e. not using ‘as constructed’ information.

The 2004 and 2010 flood zone mapping for the Tolka area pre-date some major infrastructural changes in the M3 area. Therefore, the OPW are currently reviewing options for updating the flood zone mapping for the River Tolka mapping.

A summary of upgrade work along the length of the river Tolka and in the vicinity of the proposed development is presented below:

- East Point Business Park Bridge to John McCormack Bridge: 200-year tidal flood contained by embankment on the north side & joint bank and retaining wall defence on south side.
- John McCormack Bridge to Railway Bridge: Retaining walls left and right sides looking downstream contain 200-year tidal flood.
- Railway Bridge to Annesley Bridge: Retaining walls left and right contain 200-year tidal flood.
- Annesley Bridge to Luke Kelly Bridge: Retaining walls left and right contain 200-year tidal flood event except for one 50m stretch on the north side.

The top of wall level along the right bank of the River Tolka varies between 5.28 mOD to 4.39 mOD. This indicates that the proposed site is protected from the MRFS.

Locations of the upgrade works listed above are presented in the following Figure 3-12.
Figure 3-12: Map Depicting the Bridges Downstream of Annesley Bridge
3.4.5 **Dublin North Central Pilot Area Pluvial Flood Hazard and Risk Mapping (EU Interreg IVB FloodResilienCity Project)**

Dublin City Council (DCC) is one of eleven partner organisations, drawn from eight European cities, which form the Interreg IVB flood risk management good practice project known as the FloodResilienCity (FRC).

DCC’s involvement and interest in the project was impelled by a necessity to develop sustainable flood risk management in the urban environment to deal specifically with Pluvial Flood Risk, pluvial flooding being the key component of surface water flooding.

**Figure 3.13** presents a map of the modelled area. The layers show the modelled extent of land that might be directly flooded by rainfall under existing (Do-minimum) conditions. The proposed development is susceptible to pluvial flooding under all probabilities.

![Proposed Development](image)

**Figure 3-13:** Rainfall Flood Extents – Dublin City Area (Source: [https://www.floodinfo.ie/map/floodmaps/](https://www.floodinfo.ie/map/floodmaps/))
4 FLOOD RISKS AND FLOOD ZONE MAPPING

The flood zones are defined based on the probability of flooding from rivers and the sea. The different flood zones recommended in the FRM Guidelines are:

**Flood Zone A** - where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);

**Flood Zone B** - where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and

**Flood Zone C** - where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

As previously noted, and as detailed on the PFRA map (Appendix B) and the coastal flood extent maps (Appendix D) indicate that:

- The proposed development site is located within the 0.5% AEP coastal flood extent (1 in 200 chance in any given year) i.e., Flood Zone A - Highest risk of flooding.
- The proposed development site is located within the 1% AEP fluvial flood extent (1 in 100 chance in any given year) i.e., Flood Zone A Highest risk of flooding.

As mentioned above, the most significant source of flooding at the proposed development site is from coastal flooding. The detailed ICPSS (2012) and ICWSS (2018) Hydrology and Hydraulic Analysis which resulted in the development of coastal flood extent maps, illustrate the tidal flood water levels (mOD Malin) for the 10%, 1% and 0.5% AEP flood events at Node Point 22 (in the immediate vicinity of the proposed site are +2.86mOD, +3.08mOD and +3.15mOD respectively).

According to the FRM Guidelines, the minimum floor level for a new development should be set above the 0.5% AEP (1 in 200 year) coastal flood level and should include an allowance for climate change and freeboard.

As such the proposed finished floor level (FFL) for the development shall set at a minimum level of +4.15mOD-Malin. This is based on the ICWWS estimated 0.5% coastal flood level of 3.15mOD plus 0.5m of climate change allowance for the MRFS plus a freeboard allowance of 0.5m. This level is lower than the standard of protection provided by the River Tolka’s flood walls. Therefore, the site is protected, given that the walls be maintained at their existing top levels.

Since the proposed developed is located within the flood protected areas, no such impacts on the existing flooding regime to the adjacent properties are expected to be caused by the proposed development. Furthermore, an appropriate surface water drainage system will be implemented as part of the development. Any increase in runoff volume likely to be generated from the development shall be attenuated on site before discharging to the adjacent watercourses/surface water drainage systems.

In the Dublin City Development Plan 2016-2022, the subject site was zoned as ‘to provide for and improve mixed services facilities’ with the majority of the adjacent uses to be residential. The proposed residential development at the subject can be justified.
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

1. Past Flood Events: There are no records of significant flooding of the proposed site. However, the areas in the vicinity of the Tolka River have suffered from extensive flooding before the construction of the flood alleviation measures.

2. Based on the review and analysis of the measured concurrent ground water levels in BH9 & BH4 and tide levels at Dublin Port, there does not appear to be a hydraulic connection between groundwater at/in the vicinity of the proposed development site and the Tolka river.

3. Fluvial Flood Risk: As part of the Eastern CFRAM programme, a review of the River Tolka Flooding Study has been undertaken, however, the flood maps have not been currently made available. Observation of the Preliminary Flood Risk Assessment Map (PFRA) indicates that the proposed development is located within the fluvial - indicative 1 % AEP (100-yr) event. Consequently, the proposed development is in Flood Zone A where the risk of fluvial flooding is highest.

4. Groundwater Flood Risk: The aquifer vulnerability map portrays that the entire site is in a region classified as having 'Low Vulnerability' which indicates a low phreatic surface (water table) and hence the risk of groundwater flooding is low. There is no indication on the PFRA map of any groundwater flooding on this site. Therefore, groundwater flood risk is low.

5. Coastal Flood Risk: The proposed development site is located within the 0.5% AEP coastal flood extent (1 in 200 chance in any given year) i.e., Flood Zone A - Highest risk of flooding.

6. Pluvial Flood Risk: Pluvial flood risk mapping for the proposed development site has been conducted as part of the Dublin North Central Pilot Area Pluvial Flood Hazard and Risk Mapping for the EU Interreg VB Flood Resilient City Project. The pluvial hazard rating map depicts that the proposed development site is located where the hazard is moderate. Consequently, pluvial flood risk is considered to be moderate.

7. Based on ICWWS 2018, the estimated coastal flood level in the vicinity of the proposed site for the MRFS is 3.65 mOD (0.5% AEP coast flood event). Inclusive of a freeboard allowance of 0.5m, the proposed FFL level of the buildings should be set a minimum level of 4.15mOD.

8. The top of wall level along the right bank of the River Tolka downstream of Annesley Bridge varies between 5.28 mOD and 4.39 mOD. This indicates that the proposed site is protected from the risk of future coastal flooding (Medium Range Future Scenario).

5.2 Recommended Flood Risk Mitigation Measures

The site should be defended from flooding by adopting a two-stage mitigation approach namely, flood resistance and flood resilience.

Flood Resistance Measures

Restoration of existing boundary walls up to the recommended minimum flood design level of +4.15mOD (Malin), to provide an effective local flood defence against flood water entering the properties. The restoration of the walls must include detailed engineering design to protect the property against breaching failure. It is important that the boundary walls have a waterproof seal at the interface with adjacent properties.

- The proposed new rendered blockwork wall to divide the subject site from the adjoining property must be constructed up to at least the minimum recommended flood design level i.e., +4.15mOD (Malin).
- 'Air bricks in external masonry leaf below the minimum flood resistance level of +4.15mOD (Malin) are to be sealed using 'SMART' Air bricks.
- Anti-flood valves (Non return valves) to prevent flood water backing up through the sewer/drainage network.
- Lockable external manhole covers capable of resisting reasonable uplift pressures, applied to both foul and surface water sewers (where necessary).
- Seal gaps around pipes and cables.
Existing flood walls shall be maintained at the level of protection required for the MRFS.

**Flood Resilience Measures**

- Electrical sockets, fuse boxes, controls and wiring will be raised above +4.15mOD (Malin).
- Boilers will be mounted to the wall above the level the flood water is likely to reach.
- Service meters should be moved to at least one metre above floor level (or well above likely flood level) and placed in plastic housings.
- Washing machines should be moved to the first-floor rooms if the layout of the house is suitable.
- Home entertainment equipment should be mounted to the wall at a position above the likely flood level.
- Kitchen and Bathroom: water-resistant materials such as stainless steel, plastic or solid wood should be used rather than chipboard-based units.
- Where possible appliances should be raised on plinths.
Appendix A

OPW-Past-Flood-Summary-Report
This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the "Website"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.

Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

29 Results

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Appendix B
PFRA Map
Appendix C

Composite Flood Zone Map Dublin City
Appendix D

Irish Coastal Protection Strategy Study (ICPSS) Coastal Flood Maps
NOTE: MORE DETAILED MAPS SHOWING COMBINED TIDAL AND FLUVIAL FLOOD HAZARD FOR PART OF THIS AREA (DODDER CATCHMENT ONLY) HAVE BEEN PREPARED UNDER THE RIVER DODDER CATCHMENT FRAM STUDY. PLEASE REFER TO WWW.DUBLINCITY/IE/PAGES/DODDERFLOODINGSTUDY.ASPX FOR MORE INFORMATION.
NOTE: MORE DETAILED MAPS SHOWING COMBINED TIDAL AND FLUVIAL FLOOD HAZARD FOR PART OF THIS AREA (DODDER CATCHMENT ONLY) HAVE BEEN PREPARED UNDER THE RIVER DODDER CATCHMENT FRAM STUDY. PLEASE REFER TO WWW.DUBLINCITY.IE/PAGES/DODDERFLOODINGSTUDY.ASPX FOR MORE INFORMATION.
Hydrogeological and Flood Risk Assessment Report

Appendix E

FloodResilience City Project Maps
Location Plan:

LEGEND
- 10% AEP Pluvial
- 1% AEP Pluvial
- 0.5% AEP Pluvial

IMPORTANT USER NOTE:
The viewer of this map should refer to the disclaimer, guidance notes and conditions of use that accompany this map.

The Office Of Public Works
Jonathan Swift St
Dún Laoghaire
Co. Dublin
Dublin 14

Dublin City Council
Civic Offices
Wood Quay
Dublin 8

DUPLIN PLUVIAL STUDY (FloodResiliencity)
Map: DUBLIN CITY - PLUVIAL FLOOD EXTENT MAP
Map Type: EXTENT - 180mm Rainfall
Scenario: CURRENT
Source: PLUVIAL
Map Area: URBAN

Drawn by: IH
Date: Aug - 2015
Checked by: MC
Date: Aug - 2016
Approved by: JM
Date: Aug - 2016

Map No: E98DC_DPLVD_P0_02
Map Scale: 1:50,000
Plot Scale: 1:1 @ A3
Appendix F
Site Hydrogeology
TRIAL PIT TO DETERMINE EXTENT OF EXISTING BUILDING FOUNDATION

IMT GRID REFERENCE

X = 717270  Y = 735833

LEGEND

 TRIAL PIT
 TRIAL PIT (INFILTRATION TEST)
 CABLE PERCUSSION BOREHOLE
 CABLE PERCUSSION BOREHOLE WITH FOLLOW ON ROTARY CORING IN ROCK AS REQUIRED
 TEST HOLE WITH STAND PIPE
 SLIT TRENCHING

Name | Easting | Northing
---|---|---
TP01 | 717270.049 | 735856.847
TP02 | 717268.097 | 735856.355
TP03 | 717318.395 | 735833.094
TP04 | 717281.419 | 735856.719
TP05 | 717290.492 | 735836.816
TP06 | 717268.439 | 735836.652
TP07 | 717302.488 | 735811.740
TP08 | 717242.591 | 735836.568
TP09 | 717275.567 | 735811.759
TP10 | 717218.581 | 735835.596
TP11 | 717250.511 | 735811.590
TP12 | 717262.572 | 735787.588
TP01 (IN) | 717275.567 | 735823.702
TP02 (IN) | 717268.097 | 735823.702
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TP08 | 717242.591 | 735836.568
TP09 | 717275.567 | 735811.759
TP10 | 717218.581 | 735835.596
TP11 | 717250.511 | 735811.590
TP12 | 717262.572 | 735787.588

Trial Pit to determine extent of existing building foundation

General Notes:
(i) Hard copies, pdf and dwf will form a controlled issue of the drawing. All other formats (eg. dwg) are deemed to be an uncontrolled issue and any work carried out using these shall not be in any way linked with the controlled issue unless the Awr of these files, either to RPS or to the client, ensures that they are used in such a way that the requirements clear of the drawing, or against the site.
(ii) The drawing is the property of RPS, it is a project confidential classified document. It must not be copied or its contents disclosed without prior written consent. Any changes and modifications ofclient and RPS must be considered when working with this drawing.
(iii) Information including topographical surveys, geotechnical investigation and utility detail used in the design have been provided by others. The client and RPS must be consulted when working with this drawing.
(iv) Information including topographical survey, geotechnical investigation and utility detail used in the design have been provided by others. The client and RPS must be consulted when working with this drawing.
(v) All levels refer to Ordnance Survey Datum, Mean Sea Level.
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| Max        | 3.31            | 0.41     | 3.21            | 0.5       | Max       | 3.91       | 1.40               |
| Min:       | 3.18            | 0.28     | 3.01            | 0.3       | Min:      | 1.51       | -1.00              |
| Diff.      | 0.13            | 0.13     | 0.20            | 0.20      | Diff.     | 2.40       | 2.40               |

**Note:**
The observed maximum groundwater levels in BH4 & BH9 are 0.50 and 0.41 mOD respectively, while the maximum tide levels at Dublin port is in the order of 1.4 mOD during the recorded period. This significant level diff. between the Dublin Port / Tolka River Water level and the borehole groundwater level suggests no active direct hydraulic connection between these. Any temporal variations in the groundwater levels during the recorded period can be considered as imperceptible.
Appendix I  Boring Records
### Geotechnical Boring Record

**Contract:** NDFA Social Housing - East Wasil Road, Dublin 3

**Rig Type:** DANDO 2000

**Borehole No.:** BH01

**Sheet:** Sheet 1 of 2

**Date Commenced:** 23/05/2021

**Date Completed:** 29/05/2021

**Client:** N.D.F.A

**Engineer:** R.P.S

**SPT Hammer Ref. No.:**

**Energy Ratio (%):**

**Bore By:** P. Thomas

**Processed By:** F.C

---

### Ground Information

**Depth (m) **

<table>
<thead>
<tr>
<th>Description</th>
<th>Legend</th>
<th>Elevation</th>
<th>Depth (m)</th>
<th>Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0.30</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MADE GROUND (Comprised of silty clayey builders fill with rubble and reinforced concrete pieces)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4.50</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dense grey/brown fine to coarse slightly sandy GRAVEL with some cobbles and boulders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6.70</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loose grey/brown fine to coarse silty SAND with occasional gravel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8.30</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft to firm grey sandy SILT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Water Strike Details

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.60</td>
<td>1.90</td>
<td>1</td>
<td></td>
<td>4.30</td>
<td>4.30</td>
<td>No</td>
<td>3.30</td>
<td>20</td>
<td>Moderate</td>
</tr>
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<td>5.10</td>
<td>5.30</td>
<td>0.75</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12.50</td>
<td>12.80</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>13.70</td>
<td>13.90</td>
<td>2</td>
<td></td>
<td></td>
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</tbody>
</table>

---

### Groundwater Progress

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

---

### Installation Details

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
<th>Sample Legend</th>
<th>UF - Undisturbed 100mm Diameter Sample</th>
<th>SC - SiltCont Sample</th>
<th>LR - Large Rock Sample</th>
<th>SW - Silt Water Sample</th>
<th>FW - Fish and Wildlife Sample</th>
</tr>
</thead>
</table>

**Remarks:** 1hr Erecting Covid 19 Safe Working Area. Concrete precored. CAT scanned location and hand dug inspection pit carried out.
**GEOTECHNICAL BORING RECORD**

**CONTRACT**  NDFA Social Housing - East Wasil Road, Dublin 3

**BOREHOLE NO.** BH01

<table>
<thead>
<tr>
<th>CO-ORDINATES</th>
<th>RIG TYPE</th>
<th>DATE COMMENCED</th>
<th>DATE COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUND LEVEL (mOD)</td>
<td>DANDO 2000</td>
<td>23/05/2021</td>
<td>29/05/2021</td>
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<table>
<thead>
<tr>
<th>CLIENT</th>
<th>ENGINEER</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.D.F.A</td>
<td>R.P.S</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>SPT HAMMER REF. NO.</th>
<th>ENERGY RATIO (%)</th>
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<tbody>
<tr>
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<table>
<thead>
<tr>
<th>BORED BY</th>
<th>PROCESSED BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.THOMAS</td>
<td>F.C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
<th>Legend</th>
<th>Elevation</th>
<th>Depth (m)</th>
<th>Ref. Number</th>
<th>Sample Type</th>
<th>Depth (cm)</th>
<th>Recovery</th>
<th>Field Test Results</th>
<th>Standpipe Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Soft to firm grey sandy SILT (continued)</td>
<td>x x x</td>
<td>10</td>
<td>10.30</td>
<td>AA15889 B</td>
<td>B</td>
<td>10.00</td>
<td>N = 11</td>
<td>(1, 1, 1, 2, 4, 4)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stiff dark grey sandy gravelly CLAY with occasional cobbles</td>
<td></td>
<td></td>
<td></td>
<td>AA15670 B</td>
<td>B</td>
<td>11.00</td>
<td>N = 27</td>
<td>(3, 5, 6, 6, 7, 8)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Very stiff dark grey/black very gravelly sandy CLAY with some cobbles</td>
<td></td>
<td>12.30</td>
<td></td>
<td>AA15671 B</td>
<td>B</td>
<td>12.00</td>
<td>N = 27</td>
<td>(4, 4, 5, 5, 8, 9)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>End of Borehole at 13.90 m</td>
<td></td>
<td>13.90</td>
<td></td>
<td>AA15672 B</td>
<td>B</td>
<td>13.00</td>
<td>N = 27</td>
<td>(7, 9, 12, 16, 17, 10)</td>
<td></td>
</tr>
</tbody>
</table>

**HARD STRATA BORING/CHISELLING**

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.60</td>
<td>1.90</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5.10</td>
<td>5.30</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>12.50</td>
<td>12.80</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>13.70</td>
<td>13.90</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
</table>

**GROUNDWATER PROGRESS**

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
</table>

**REMARKS**

1hr Erecting Covid 19 Safe Working Area. Concrete precorded.
.CAT scanned location and hand dug inspection pit carried out.

Sample Legend

- S - Soil Sample
- T - Terrestrial Trench Sample
- U - Unbored Pu Sample
- E - Environmental Sample (Ent + U or T)
CONTRACT: NDFA Social Housing - East Waskil Road, Dublin 3

CO-ORDINATES

GROUND LEVEL (mOD)

RIG TYPE: DANDO 2000

BOREHOLE DIAMETER (mm)

BOREHOLE DEPTH (m)

CLIENT: N.D.F.A

SPT HAMMER REF. NO.

ENERGY RATIO (%)

ENGINEER: R.P.S

BORED BY: P.THOMAS

PROCESSED BY: F.C

GEOTECHNICAL BORING RECORD

BOREHOLE NO.

SHEET

DATE COMMENCED: 02/06/2021

DATE COMPLETED: 08/06/2021

23326A

Sheet 1 of 2

Description

Depth (m)

Legend

Elevation

Depth (m)

Samples

Ref. Number

Sample Type

Depth (m)

Recovery

Field Test

Results

Standpipe

Details

- 0

CONCRETE

LEAN MIX

MADE GROUND (Comprised of brick, rubble, ash, clinker)

Medium dense grey fine to coarse silty sandy GRAVEL with occasional cobbles

Loose grey gravelly SAND

Soft very sandy SILT (Possibly silty sand) with occasional fine gravel

Firm grey sandy SILT/CLAY with some gravel

From (m) To (m) Time (h) Comments

4.60 4.90 1

4.60 4.90 2

6.90

7

Water Strike Details

WATER STRIKE DETAILS

From (m) To (m) Time (h) Comments

No water strike

Installation Details

Date Depth Hole Casing Depth Depth to Water Comments

09-06-21 14.80 1.00 14.80 50mm SP

Remarks

1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

Sample Legend

U - Undisturbed 100mm Diameter Sample

S - Soil Sample

L - Large Soil Sample

E - Environmental Sample

V - Water Sample
**GEOTECHNICAL BORING RECORD**

**CONTRACT**  NDFA Social Housing - East Wasil Road, Dublin 3

**CO-ORDINATES**

**GROUND LEVEL (mOD)**

**RIG TYPE** DANDO 2000

**BOREHOLE DIAMETER (mm)** 200

**BOREHOLE DEPTH (m)** 14.80

**CLIENT** N.D.F.A

**ENGINEER** R.P.S

**SPT HAMMER REF. NO.**

**ENERGY RATIO (%)**

**BORED BY** P.THOMAS

**PROCESSED BY** F.C

**BOREHOLE NO.** BH04

**SHEET** Sheet 2 of 2

**DATE COMMENCED** 02/06/2021

**DATE COMPLETED** 08/06/2021

---

**Depth (m)**

**Description**

**Legend**

**Elevation**

**Depth (m)**

**Samples**

**Field Test Results**

**Standpipe Details**

10

Firm grey sandy SILT/CLAY with some gravel (continued)

AA156696 B 10.00 N = 9

AA156696 U 10.00 100% sec

AA156697 B 11.00 N = 11

11

Stiff grey gravelly SILT/CLAY with occasional cobbles

11.50

AA156696 B 12.00 N = 21

AA156696 B 12.00 (2, 4, 5, 6, 6)

AA156696 B 13.00 N = 24

AA156700 B 14.00 (3, 5, 6, 7, 7, 7)

AA156700 B 14.00 N = 53

14

Very stiff black sandy gravelly CLAY with some cobbles

14.00

14.80

15

Obstruction
End of Borehole at 14.80 m

---

**HARD STRATA BORING/CHISELLING**

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.80</td>
<td>4.90</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14.80</td>
<td>14.80</td>
<td>2</td>
<td></td>
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</table>

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No water strike</td>
</tr>
</tbody>
</table>

**GROUNDWATER PROGRESS**

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>08-06-21</td>
<td>14.80</td>
<td>1.00</td>
<td>14.80</td>
<td>50mm SP</td>
</tr>
</tbody>
</table>

**REMARKS** 1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

**Sample Legend**

- SD - Small Dispersed Soil
- BD - Bulk Dispersed
- LBD - Large Bulk Dispersed
- W - Water Sample
- UT - Undisrupted 150mm Diameter Sample
- FT - Fresh Trench Sample
## Geotechnical Boring Record

**Contract:** NDFA Social Housing - East Wastl Road, Dublin 3  
**Borehole No.:** BH06  
**Report Number:** 23326A

### Co-ordinates
- **Ground Level (m OD):**
- **Client:** N.D.F.A
- **Engineer:** R.P.S
- **SPT Hammer Ref. No.:**
- **Energy Ratio (%):**
- **Rig Type:** DANDO 2000
- **Borehole Diameter (mm):** 200
- **Borehole Depth (m):** 16.50
- **Date Commenced:** 10/06/2021
- **Date Completed:** 11/06/2021
- **Bored By:** P. Thomas
- **Processed By:** F.C

### Description

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>CONCRETE</td>
</tr>
<tr>
<td></td>
<td>LEAN MIX</td>
</tr>
<tr>
<td>0.7</td>
<td>MADE GROUND (Comprised of silty/clayey fill with rubble - Strong hydrocarbon smell noted from 3.50m)</td>
</tr>
<tr>
<td>4.1</td>
<td>Medium dense to dense grey fine to coarse GRAVEL with frequent cobbles</td>
</tr>
<tr>
<td>7.0</td>
<td>Very soft grey sandy SILT (Possibly loose silty Sand)</td>
</tr>
<tr>
<td>9.0</td>
<td>Soft to firm grey sandy SILT/CLAY with occasional finegravel</td>
</tr>
</tbody>
</table>

### Hard Strata Boring/Chiselling

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.70</td>
<td>0.90</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4.50</td>
<td>6.00</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>15.90</td>
<td>16.10</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>16.30</td>
<td>16.50</td>
<td>2</td>
<td></td>
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</table>

### Water Strike Details

<table>
<thead>
<tr>
<th> </th>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.70</td>
<td>3.70</td>
<td>3.80</td>
<td>No</td>
<td>20</td>
<td>Slow</td>
<td></td>
</tr>
<tr>
<td>4.20</td>
<td>4.20</td>
<td>No</td>
<td>3.50</td>
<td>20</td>
<td>Moderate</td>
<td></td>
</tr>
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</table>

### Installation Details

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
</table>

### Groundwater Progress

<table>
<thead>
<tr>
<th>Date</th>
<th>Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>comments</th>
</tr>
</thead>
</table>

### Remarks

1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

---

**Sample Legend**
- 0 - Craig Cement (void)
- 1/2 - Bolt Chucked
- LR - Large Roll Chucked
- Env - Environmental Sample (Task + VAT + Tub)
- W - Water Sample
- UTV - Undisturbed 100mm Diameter Sample
## Geotechnical Boring Record

**Contract:** NDFA Social Housing - East Wasil Road, Dublin 3

**Client:** N.D.F.A

**Engineer:** R.P.S

**Rig Type:** DANO 2000

**Borehole Diameter (mm):** 200

**Borehole Depth (m):** 16.50

**Date Commenced:** 10/06/2021

**Date Completed:** 11/06/2021

**Bored By:** P. Thomas

**Processed By:** F.C.

### Depth (m)

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
<th>Legend</th>
<th>Field Test Results</th>
<th>Sample Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Soft to firm grey sandy SILT/CLAY with occasional finegravel (continued)</td>
<td>AA198876 B 10.00</td>
<td>N = 10</td>
<td>(1, 2, 3, 3, 3)</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>AA198877 B 11.00</td>
<td>N = 12</td>
<td>(2, 3, 4, 5, 5, 5)</td>
</tr>
<tr>
<td>11.90</td>
<td></td>
<td></td>
<td>N = 20</td>
<td>(2, 3, 4, 5, 5, 5, 5)</td>
</tr>
<tr>
<td>12</td>
<td>Stiff grey silty gravelly CLAY with occasional cobbles</td>
<td>AA198878 B 12.00</td>
<td>N = 24</td>
<td>(3, 4, 5, 6, 6, 6, 6)</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>AA198879 B 13.00</td>
<td>N = 24</td>
<td>(3, 4, 5, 6, 6, 6, 6, 6, 6)</td>
</tr>
<tr>
<td>14.30</td>
<td></td>
<td>AA198880 B 14.00</td>
<td>N = 34</td>
<td>(3, 4, 5, 6, 6, 6, 6, 6, 6, 6, 6, 6)</td>
</tr>
<tr>
<td>15</td>
<td>Medium dense to dense black fine to coarse clayey GRAVEL with some cobbles and occasional boulders</td>
<td>AA198881 B 15.00</td>
<td>N = 50/150 mm</td>
<td>(7, 14, 18, 32)</td>
</tr>
<tr>
<td>16.50</td>
<td>Obstruction</td>
<td>AA198882 B 16.00</td>
<td>N = 50/150 mm</td>
<td>(7, 14, 18, 32)</td>
</tr>
</tbody>
</table>

### Hard Strata Boring/Chiselling

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.70</td>
<td>0.90</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.50</td>
<td>5.00</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.30</td>
<td>16.50</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Water Strike Details

### Groundwater Progress

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

### Remarks

1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.
## Geotechnical Boring Record

**Contract:** NDFA Social Housing - East Wasil Road, Dublin 3

**Borehole No.:** EH07  
**Sheet:** 1 of 2

### Co-ordinates
- GROUND LEVEL (mOD)

### Rig Type
- RIG TYPE: DANDO 2000
- BOREHOLE DIAMETER (mm): 200
- BOREHOLE DEPTH (m): 15.30

### Client
- N.D.F.A

### Engineer
- R.P.S

### SPT Hammer Ref. No.

### Energy Ratio (%)

### Bored By
- P. Thomas

### Processed By
- F.C

### Depth (m) | Description
--- | ---
3.00 | Concrete
0.60 | Lean Mix
1.00 | Made Ground (Comprised of clayey rubble fill with brick, concrete, ceramics, steel, tyres - Strong hydrocarbon smell noted 3.70m)
4.20 | Medium dense to dense grey fine to coarse silty sandy gravel (Blowing noted in fines 5.50-3.80m)
7.10 | Loose grey very silty sand (Possibly sandy silt)
8.70 | Firm grey sandy silt

### Legend
- **Legend:** Boring, Sample, Field Test Results, Standard Drilled

### Samples
- **Reference Number:** AA169651
- **Sample Type:** B
- **Depth:** 1.00
- **Recovery:** N = 7
- **Comments:** (2, 2, 1, 5, 2, 2)

### Water Strike Details

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.50</td>
<td>4.00</td>
<td>1.5</td>
<td>Water Strike</td>
</tr>
<tr>
<td>14.80</td>
<td>14.80</td>
<td>1</td>
<td>Seepage</td>
</tr>
<tr>
<td>15.10</td>
<td>15.30</td>
<td>2</td>
<td>Slow</td>
</tr>
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</table>

### Groundwater Progress

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

### Remarks
- 1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

### Sample Legend
- **G:** Small Dense Particle
- **S:** Silt Dispersed
- **D:** Silty Silt Dispersed
- **Dw:** Silty Silt Silt Dispersed
- **U:** Undisturbed 100mm Diameter
- **UP:** Undisturbed 75mm Diameter
- **Dw:** Disturbed Sample (Jar + Tub)
- **W:** Water Sample
## Geotechnical Boring Record

**Contract:** NDFA Social Housing - East Wasil Road, Dublin 3  
**Rig Type:** DANNO 2000  
**Borehole Diameter (mm):** 200  
**Borehole Depth (m):** 15.30  
**Date Commenced:** 09/09/2021  
**Date Completed:** 10/09/2021  
**Client:** N.D.F.A  
**Engineer:** R.P.S  
**SPT Hammer Ref. No.:**  
**Energy Ratio (%):**  
**Bored By:** P. Thomas  
**Processed By:** F.C.

### Depth (m)  Description  Sample Details

- **10 m:** Stiff grey sandy very gravelly CLAY with occasional cobbles (continued)
  - **Elevation:** AA199562  
  - **Depth:** 12.00  
  - **Recovery:** N = 25  
  - **Field Test Results:** (2, 3, 5, 6, 7)
  - **Chip Details:**
    - **Elevation:** AA199661  
      - **Depth:** 11.00  
      - **Recovery:** N = 27  
      - **Field Test Results:** (3, 4, 6, 7, 8)
  - **Chip Details:**
    - **Elevation:** AA199651  
      - **Depth:** 14.00  
      - **Recovery:** N = 34  
      - **Field Test Results:** (5, 6, 8, 10)

- **13.20 m:** Very stiff to hard black gravelly CLAY with occasional cobbles
  - **Elevation:** AA199632  
    - **Depth:** 13.00  
    - **Recovery:** N = 26  
    - **Field Test Results:** (3, 4, 6, 7, 10)

### End of Borehole at 15.30 m

### Hard Strata Boring/Chiselling  Water Strike Details

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed Al</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.50</td>
<td>4.00</td>
<td>1.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.60</td>
<td>14.80</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
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### Installation Details

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

### Groundwater Progress

### Remarks

1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.
**GEOTECHNICAL BORING RECORD**

**CONTRACT**
NDFA Social Housing - East Wascott Road, Dublin 3

**BOREHOLE NO.**
BH08

**RIG TYPE**
DANDO 2000

**BOREHOLE DIAMETER (mm)**
200

**BOREHOLE DEPTH (m)**
0.70

**DATE COMMENCED**
24/05/2021

**DATE COMPLETED**
24/05/2021

**CLIENT**
N.D.F.A

**ENGINEER**
R.P.S

**SPT HAMMER REF. NO.**

**ENERGY RATIO (%)**

**BORED BY**
P.THOMAS

**PROCESSED BY**
F.C

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
<th>Legend</th>
<th>Elevation</th>
<th>Depth (m)</th>
<th>Ref. Number</th>
<th>Sample Type</th>
<th>Depth (m)</th>
<th>Recovery</th>
<th>Field Test Results</th>
<th>Standpipe Details</th>
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<tbody>
<tr>
<td>0</td>
<td>CONCRETE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.30</td>
<td>MADE GROUND (Comprised of silty/clayey builders fill with rubble and reinforced concrete pieces)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.70</td>
<td>Obstruction End of Borehole at 0.70 m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**HARD STRATA BORING/CHISELLING**

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.50</td>
<td>4.50</td>
<td>No</td>
<td>3.10</td>
<td>20</td>
<td>Moderate</td>
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**GROUNDWATER PROGRESS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REMARKS**
1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out. Obstruction encountered. Relocated to BH08A and attempted rebore.

**Sample Legend**
- D - Small Disturbed (wet)
- D - Small Disturbed (dry)
- L - Large Disturbed (wet)
- L - Large Disturbed (dry)
- E - Environmental Sample (Jar + Vid + Tub)
- UT - Undisturbed 100mm Diameter Sample
- U - Undisturbed 100mm Sample
**GEOTECHNICAL BORING RECORD**

**CONTRACT**  
NDFSA Social Housing - East Wexford Road, Dublin 3

**RIG TYPE** DANDO 2000

**BOREHOLE NO.** BH08A

**DATE COMMENCED** 24/05/2021

**DATE COMPLETED** 26/05/2021

**BORER BY** P. THOMAS

**ENGINEER** R.P.S

**SPT HAMMER REF. NO.**

**ENERGY RATIO (%)**

**FIELD TEST RESULTS**

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
<th>Legend</th>
<th>Elevation</th>
<th>Depth (m)</th>
<th>Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.30</td>
<td>MADE GROUND (Comprised of concretes pieces and boulders)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.50</td>
<td>MADE GROUND (Comprised of clayey/silty fill with rubble, red brick and concrete pieces - Strong hydrocarbon smell noted from 4.00m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.50</td>
<td>Grey/brown fine to coarse slightly sandy GRAVEL with cobbles and some boulders - Blowing noted 0.00-5.10m</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.20</td>
<td>Stiff grey sandy SILT (Possibly very silty Sand)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.30</td>
<td>Stiff grey slightly gravelly sandy SILT/CLAY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HARD STRATA BORING/CHISELLING**

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.80</td>
<td>4.00</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4.40</td>
<td>4.60</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>5.80</td>
<td>6.00</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>16.30</td>
<td>16.50</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>No water strike</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GROUNDWATER PROGRESS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

**REMARKS**  
1hr Erecting Covid 19 Safe Working Area. Concrete precored. CAT scanned location and hand dug inspection pit carried out.

**Sample Legend**
- D - Small Diameter (1st)  
- T - Bulk Diameter  
- L - Larger Diameter  
- U - Universal Sample  
- Wr - Water Sample  
- ER - Environmental Sample (air + Vol + Tab)
GEOTECHNICAL BORING RECORD

CONTRACT: NDFA Social Housing - East Wastil Road, Dublin 3
BOREHOLE NO.: BH08A

CO-ORDINATES
GROUND LEVEL (mOD)

RIG TYPE: DANDO 2000
BOREHOLE DIAMETER (mm): 200
BOREHOLE DEPTH (m): 16.50

DATE COMMENCED: 24/05/2021
DATE COMPLETED: 26/05/2021

CLIENT: N.D.F.A
ENGINEER: R.P.S

SPT HAMMER REF. NO.
ENERGY RATIO (%)

BORED BY: P. THOMAS
PROCESSED BY: F.C

Depth (m) Description

10 Stiff grey slightly gravelly sandy SILT/CLAY (continued)

11

12

13

14 Coarse silty/clayey GRAVEL/COBBLE layer

15 Very stiff to hard black sandy gravelly CLAY with some cobble

16 End of Borehole at 16.50 m

Legend: Sample Type: AA139994 B = 10.00

Samples

Field Test Results

N = 14

Energy Ratio: 1, 2, 3, 4, 5

Energy Ratio: 1, 2, 4, 5, 6

Energy Ratio: 1, 2, 3, 5, 6

Energy Ratio: 2, 4, 5, 6

Energy Ratio: 3, 5, 6, 10, 14

Energy Ratio: 9, 14, 16, 19, 15

Energy Ratio: 11, 14, 16, 22, 9

HARD STRATA BORING/CHISELLING

WATER STRIKE DETAILS

From (m) To (m) Time (h) Comments Water Strike Casing Depth Sealed At Rise To Time (min) Comments

3.50 4.00 1 1 No water strike

4.40 4.60 1.5

15.90 16.00 1 0.75

16.30 16.50 2

Sample Legend

UT - Undisturbed 105mm Diameter
RC - Sited Drilled
DR - Drilled RC Sample
SK - Split Sample
B - bulk Sample
RA - Representative Sample (ln + Vol + Tubi)
W - Water Sample

INSTALLATION DETAILS

Date Tip Depth RZ Top RZ Base Type

REMKS 1hr Erecting Covid 19 Safe Working Area. Concrete precured. CAT scanned location and hand dug inspection pit carried out.
<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
<th>Elevation</th>
<th>Samples</th>
<th>Field Test Results</th>
<th>Standard Penetration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Firm grey sandy SILT/CLAY (continued)</td>
<td>10.90</td>
<td>A159437</td>
<td>B</td>
<td>10.00</td>
<td>N = 11</td>
</tr>
<tr>
<td>11</td>
<td>Stiff grey sandy gravelly CLAY with occasional cobbles</td>
<td>12.00</td>
<td>A159438</td>
<td>B</td>
<td>11.00</td>
<td>N = 23</td>
</tr>
<tr>
<td>12</td>
<td>Very stiff to hard black sandy gravelly CLAY with some cobbles</td>
<td>12.00</td>
<td>A159439</td>
<td>B</td>
<td>12.00</td>
<td>N = 63</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>13.00</td>
<td>A159440</td>
<td>B</td>
<td>13.00</td>
<td>N = 50</td>
</tr>
<tr>
<td>14</td>
<td>End of Borehole at 14.10 m</td>
<td>14.40</td>
<td>A159441</td>
<td>B</td>
<td>14.00</td>
<td>N = 5975 mm</td>
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</table>

**HARD STRATA BORING/CHISELLING**

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.50</td>
<td>3.90</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>13.00</td>
<td>13.20</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>13.30</td>
<td>13.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.90</td>
<td>14.10</td>
<td>2</td>
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</table>

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
</table>

**GROUNDSUBER PROGRESS**

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

**REMARKS** 1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

**Sample Legend**

- S - Standardised 100mm Diameter
- E - Extracted Sample
- D - Devised Drilled
- A - Extracted Axial Sample
- Env - Environmental Sample (Ice + Vol + Top)
- W - Water Sample
## Geotechnical Boring Record

### Details
- **Contract**: NDFA Social Housing - East Wasil Road, Dublin 3
- **Rig Type**: DANDO 2000
- **Borehole Diameter (mm)**: 200
- **Borehole Depth (m)**: 16.30
- **Date commenced**: 14/09/2021
- **Date completed**: 15/09/2021
- **Client**: N.D.F.A
- **Engineer**: R.P.S
- **SPT Hammer Ref. No.**: P.HAMMER
- **Energy Ratio (%)**: 100
- **Bored by**: P. THOMAS
- **Processed by**: F.C

### Description

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>CONCRETE, MADE GROUND (Comprised of hardcore stone fill)</td>
</tr>
<tr>
<td></td>
<td>MADE GROUND (Comprised of clayey rubble fill with brick, concrete - Strong hydrocarbon smell noted 4.00m)</td>
</tr>
<tr>
<td>1.5</td>
<td>Medium dense coarse very sandy GRAVEL with occasional cobbles</td>
</tr>
<tr>
<td>7.2</td>
<td>Soft grey sandy SILT (Possibly very silty Sand)</td>
</tr>
<tr>
<td>9.2</td>
<td>Soft to firm rey slightly gravelly sandy SILT</td>
</tr>
</tbody>
</table>

### Samples

<table>
<thead>
<tr>
<th>Ref Number</th>
<th>Sample Type</th>
<th>Depth (m)</th>
<th>Recovery</th>
<th>N value</th>
<th>Field Test Results</th>
</tr>
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<tbody>
<tr>
<td>AA166693</td>
<td>B</td>
<td>1.00</td>
<td></td>
<td>N = 8</td>
<td>(3, 2, 2, 1, 2, 3)</td>
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<td>AA166684</td>
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<td>2.00</td>
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<td>N = 11</td>
<td>(1, 2, 3, 3, 3, 3)</td>
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<tr>
<td>AA166685</td>
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<td>N = 6</td>
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<tr>
<td>AA166686</td>
<td>B</td>
<td>4.00</td>
<td></td>
<td>N = 11</td>
<td>(4, 5, 6, 3, 11)</td>
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<tr>
<td>AA166687</td>
<td>B</td>
<td>6.00</td>
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<td>N = 26</td>
<td>(3, 5, 5, 7, 7, 7)</td>
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<td>AA166688</td>
<td>B</td>
<td>7.00</td>
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<td>N = 11</td>
<td>(4, 6, 7, 5, 7, 7)</td>
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<td>AA166699</td>
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<td>AA166690</td>
<td>B</td>
<td>9.00</td>
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<td>N = 4</td>
<td>(1, 6, 1, 1, 1, 1)</td>
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</table>

### Hard Strata Boring/Chiselling

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00</td>
<td>4.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.00</td>
<td>5.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.20</td>
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<td></td>
</tr>
<tr>
<td>3.00</td>
<td>4.00</td>
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</table>

### Water Strike Details

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00</td>
<td>4.00</td>
<td>3.00</td>
<td>20</td>
<td>Seepage</td>
<td>Rapid</td>
</tr>
<tr>
<td>5.00</td>
<td>5.00</td>
<td>20</td>
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### Groundwater Progress

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

### Remarks

- 1hr Erecting Covid 19 Safe Working Area. Concrete preconed CAT scanned location and hand dug inspection pit carried out.

### Sample Legend

- D: Silt Discoloured
- S: Silt Discoloured
- R: Rendzina Discoloured
- E: Environmental Sample (Jar + Vol + Tub)
- UF: Uncontaminated 100mm Diameter Sample
- W: Water Sample

---

**Note:** The content above is a geotechnical boring record detailing the boring and sampling procedure along with the results obtained. It includes descriptions of the bored strata, sample data, and water strike details, along with remarks on the site conditions and sample legends.
## GEOTECHNICAL BORING RECORD

**CONTRACT**
NDFA Social Housing - East Wasil Road, Dublin 3

**BOREHOLE NO.**
BH10

**BOREHOLE DIAMETER (mm)**
200

**BOREHOLE DEPTH (m)**
16.30

**DATE COMENCED**
14/09/2021

**DATE COMPLETED**
15/09/2021

**SPT HAMMER REF. NO.**

**ENERGY RATIO (%)**

### CO-ORDINATES
- **CLIENT**: N.D.F.A
- **ENGINEER**: R.P.S
- **BORED BY**: P.THOMAS
- **PROCESSED BY**: F.C

### Description

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
<th>Legend</th>
<th>Elevation</th>
<th>Depth (m)</th>
<th>Samples</th>
<th>Field Test Results</th>
<th>Stain type Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Soft to firm rey slightly gravelly sandy SILT (continued)</td>
<td><img src="image" alt="Legend" /></td>
<td><img src="image" alt="Legend" /></td>
<td>10.00</td>
<td>AA166666 B</td>
<td>N = 8 (1, 1, 1, 2, 2)</td>
<td></td>
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<tr>
<td>11</td>
<td></td>
<td><img src="image" alt="Legend" /></td>
<td><img src="image" alt="Legend" /></td>
<td>10.50</td>
<td>AA166666 U</td>
<td>100%</td>
<td></td>
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<tr>
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<td></td>
<td><img src="image" alt="Legend" /></td>
<td><img src="image" alt="Legend" /></td>
<td>11.00</td>
<td>AA166666 B</td>
<td>N = 8 (1, 1, 2, 2, 3)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td><img src="image" alt="Legend" /></td>
<td><img src="image" alt="Legend" /></td>
<td>12.00</td>
<td>AA166666 B</td>
<td>N = 17 (2, 4, 4, 4, 5)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td><img src="image" alt="Legend" /></td>
<td><img src="image" alt="Legend" /></td>
<td>13.00</td>
<td>AA166666 B</td>
<td>N = 25 (2, 4, 5, 6, 7, 7)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Medium dense to dense grey very clayey GRAVEL with cobbles and boulders and some black clayey bands</td>
<td><img src="image" alt="Legend" /></td>
<td><img src="image" alt="Legend" /></td>
<td>14.20</td>
<td>AA166666 B</td>
<td>N = 39 (3, 7, 8, 11, 12)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td><img src="image" alt="Legend" /></td>
<td><img src="image" alt="Legend" /></td>
<td>15.00</td>
<td>AA166666 B</td>
<td>N = 59 (6, 10, 12, 14, 14)</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Obstruction</td>
<td><img src="image" alt="Legend" /></td>
<td><img src="image" alt="Legend" /></td>
<td>16.30</td>
<td>AA166666 B</td>
<td>N = 50/225 (9, 16, 18, 20, 23, 12)</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>End of Borehole at 16.30 m</td>
<td><img src="image" alt="Legend" /></td>
<td><img src="image" alt="Legend" /></td>
<td>16.30</td>
<td>AA166666 B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HARD STRATA BORING/CHISELLING**

### WATER STRIKE DETAILS

<table>
<thead>
<tr>
<th>From (m)</th>
<th>To (m)</th>
<th>Time (h)</th>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
</table>

### INSTALLATION DETAILS

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
<th>Water Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

**REMARKS**
1hr Erecting Covid 19 Safe Working Area. Concrete precored. CAT scanned location and hand dug inspection pit carried out.

Sample Legend:
- **D** - Small Dusted (1st)
- **S** - Small Dusted
- **L** - Large Boulders
- **M** - Medium Boulders
- **E** - Environmental Sample (Air + Vol + Tub)
- **S** - Soil Sample
- **W** - Water Sample

**GROUNDWATER PROGRESS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

Sample Legend:
- **U** - Undisturbed 100mm Diameter Sample
- **S** - Soil Sample
- **W** - Water Sample
GEOTECHNICAL BORING RECORD

CONTRACT: NDFA Social Housing - East Wasil Road, Dublin 3

RIG TYPE: DANDO 2000
BOREHOLE NO: BH11
BOREHOLE NO. SHEET: Sheet 1 of 2

CO-ORDINATES

CLIENT: N.D.F.A
ENGINEER: R.P.S

GROUND LEVEL (m ODO)

BOREHOLE DIAMETER (mm)

ENERGY RATIO (%)

DATE COMMENCED: 31/05/2021
DATE COMPLETED: 02/06/2021

SPT HAMMER REF. NO.
BORED BY: P. THOMAS

BOREHOLE DEPTH (m)

PROCESSED BY: F.C

Samples

Depth (m) Description Legend Elevation Depth (m) Ref. Number Sample Type Depth (m) Recovery Field Test Results Sample Details

- 0 CONCRETE 0.30 AA156673 B 1.00 N = 9 (1, 1, 1, 2, 2, 2, 2, 4, 4)
LEAN MIX 0.60

1 MADE GROUND (Comprised of hardcore stone fill) 1.00 AA156674 B 2.00 N = 5 (1, 0, 1, 1, 1, 2, 2)

MADE GROUND (Comprised of clayey rubble fill with brick, concrete - Strong hydrocarbon smell noted 3.500m) 3.70 AA156675 B 3.00 N = 8 (1, 1, 1, 2, 3, 3, 2, 2)

Dense grey fine to coarse GRAVEL and cobbles 6.30 AA156676 B 4.00 N = 35 (3, 3, 5, 5, 8, 8, 12, 12)

Loose grey slightly gravelly SAND (Blowing noted) 8.20 AA156677 B 5.00 N = 59 (6, 9, 10, 12, 12, 12, 12, 12)

Soft to firm grey sandy gravelly SILT 8.20 AA156678 B 6.00 N = 9 (5, 7, 5, 5, 3, 3, 3, 3, 3)

HARD STRATA BORING/CHISELLING

From (m) To (m) Time (h) Comments Water Strike Casing Depth Sealed At Rise To Time (min) Comments

3.60 3.60 0.80 No 20 Moderate
4.50 4.50 3.50 20 Moderate

WATER STRIKE DETAILS

INSTALLATION DETAILS

Date Tip Depth RZ Top RZ Base Type

REMARKS: 1hr Erecting Covid 19 Safe Working Area. Concrete precured CAT scanned location and hand dug inspection pit carried out.

Sample Legend
D - Dense Disturbed (x4)
E - Soft Disturbed (x4)
R - Rock Core Sample
U - Unconcluded (x4)
ST - Soil Sample
WT - Water Sample

GROUNDWATER PROGRESS
<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
<th>Legend</th>
<th>Elevation</th>
<th>Ref.</th>
<th>Sample Number</th>
<th>Sample Type</th>
<th>Depth (m)</th>
<th>Recovery</th>
<th>Field Test Results</th>
<th>Standing Water Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Soft to firm grey sandy gravelly SILT (continued)</td>
<td>x</td>
<td>10.60</td>
<td>AA156683</td>
<td>B</td>
<td>10.00</td>
<td>N = 14</td>
<td>(1, 2, 3, 4, 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Very stiff black sandy gravelly CLAY with occasional cobbles</td>
<td>x</td>
<td>11.00</td>
<td>AA156684</td>
<td>B</td>
<td>11.00</td>
<td>N = 90</td>
<td>(5, 7, 10, 11, 14, 15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Obstruction</td>
<td></td>
<td>12.40</td>
<td>AA156685</td>
<td>B</td>
<td>12.00</td>
<td>N = 50/50 mm</td>
<td>(14, 11, 23, 27)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of Borehole at 12.40 m
Appendix IA  Rotary Core Records / Photographs
### Geotechnical Core Log Record

**Contract:** NDFA Social Housing - East Wall Road  
**DRILLHOle NO:** RC01  
**DRILLED BY:** IGLS  
**LOGGED BY:** D.O'Shea  
**DATE COMPLETED:** 22/09/2021  
**DATE COMMENCED:** 22/09/2021

### Coordinates
- **GROUND LEVEL (mOD):**  
- **RIG FLUSH:** Air/Mist  
- **RIG TYPE:** GEO-405  
- **INCLINATION (deg):** -90  
- **CORE DIAMETER (mm):** 78

### Core Log
- **Description:**
  - SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of concrete)
  - SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of clayey gravelly cobbles with concrete)
  - SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey/brown fine to coarse slightly sandy GRAVEL with some cobbles and boulders
  - SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey/brown fine to coarse silty SAND with occasional gravel
  - SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy SILT

### Water Strike Details
- **Water Strike:**  
- **Casing Depth:**  
- **Sealed At:**  
- **Rise To:**  
- **Time (min):**  
- **Comments:** No water strike recorded

### Groundwater Details

<table>
<thead>
<tr>
<th>Date</th>
<th>Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Installation Details
<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GEOTECHNICAL CORE LOG RECORD

CONTRACT: NDFA Social Housing - East Wall Road

DRILL NO: RC01

DATE COMMENCED: 22/09/2021
DATE COMPLETED: 22/09/2021

RIG TYPE: GEO-405
FLUSH: Air/Mist

INCLINATION (deg): -90
CORE DIAMETER (mm): 78

CLIENT: N.D.F.A
ENGINEER: R.P.S
LOGGED BY: D.O'Shea

### Core Log Details

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.30</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of dark grey sandy gravelly CLAY with occasional cobbles</td>
</tr>
<tr>
<td>12.30</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of dark grey/black very gravelly sandy CLAY with some cobbles</td>
</tr>
<tr>
<td>16.00</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of black sandy gravelly CLAY</td>
</tr>
<tr>
<td>19.50</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy gravelly COBBLES</td>
</tr>
</tbody>
</table>

**REMARKS**

Hole cased 0.00-26.50m. Erect Covid-19 Safe Zone - 1hr.

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>No water strike recorded</td>
</tr>
</tbody>
</table>

**GROUNDWATER DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
</table>
### Geotechnical Core Log Record

**Contract:** NDFA Social Housing - East Wall Road

**Drillhole No.:** RC01

**Client:** N.D.F.A

**Engineer:** R.P.S

**Rig Type:** GEO-405 Air/Mist

**Inclination (deg):** -90

**Core Diameter (mm):** 78

**Date Commenced:** 22/09/2021

**Date Completed:** 22/09/2021

**Logged By:** D.O'Shea

### Log Details

<table>
<thead>
<tr>
<th>Downhole Depth (m)</th>
<th>Core Home Depth (m)</th>
<th>T.C.R. %</th>
<th>S.C.R. %</th>
<th>R.Q.D. %</th>
<th>Fracture Spacing Log (mm)</th>
<th>Non-Intact Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>26</td>
<td>8</td>
<td>16</td>
<td>67</td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy gravelly COBBLES (continued)</td>
</tr>
<tr>
<td>26.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 61 (4, 7, 11, 14, 16, 17)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of black sandy gravelly CLAY</td>
</tr>
<tr>
<td>22.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 44 (2, 4, 9, 12, 14)</td>
</tr>
<tr>
<td>24.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy gravelly COBBLES</td>
</tr>
<tr>
<td>26.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 65 (4, 6, 14, 17, 19)</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 82 (2, 6, 11, 14, 15, 12)</td>
</tr>
<tr>
<td>27.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Probable clay-filled fracture - returns of stiff, black slightly sandy slightly gravelly CLAY. Sand is fine. Gravel is angular to subangular, fine to medium of limestone.</td>
</tr>
<tr>
<td>28.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

### Water Strike Details

- **Water Strike:** No water strike recorded

### Groundwater Details

### Installation Details

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
GEOTECHNICAL CORE LOG RECORD

CONTRACT
NDFA Social Housing - East Wall Road

GROUNDS LEVEL (mOD)

CLIENT
N.D.F.A

ENGEEER
R.P.S

RIG TYPE
GEO-405

FLUSH
Air/Mist

INCLINATION (deg)
-90

CORE DIAMETER (mm)
78

DRILLING NO
RC01

DATE COMMMENCED
22/09/2021

DATE COMPLETED
22/09/2021

DRILLED BY
IGSL

LOGGED BY
D.O'Shea

<table>
<thead>
<tr>
<th>Downhole Depth (m)</th>
<th>Core Run Depth (m)</th>
<th>T.C.R.%</th>
<th>S.C.R.%</th>
<th>R.O.D.%</th>
<th>Fracture Spacing Log (mm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>100</td>
<td>69</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.50</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Weak to very locally medium strong, medium to thinly bedded to structureless, grey/dark grey/black, fine-grained, LIMESTONE (argillaceous limestone with calc-silicate lenses and subordinate MUDSTONE, local stylolites, pyrite present, commonly brecciated and re-cemented with abundant calcite-veining), slightly weathered to locally moderately weathered.

Many incipient fractures throughout.

Discontinuities are medium to closely spaced, smooth to locally rough, planar to irregular. Apertures are tight to locally moderately open, locally clay-filled (at 29.16-29.33m & 30.68-30.75m), commonly calcite-veined (1-100mm thick). Dips are 10-45° & locally 80° & irregular.

End of Borehole at 31.50 m

REMARKS
Hole cased 0.00-26.50m. Erect Covid-19 Safe Zone - 1hr.

WATER STRIKE DETAILS

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments
No water strike recorded

GROUNDSWATER DETAILS

INSTALLATION DETAILS

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
### GEOTECHNICAL CORE LOG RECORD

**CONTRACT**  
NDFA Social Housing - East Wall Road

**DRILLHOLE NO**  
RC06

**GROUNDS LEVEL (mOD)**  

**RIG TYPE**  
GEO-405

**FLUSH**  
Air/Mist

**INCLINATION (deg)**  
-90

**CORE DIAMETER (mm)**  
78

**CLIENT**  
N.D.F.A

**ENGINEER**  
R.P.S

**DATE COMMENCED**  
20/09/2021

**DATE COMPLETED**  
20/09/2021

**DRILLED BY**  
IGSL

**LOGGED BY**  
D.O'Shea

<table>
<thead>
<tr>
<th>Downhole Depth (m)</th>
<th>Core Run Depth (m)</th>
<th>T.C.R.%</th>
<th>S.C.R.%</th>
<th>R.O.D.%</th>
<th>Fracture Spacing Log (mm)</th>
<th>Non-Intact Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.20</td>
<td></td>
<td></td>
<td></td>
<td>0.70</td>
<td></td>
<td>SYMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of concrete)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of dry concrete lean mix)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of silty/clayey gravelly cobbles - Strong hydrocarbon smell noted from 3.50m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMETRIX DRILLING: No recovery, observed by driller as returns of grey fine to coarse GRAVEL with frequent cobbles</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy SILT (Possibly loose silty Sand)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy SILT/CLAY with occasional fine gravel</td>
</tr>
</tbody>
</table>

**REMARKS**  
Hole cased 0.00-26.50m. Erect Covid-19 Safe Zone - 1hr.

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.70</td>
<td>4.70</td>
<td>N/P</td>
<td></td>
<td>Slow</td>
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</table>

**GROUNDWATER DETAILS**

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GEOTECHNICAL CORE LOG RECORD

CONTRACT: NDFA Social Housing - East Wall Road

RIG TYPE: GEO-405
FLUSH: Air/Mist
INCLINATION (deg): -90
CORE DIAMETER (mm): 78

CLIENT: N.D.F.A
ENGINEER: R.P.S

DATE COMMENCED: 20/09/2021
DATE COMPLETED: 20/09/2021
DRILLED BY: IGS
LOGGED BY: D.O'Shea

Drill Log:

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.90</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy Silt/Clay with occasional fine gravel (continued)</td>
</tr>
<tr>
<td>14.30</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey silty gravelly Clay with occasional cobbles</td>
</tr>
<tr>
<td>16.50</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of black fine to coarse clayey Gravel with some cobbles and occasional boulders</td>
</tr>
</tbody>
</table>

REMARKS:
Hole cased 0.00-26.50m, Erect Covid-19 Safe Zone - 1hr.

WATER STRIKE DETAILS:

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.70</td>
<td>4.70</td>
<td>N/S</td>
<td></td>
<td></td>
<td>Slow</td>
</tr>
</tbody>
</table>

GROUNDWATER DETAILS:

INSTALLATION DETAILS:

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
</table>

Details provided in the log include the depth at which water strikes, the type of casing, and the sealing of the borehole. The remarks section notes the casing of the borehole from 0.00 to 26.50 meters, with records of COVID-19 safe zone measures. The water strike details indicate a water level at 4.70 meters, with no sealing at this depth. The groundwater details and installation specifics are tabled for further analysis.
**GEOTECHNICAL CORE LOG RECORD**

**CONTRACT**
NDFA Social Housing - East Wall Road

**CO-ORDINATES**

<table>
<thead>
<tr>
<th>GROUND LEVEL (mOD)</th>
<th>T.C.R.%</th>
<th>S.C.R.%</th>
<th>R.Q.D.%</th>
<th>Fracture Spacing Log (mm)</th>
<th>Non-Intact Zone</th>
<th>Legend</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Depth (m)</th>
<th>Elevation</th>
<th>Standard Details</th>
<th>SPT (N Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy cobbly GRAVEL (continued)</td>
<td>21.00</td>
<td></td>
<td></td>
<td>N = 67 (3, 7, 9, 17, 22, 19)</td>
</tr>
<tr>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of clayey gravelly COBBLES</td>
<td></td>
<td></td>
<td></td>
<td>N = 79 (4, 15, 15, 17, 19, 26)</td>
</tr>
<tr>
<td>Strong to medium strong, medium to thinly bedded, grey/dark grey/black, fine-grained, LIMESTONE (argillaceous limestone with calc-silicate lenses and subordinate MUDSTONE, local stylolites, pyrite present), slightly weathered to locally moderately weathered. Many incipient fractures throughout. Discontinuities are medium to closely spaced, smooth to locally rough, planar to irregular. Apertures are tight to locally moderately open, locally clay-filled (at 29.44-29.53m), locally calcite-veined (1-30mm thick). Dips are 10-45° &amp; locally 60° &amp; irregular.</td>
<td>27.00</td>
<td></td>
<td></td>
<td>N = 70 (5, 9, 15, 16, 21, 18)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 59 (4, 6, 7, 7, 23, 22)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 25/10 mm (25, 25)</td>
</tr>
</tbody>
</table>

**RIG TYPE** GEO-405

**FLUSH** Air/Mist

**INCLINATION (deg)** -90

**CORE DIAMETER (mm)** 78

**DATE COMMENCED** 20/09/2021

**DATE COMPLETED** 20/09/2021

**DRILLED BY** IGS

**LOGGED BY** D.O'Shea

**REMARKS**
Hole cased 0.00-26.50m. Erect Covid-19 Safe Zone - 1hr.

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.70</td>
<td>4.70</td>
<td>N/S</td>
<td></td>
<td>Slow</td>
<td></td>
</tr>
</tbody>
</table>

**GROUNDWATER DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Bass</th>
<th>Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-09-21</td>
<td>30.00</td>
<td>27.00</td>
<td>3.60</td>
<td>Water level recorded 5 mins after end of drilling</td>
<td></td>
</tr>
</tbody>
</table>
GEOTECHNICAL CORE LOG RECORD

CONTRACT: NDFA Social Housing - East Wall Road

RIG TYPE: GEO-405
FLUSH: Air/Mist
INCLINATION (deg): -90
CORE DIAMETER (mm):

DATE COMMENCED: 13/09/2021
DATE COMPLETED: 13/09/2021
DRILLED BY: IGSL
LOGGED BY: D. O'Shea

CO-ORDINATES
GROUND LEVEL (mOD)

CLIENT: N.D.F.A
ENGINEER: R.P.S

T.C.R. % R.Q.D. % Fracture Spacing Log (mm) Non-weathered Zone

Description
Depth (m) Elevation Standpipe Details SPT (N Value)

0 0.30
0.60
4.20
7.10
8.70
9.90

SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of concrete)

SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of dry concrete - lean mix)

SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of clayey cobbles with brick, concrete, ceramics, steel, tyres - Strong hydrocarbon smell noted 3.70m)

SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey fine to coarse silty sandy GRAVEL

SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey very silty SAND

SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy SILT

REMARKS

Hole cased 0.00-24.00m. Erect Covid-19 Safe Zone - 1 hr.

WATER STRIKE DETAILS

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.30</td>
<td>4.30</td>
<td>N/S</td>
<td></td>
<td></td>
<td>Slow</td>
</tr>
<tr>
<td>15.70</td>
<td>15.70</td>
<td>N/S</td>
<td></td>
<td></td>
<td>Slow</td>
</tr>
</tbody>
</table>

GROUNDWATER DETAILS

INSTALLATION DETAILS

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
</table>

REPORT NUMBER 23326A
### GEOTECHNICAL CORE LOG RECORD

**CONTRACT**
NDFA Social Housing - East Wall Road

**DRILLHOLE NO**
RC07  

**DATE COMMENCED**
13/09/2021  
**DATE COMPLETED**
13/09/2021

**RIG TYPE**
GEO-405

**FLUSH**
Air/Mist

**CLIENT**
N.D.F.A

**ENGINEER**
R.P.S

**INCLINATION (deg)**
-90

**CORE DIAMETER (mm)**

**LOGGED BY**
D.O'Shea

### CO-ORDINATES

<table>
<thead>
<tr>
<th>Downhole Depth (m)</th>
<th>T.C.R.%</th>
<th>S.C.R.%</th>
<th>R.O.D.%</th>
<th>Fracture Spacing Log (mm)</th>
<th>Non-Intact Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMEXTRIX DRILLING: No recovery, observed by driller as returns of grey sandy very gravelly CLAY with occasional cobbles (continued)</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMEXTRIX DRILLING: No recovery, observed by driller as returns of black gravelly CLAY with occasional cobbles</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMEXTRIX DRILLING: No recovery, observed by driller as returns of CLAY</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMEXTRIX DRILLING: No recovery, observed by driller as returns of gravelly cobbly CLAY</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMEXTRIX DRILLING: No recovery, observed by driller as returns of sandy gravelly COBBLES</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 30 (1, 4, 6, 8, 9)</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 27 (2, 5, 6, 7, 8)</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 70/135 (4, 8, 23, 25)</td>
</tr>
</tbody>
</table>

### REMARKS

Hole cased 0.00-24.00m. Erect Covid-19 Safe Zone - 1hr.

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.30</td>
<td>4.30</td>
<td>N/S</td>
<td></td>
<td></td>
<td>Slow</td>
</tr>
<tr>
<td>15.70</td>
<td>15.70</td>
<td>N/S</td>
<td></td>
<td></td>
<td>Slow</td>
</tr>
</tbody>
</table>

### WATER STRIKE DETAILS

### GROUNDWATER DETAILS

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
</table>

### INSTALLATION DETAILS

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
</table>
### GEOTECHNICAL CORE LOG RECORD

**CONTRACT:** NDFA Social Housing - East Wall Road  
**DRILLHOLE NO:** RC07  
**REPORT NUMBER:** 23326A  
**DATE COMMENCED:** 13/09/2021  
**DATE COMPLETED:** 13/09/2021

### CO-ORDINATES

<table>
<thead>
<tr>
<th>GROUND LEVEL (mOD)</th>
<th>CLIENT</th>
<th>RIG TYPE</th>
<th>ENGINEER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N.D.F.A</td>
<td>GEO-405</td>
<td>R.P.S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air/Mist</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INCLINATION (deg) | -90

### CORE DIAMETER (mm)

<table>
<thead>
<tr>
<th>Fracture Spacing Log (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### DESCRIPTION

**Description:** SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy gravelly COBBLES (continued)

**Depth (m):** 25.50

**Elevation:**

**Sandpipe Details:**

**SPT (N Value):**

<table>
<thead>
<tr>
<th>N = 25/10 mm (25, 25)</th>
</tr>
</thead>
</table>

**End of Borehole at 25.50 m**

### REMARKS

Hole cased 0.00-24.00m. Erect Covid-19 Safe Zone - 1 hr.

### WATER STRIKE DETAILS

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.30</td>
<td>4.30</td>
<td>N/S</td>
<td>15.70</td>
<td>Slow</td>
<td></td>
</tr>
<tr>
<td>15.70</td>
<td>15.70</td>
<td>N/S</td>
<td></td>
<td>Slow</td>
<td></td>
</tr>
</tbody>
</table>

### GROUNDWATER DETAILS

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
<th>Depth to Water</th>
<th>Water level recorded 5 mins after end of drilling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13-09-01</td>
<td>25.59</td>
<td>7.40</td>
<td>7.40</td>
<td>Water level</td>
<td></td>
</tr>
</tbody>
</table>

### INSTALLATION DETAILS

<table>
<thead>
<tr>
<th>Date</th>
<th>Hole Depth</th>
<th>Casing Depth</th>
<th>Depth to Water</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>13-09-01</td>
<td>25.59</td>
<td>7.40</td>
<td>7.40</td>
<td>Water level recorded 5 mins after end of drilling.</td>
</tr>
</tbody>
</table>
GEOTECHNICAL CORE LOG RECORD

CONTRACT: NDFA Social Housing - East Wall Road

CO-ORDINATES
GROUND LEVEL (mOD)
CLIENT: NDFA
ENGINEER: R.P.S.

RIG TYPE: GEO-405
FLUSH: AirMist
INCLINATION (deg): -90
CORE DIAMETER (mm):

DRILLHOLE NO: RC10
DATE COMMENCED: 15/09/2021
DATE COMPLETED: 15/09/2021
DRILLED BY: IGSL
LOGGED BY: D.O'Shea

Legend
- Fracture Spacing Log (mm)
- Non-Intact Zone

Description

SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of concrete) at 0.20m
SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of gravel) at 0.50m
SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of clayey cobbles with brick, concrete - Strong hydrocarbon smell noted 4.00m) at 4.20m
SYMMETRIX DRILLING: No recovery, observed by driller as returns of coarse very sandy GRAVEL with occasional cobbles at 7.20m
SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy SILT at 9.20m

REMARKS
Hole cased 0.00-25.00m. Erect Covid-19 Safe Zone - 1hr.

WATER STRIKE DETAILS
Water Strike | Casing Depth | Sealed At | Rise To | Time (min) | Comments
---|---|---|---|---|---
No water strike recorded

GROUNDWATER DETAILS

INSTALLATION DETAILS
Date | Tip Depth | RZ Top | RZ Base | Type
---|---|---|---|---

REPORT NUMBER
23326A
### GEOTECHNICAL CORE LOG RECORD

**CONTRACT**
NDFA Social Housing - East Wall Road

**DRILLHOLE NO**
RC10

**CLIENT**
N.D.F.A

**ENGINEER**
R.P.S

**RIG TYPE**
GEO-405

**FLUSH**
Air/Mist

**INCLINATION (deg)**
-90

**CORE DIAMETER (mm)**

**DATE COMMENCED**
15/09/2021

**DATE COMPLETED**
15/09/2021

**DRILLED BY**
IGSL

**LOGGED BY**
D.O'Shea

---

### Core Log Details

<table>
<thead>
<tr>
<th>Downhole Depth (m)</th>
<th>Core Run Depth (m)</th>
<th>T.C.R.%</th>
<th>S.C.R.%</th>
<th>R.Q.D.%</th>
<th>Fracture Spacing Log (mm)</th>
<th>Non-Intact Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey slightly gravelly sandy SILT (continued)</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey very clayey GRAVEL with cobbles and boulders and some black clayey bands</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of CLAY</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 15 (1, 3, 3, 4, 4)</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 20 (2, 4, 5, 5, 5, 5)</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N = 23 (3, 6, 6, 7, 9, 9, 9)</td>
</tr>
</tbody>
</table>

---

### Remarks

Hole cased 0.00-25.00m, Erect Covid-19 Safe Zone - 1hr.

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No water strike recorded</td>
</tr>
</tbody>
</table>

**GROUNDWATER DETAILS**

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
</table>
**GEOTECHNICAL CORE LOG RECORD**

**CONTRACT**
NDFA Social Housing - East Wall Road

**CO-ORDINATES**

<table>
<thead>
<tr>
<th>GROUND LEVEL (mOD)</th>
<th>RIG TYPE</th>
<th>DRILLHOLE NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GEO-405</td>
<td>RC10</td>
</tr>
</tbody>
</table>

**DATE COMMENCED**
15/09/2021

**DATE COMPLETED**
15/09/2021

**CLIENT**
N.D.F.A

**ENGINEER**
R.P.S

**RIG TYPE**
GEO-405

**FLUSH**
Air/Mist

**INCLINATION (deg)**
-90

**CORE DIAMETER (mm)**

**LOGGED BY**
D.O'Shea

**Non-Intact Zone**

<table>
<thead>
<tr>
<th>Downhole Depth (m)</th>
<th>Core Run Depth (m)</th>
<th>T.C.R. %</th>
<th>S.C.R. %</th>
<th>R.O.D. %</th>
<th>Fracture Spacing Log (mm)</th>
<th>Legend</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY (continued)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly cobbly CLAY</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of Borehole at 25.00 m</td>
</tr>
</tbody>
</table>

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No water strike recorded</td>
</tr>
</tbody>
</table>

**GROUNDWATER DETAILS**

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-09-21</td>
<td>25.00</td>
<td>25.00</td>
<td>21.10</td>
<td></td>
</tr>
</tbody>
</table>

Water level recorded 5 mins after end of drilling.
### GEOTECHNICAL CORE LOG RECORD

**CONTRACT**
NDFA Social Housing - East Wall Road

**DRILLHOLE NO.**
RC11

**RIG TYPE**
GEO-405

**FLUSH**
Air/Mist

**INCLINATION (deg)**
-90

**CORE DIAMETER (mm)**

---

**CLIENT**
NDFA

**ENGINEER**
R.P.S

**DATE COMMENCED**
14/09/2021

**DATE COMPLETED**
14/09/2021

**DRILLED BY**
IGSL

**LOGGED BY**
D.O'Shea

---

### DOWNHOLE LOG DETAILS

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.30</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of concrete)</td>
</tr>
<tr>
<td>0.60</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of dry concrete lean mix)</td>
</tr>
<tr>
<td>1.00</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND (Comprised of gravel)</td>
</tr>
<tr>
<td>3.70</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey fine to coarse GRAVEL and cobbles</td>
</tr>
<tr>
<td>6.30</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey slightly gravelly SAND (Blowing noted)</td>
</tr>
<tr>
<td>8.20</td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy gravelly SILT</td>
</tr>
</tbody>
</table>

---

**REMARKS**
Hole cased 0.00-25.00m. Erect Covid-19 Safe Zone - 1 hr.

---

**WATER STRIKE DETAILS**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No water strike recorded</td>
</tr>
</tbody>
</table>

---

**GROUNDWATER DETAILS**

---

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
</table>

---

**REPORT NUMBER**
23326A
### GEOTECHNICAL CORE LOG RECORD

#### CONTRACT
NDFA Social Housing - East Wall Road

#### CO-ORDINATES

<table>
<thead>
<tr>
<th>GROUND LEVEL (mOD)</th>
<th>RIG TYPE</th>
<th>FLUSH</th>
<th>INCLINATION (deg)</th>
<th>CORE DIAMETER (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GEO-405</td>
<td>Air/Mist</td>
<td>-90</td>
<td></td>
</tr>
</tbody>
</table>

#### DATE

- **DATE commencED:** 14/09/2021
- **DATE completed:** 14/09/2021

#### DRILLED BY
IGSL

#### LOGGED BY
D.O'Shea

#### CLIENT
NDFA

#### ENGINEER
R.P.S

<table>
<thead>
<tr>
<th>Downhole Depth (m)</th>
<th>Core Run Depth (m)</th>
<th>T.C.R.%</th>
<th>S.C.R.%</th>
<th>R.O.D.%</th>
<th>Fracture Spacing (mm)</th>
<th>Non-Intact Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Symmetry Drilling:** No recovery, observed by driller as returns of grey sandy gravelly Silt (continued)

---

**Symmetry Drilling:** No recovery, observed by driller as returns of black sandy gravelly CLAY with occasional cobbles

---

**Symmetry Drilling:** No recovery, observed by driller as returns of clayey gravelly COBBLES

---

**Remarks:**
Hole cased 0.00-25.00m. Erect Covid-19 Safe Zone - 1 hr.

---

**Water Strike Details**

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Comments:** No water strike recorded

---

**Groundwater Details**

**Installation Details**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Geotechnical Core Log Record

**Contract:** NDFA Social Housing - East Wall Road  
**DRILL HOLE NO:** RC11  
**Date Commenced:** 14/09/2021  
**Date Completed:** 14/09/2021  
**Client:** NDFA  
**Engineer:** R.P.S  
**Rig Type:** GEO-405  
**Flush:** Air/Mist  
**Inclination (deg):** -90  
**Core Diameter (mm):**  
**Logged By:** D.O'Shea

### Core Log Details

<table>
<thead>
<tr>
<th>Downhole Depth (m)</th>
<th>Core Run Depth (m)</th>
<th>T.C.R.%</th>
<th>S.C.R.%</th>
<th>R.O.D.%</th>
<th>Fracture Spacing Log (mm)</th>
<th>Non-Intact Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of clayey gravelly COBBLES (continued)</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of clayey GRAVEL</td>
</tr>
<tr>
<td>22.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SYMMETRIX DRILLING: No recovery, observed by driller as returns of clayey gravelly COBBLES</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of Borehole at 25.00 m</td>
</tr>
</tbody>
</table>

### REMARKS

- Hole cased 0.00-25.00m. Erect Covid-19 Safe Zone - 1hr.

### Water Strike Details

<table>
<thead>
<tr>
<th>Water Strike</th>
<th>Casing Depth</th>
<th>Sealed At</th>
<th>Rise To</th>
<th>Time (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No water strike recorded</td>
</tr>
</tbody>
</table>

### Groundwater Details

**Date** | **Hole Depth** | **Casing Depth** | **Depth to Water** | **Comments**
--- | --- | --- | --- | ---

### Installation Details

<table>
<thead>
<tr>
<th>Date</th>
<th>Tip Depth</th>
<th>RZ Top</th>
<th>RZ Base</th>
<th>Type</th>
</tr>
</thead>
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**Report Number:** 23326A