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Geotechnical Report

Cuirt na Coiribe Student
Housing Development, Galway

Exeter Ireland Property III Ltd

Project reference: 60588866

June 2020

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
0	9th June 2020	SHD Application	EMcK	Emma McKendrick	Associate Director

Distribution List

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Table of Contents

Figures

Tables

1. Introduction

AECOM has been commissioned by Exeter Ireland Property III Limited to prepare a Geotechnical Assessment to accompany a planning application to An Bord Pleanála (ABP) for a proposed development at Cúirt Na Coiribe Student Accommodation Complex, Dun Na Coiribe Road, off Headford Rd, Galway (Figure 1.1).

The site currently comprises an existing 405 No. student accommodation bed spaces and ancillary floorspace including a restaurant to be retained in two buildings ranging in height from two to six storeys with a gross floor space of c. 11,128 sq m (plus basement carparking measuring 3,661 sq m).

The proposed development will consist of: the demolition of the two storey building (582 sq m) at the entrance to the scheme towards the eastern boundary of the site and the removal of the fifth storey (attic) level (1,123 sq m) of the main building; and the provision of horizontal and vertical additions to and extensions of the main existing building providing 920 No. bed spaces (an additional 515 No. student accommodation bed spaces) in 868 No. bedrooms; ancillary student accommodation spaces at basement and ground floor level measuring 1,688 sq m and including gym/fitness studio, games room, library/study spaces, multi-functional spaces, café/restaurant, and student lounge spaces; all provided in a single building in 9 No. linked blocks ranging in height from 2 No. to 6 No. storeys (gross floor space of 24,521 sq m plus basement car-parking and plant (2,615 sq m)).The scheme comprises a total floor area above ground of 22,180 sq m over a basement of 4,956 sq m.

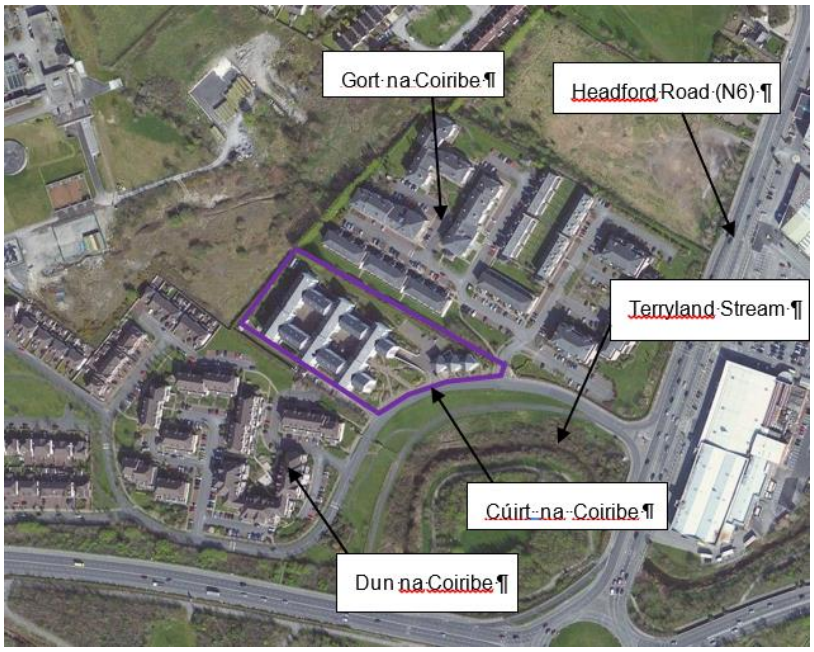

Figure 1 – Site Location

The existing building is supported on piled foundation and building extensions and local increase in existing basement areas will all also be supported on piled foundations.

The local excavation for the new basement areas will require dewatering of the basement works area. However, the water removed from the works area will be returned to the local ground by recharge wells. A design of the dewatering strategy can be made available by the Temporary Works Designer at the appropriate stage prior to commencement of the construction.

The Aecom Construction methodology report accompanying the application includes a strategy for monitoring the existing and adjacent structures. Refer to section 2.1 of AECOM report CNC-ACM-00-ZZ-SP-SE-0001.

2. Geology and Hydrogeology

Receiving Environment

In order to understand potential impacts for the proposed development with respect to geology and hydrogeology a desk top study has been completed using the following relevant information:

- OSi Online Mapping
- GSI Online Database- Generalised Bedrock Geology, Subsoil, Vulnerability and Aquifer Maps
- Geological Survey of Ireland (GSI)
- GSI well, geological heritage and geotechnical data

GSI Geological Mapping

The Geological Survey of Ireland (GSI) national bedrock map shows the bedrock geology of the study area is entirely composed of Burren formation – pale grey clean skeletal limestone.

Figure 2 below shows a snapshot of the bedrock formation in the vicinity of the site.

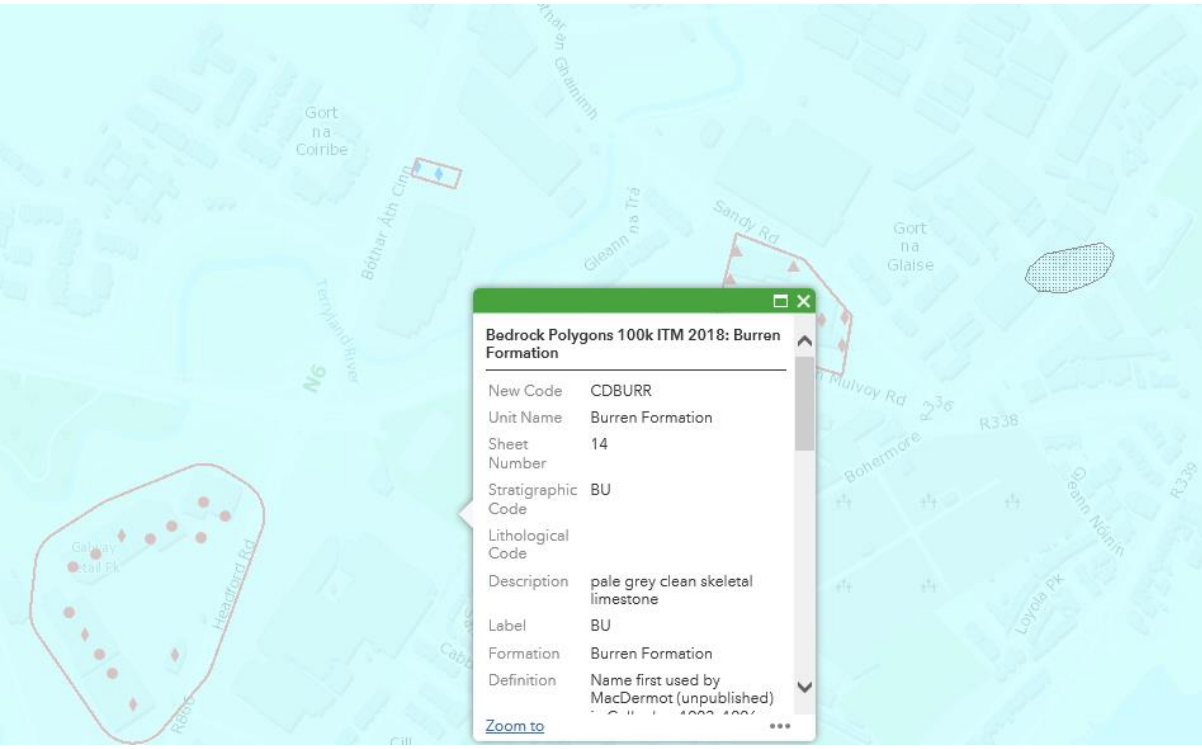

Figure 2 – GSI Bedrock Mapping

With reference to Figure 3 and 4 below, the top and sub soils to the north of the site can be characterised by till derived from limestone, while the top and sub soils to the south of the site can be characterised by fen peat. To the south of the fen peat, alluvial material is noted.

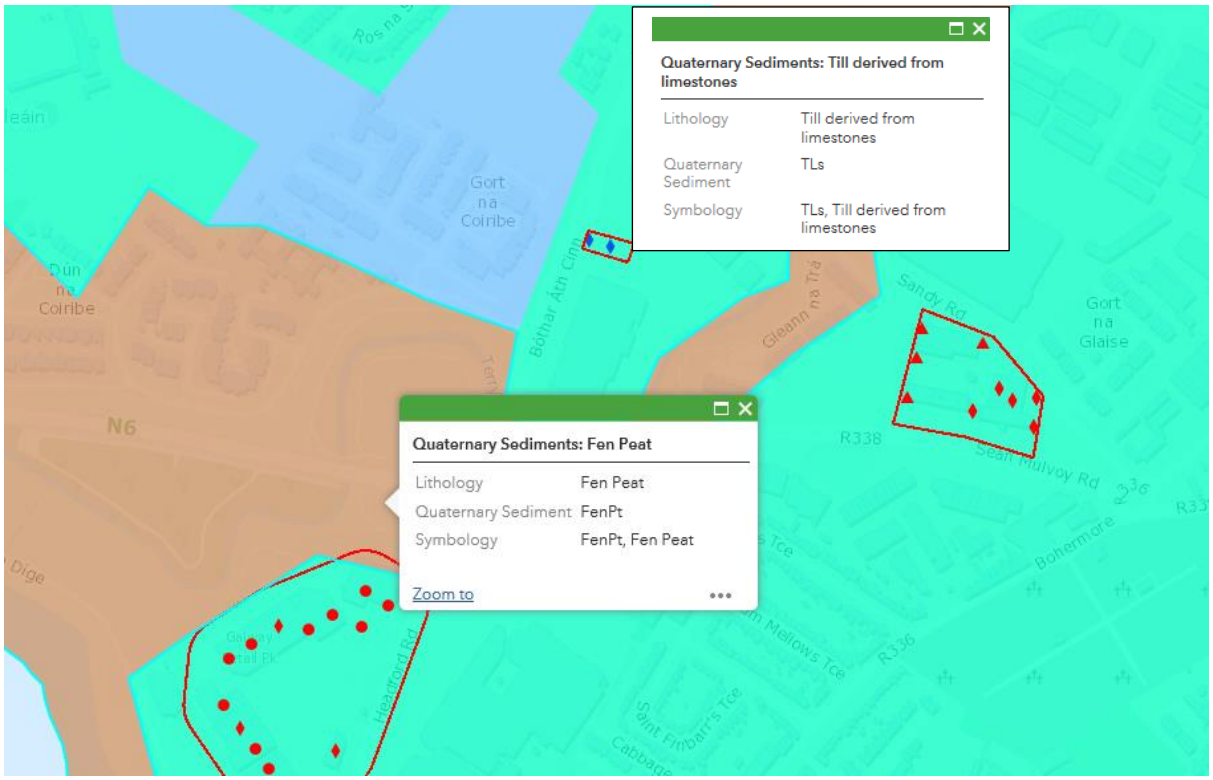

Figure 3 – GSI Quaternary Sediments Mapping

Figure 4 – GSI Teasgasc Mapping

GSI Groundwater Maps

Figure 5 below shows a snapshot of the ground water vulnerability in the vicinity of the site. The groundwater vulnerability is noted to be Highly Vulnerable.

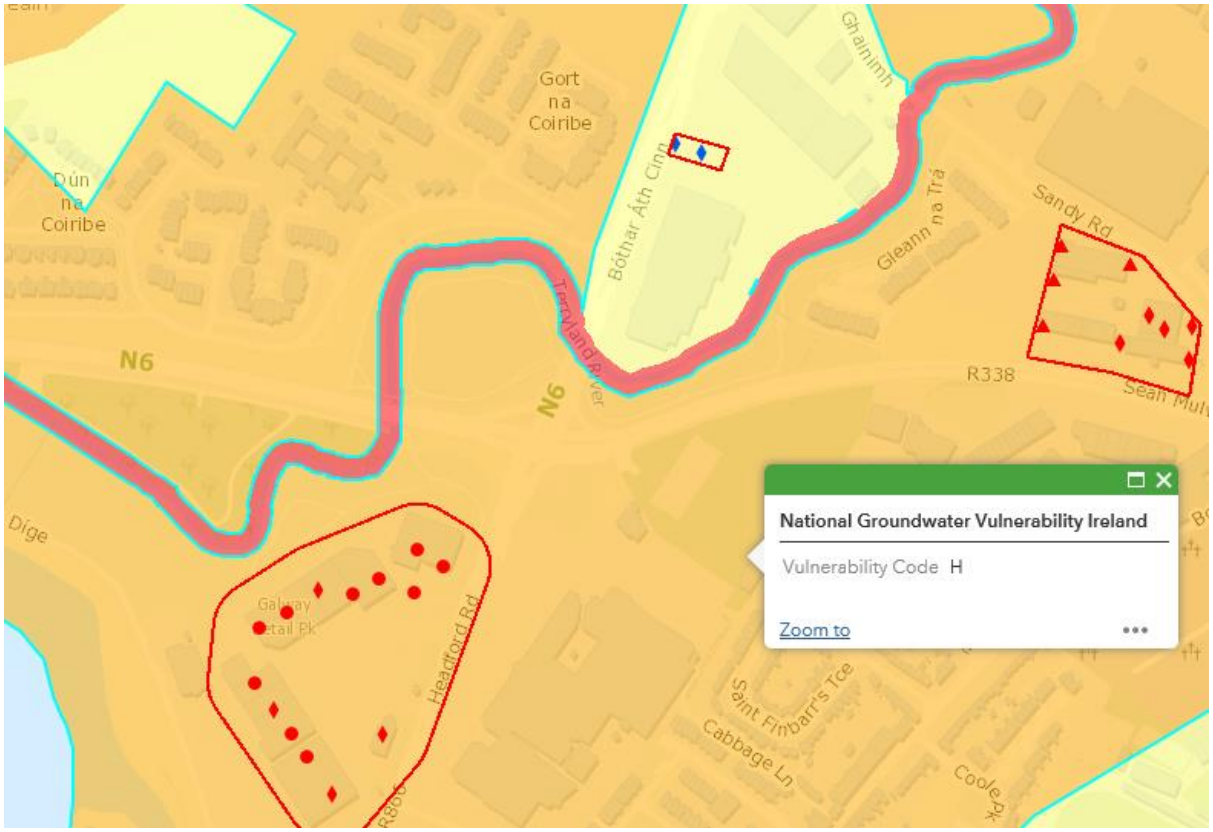

Figure 5 – GSI Ground Water Vulnerability Mapping

Figure 6 below indicates that the bedrock aquifer is reported to be Regional Important, Karstified Conduit.

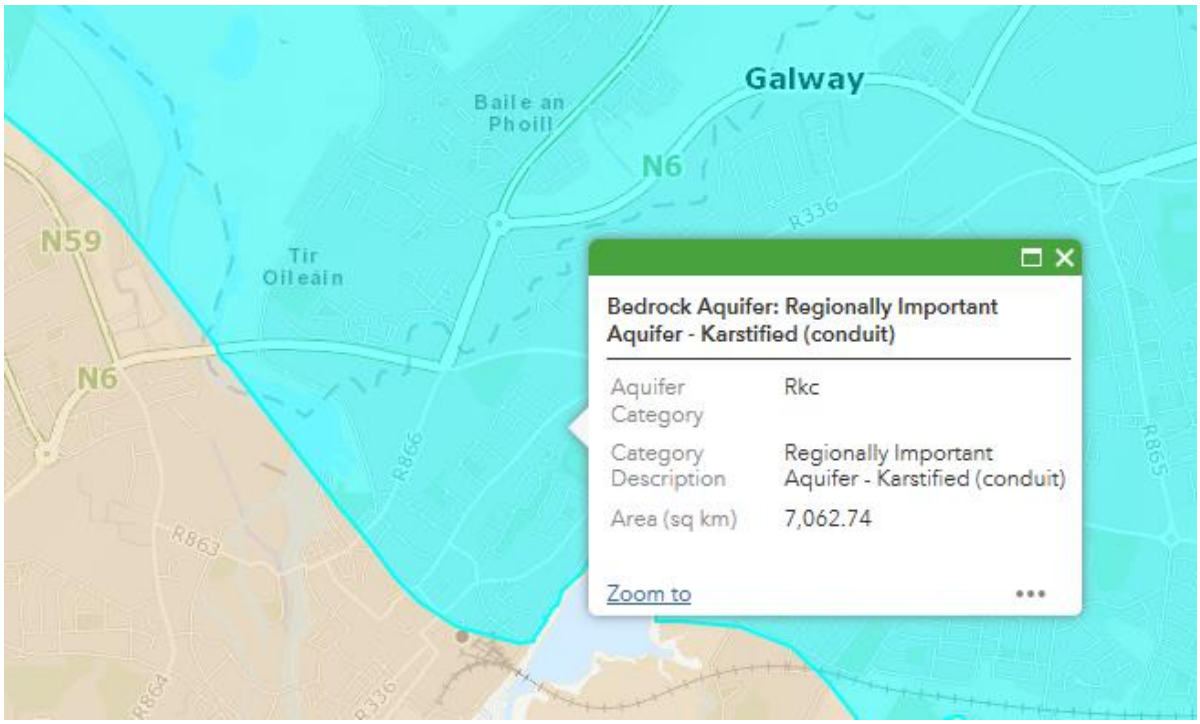

Figure 6 – GSI Ground Water Features

Figure 7 shows an extract from the online 6” map Cassina Map (dating between 1830s and 1930s) and the OSi Aerial map from 2000. Both maps show the site to be undeveloped.

Figure 7 – Extract from 6inch Cassina Map and 2000 Aerial OSi Map

3. GI in the Vicinity of the Site

The GSI online database holds records of external site investigation reports for 3 sites in the vicinity of Cuirt na Coiribe as illustrated in Figure 8 below

Figure 8 – Locations of site investigation GSI

With reference to Figure 9, for the shopping centre site rock was typically proven at depths of between 10m and 20m and in places rock was proven between 5m and 10m. For the ESB depot site rock was proven at depths of between 5m and 10m. In respect of the unnamed site rock wasn't proven at depths of 5m to 10m.

External Geotechnical Boreholes

- 0-5m Bedrock Met
- 5-10m Bedrock Met
- 10-20m Bedrock Met
- 20-30m Bedrock Met
- 30-1000m Bedrock Met
- 0-5m Bedrock Not Met
- 5-10m Bedrock Not Met
- 10-20m Bedrock Not Met
- 20-30m Bedrock Not Met
- 30-1000m Bedrock Not Met

Figure 9 – GSI Legend for External Geotechnical Boreholes

The site investigation reports for the shopping centre site and the ESB depot are included in Appendix A.

4. Site Specific Ground Investigation

In September 2019, Ground Investigations Ireland Ltd drilled 3 rotary cores to a depth of 5m for the purposes of monitoring ground water levels and gas monitoring. The locations of the rotary cores | monitoring wells are indicated in Figure 10.

Figure 10 – Locations Rotary Cores | monitoring wells

A targeted site specific ground investigation was also undertaken at the end of May 2020 by Ground Investigations Ireland Ltd. The locations of the trial pits are indicated in Figure 11.

Figure 11 – Locations Trial Pits

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. Further site investigation works will be undertaken once unrestricted access to the development is possible.

The scope of the work undertaken to date includes the following:

- Visit project site to observe existing conditions
- Installation and monitoring of 3 No. Groundwater | Gas monitoring wells
- 8 No. trial pits to a maximum depth of 2.0m BGL
- No. shallow rotary core boreholes to a maximum depth of 5.3m BGL (RC-01 to RC-03)
- 3 No. deeper rotary core boreholes to a maximum depth of 19.3m BGL (RC-01A to RC-03A).
- Report with recommendations

The full report is included in Appendix B.

Ground Water Levels

Readings were taken from the 3 ground water monitoring wells on 24th September 2019 (after installation) on 4th October 2019 and also on 25th March 2020.

The water depths recorded are included in Table 1 (see also GII report in Appendix 1)

Date	RC-01	RC-02	RC-03
24.09.19	2.56m	2.65m	4.2m
04.10.19	2.97m	2.11m	3.08m
23.03.20	3.42m	2.12m	3.11m

Table 1 Ground Water Levels

No groundwater was noted during the investigation undertaken in May 2020, however it should be noted that the exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime.

Ground Conditions

The sequence of strata encountered were relatively consistent across the site and are generally comprised;

- Topsoil
- Made Ground
- Cohesive Deposits
- Weathered Bedrock
- Bedrock

TOPSOIL: Topsoil was encountered in all the exploratory holes and was present to a maximum depth of 0.3m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil/Surfacing and were present to a maximum depth of 3m. These deposits were described generally as slightly silty slightly sandy slightly gravelly CLAY underlain by slightly clayey fine to coarse subangular GRAVEL with occasional subangular to sub-rounded cobbles. The made ground deposits were noted to contain varying amount of anthropogenic materials including fragments of red brick and concrete, ceramics, timber, plastic, glass, insulation foam, rebar, wire, geotextile and plastic water pipe (Wavin).

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as soft light brown to brown slightly sandy slightly gravelly Silt. The silt became increasingly gravelly with depth. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs. These deposits ranged in depth from 7m BGL to 8.2mBGL. In RC-03A the driller noted boulder clay between 7m and 14.2m BGL.

The recovered cohesive material was described as fine to coarse sub-angular to sub-rounded clayey Gravel and Limestone cobbles and boulders.

BEDROCK: The rotary core boreholes recovered dark grey medium to coarse grained thinly laminated slightly fossiliferous LIMESTONE with calcite veining. The depth to rock varies from 8.0m BGL in RC-01A to a maximum of 14.2m BGL in RC-03A. The total core recovery is good, typically 100% with some of the uppermost runs dropping to between 75 and 92%. The SCR and RQD both are relatively poor in the upper weathered zone in RC-01A, often recovered as non-intact, however both indices show an increase with depth in each of the boreholes.

5. Foundations

The existing building is supported on piled foundations and the extensions are also designed to be supported on piled foundations. The local excavation for the new basement areas illustrated in Figure 12 (dark blue lines) will require localised dewatering of the basement works area.

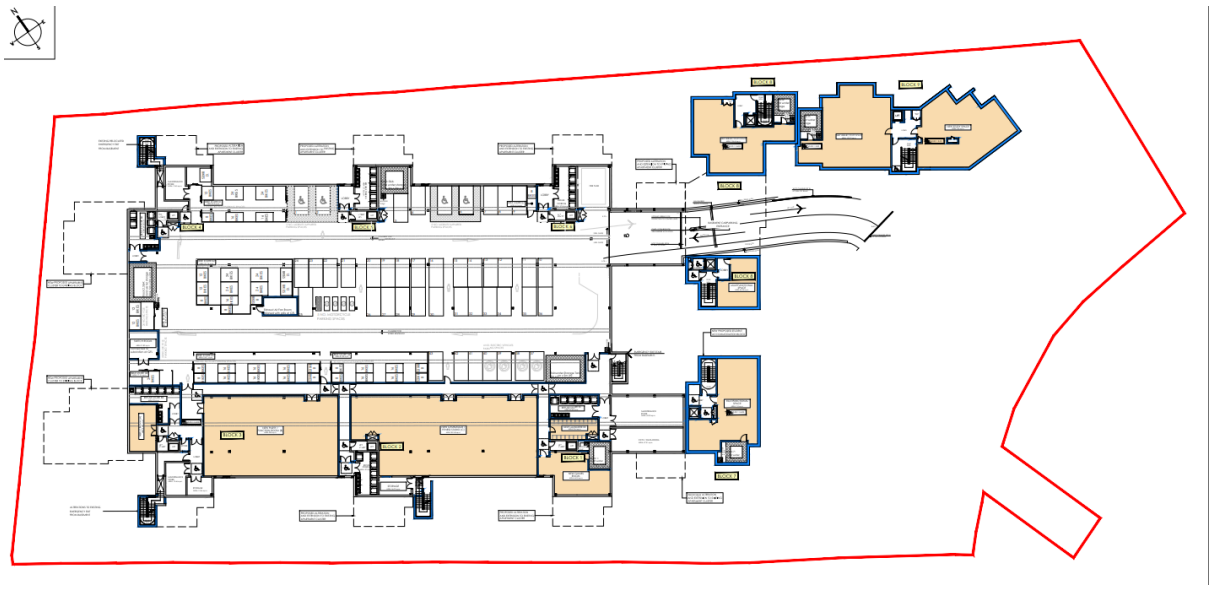

Figure 12 – Basement Plan showing proposed walls in dark blue

However, the water removed from the works area will be returned to the local ground by recharge wells. A design of the dewatering strategy can be made available by the Temporary Works Designer at the appropriate stage prior to commencement of the construction. The Aecom Construction methodology report accompanying the application includes a strategy for monitoring the existing and adjacent structures. Refer to section 2.1 of AECOM report CNC-ACM-00-ZZ-SP-SE-0001.

The building extensions and local increase in existing basement areas will all be supported on piled foundations. This type of foundation scheme does not require surcharging or vertical drainage to consolidate the existing ground strata so there will be no impact on the ground water regime.

Appendix A

Site investigation reports for ESB depot & shopping centre

Appendix B

GII Site Specific Ground Investigation

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