# DALYMOUNT STADIUM REDEVELOPMENT

Dublin City Council

# BASEMENT IMPACT ASSESSMENT

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Integrated Design Team:

IDOM

GILROYMCMAHON
ARCHITECTS

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Document Approver:

| *Name:* | *Role* | *Date* |
|---|---|---|
| Viral Bhavsar | Project Director | 11/07/2023 |

Document Authoriser:

| *Name:* | *Role* | *Date* |
|---|---|---|
| Luis Alberto Ribacoba | Civil / Drainage Lead | 06/07/2023 |

Document Author:

| *Name:* | *Role* | *Date* |
|---|---|---|
| Arantza de Echenique | Design Engineer | 06/07/2023 |

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# 3.0 EXECUTIVE SUMMARY

## 3.1. OVERVIEW

The Integrated Design Team (IDT), led by IDOM + Gilroy McMahon Architects, have been appointed by Dublin City Council (DCC) for the Dalymount Park Stadium Redevelopment project.

The works comprise the demolition of the existing stadium and the construction of a new stadium to cater for c. 8,000 patrons and associated facilities (spectators, players and club), with an additional c. 500sqm dedicated for a Community Facility.

Dalymount Park is a football stadium located in Phibsborough (Dublin), and is recognised at both local and national levels for its contribution to Irish Football. It has an important place in the history of Irish football, hosting many international football matches, friendlies, and European ties over its history. IDT have prepared a design proposal for the stadium redevelopment.

## 3.2. PURPOSE OF REPORT

The purpose of the Basement Impact Assessment, as is defined in the Basement Development Guidance of Dublin City Council, is to identify potential impacts, short and long term; to inform whether a proposed basement is acceptable; and to identify whether appropriate mitigating measures can be incorporated.

On the following sections site location, project potential impacts and measures will be described.

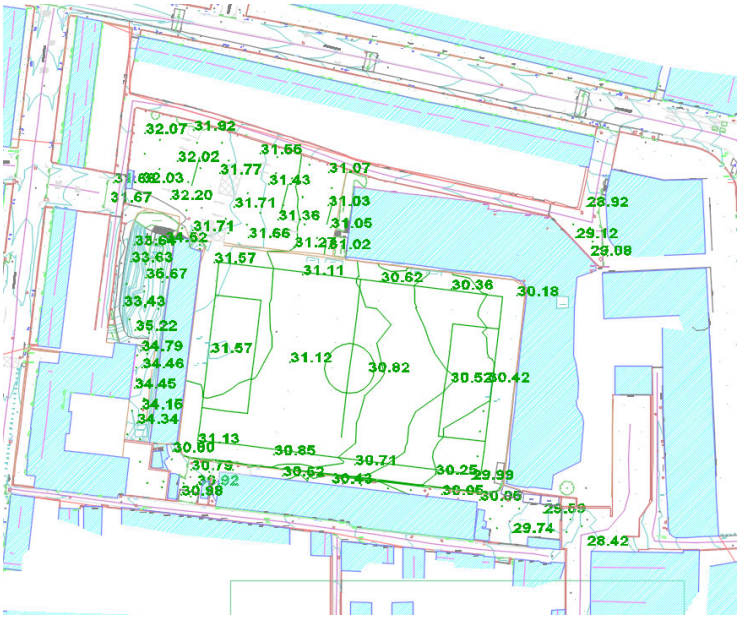
# 4.0 SITE DESCRIPTION

## 4.1. SITE LOCATION

The site is located in a primarily residential area in Phibsborough, Dublin, within St Peter's Rd, Connaught St, Phibsborough Rd, and N Circular Rd. It is constrained to the space available within the centre of the residential block in which it sits.


## 4.2. SITE TOPOGRAPHY

A topographical survey of the existing site has been prepared by APEX Surveys. The parking areas levels varies from +32.00m to +30m approximately. On the below image levels are summarized.




## 4.3. EXISTING GROUND CONDITIONS

A preliminary site investigation was carried out by Ground Investigations of Ireland (GII) on summer 2022. These investigations included:

- Site visit
- 4 boreholes up to 20mbgl (meters below ground level)
- 1 Dynamic Probe (DPSH)
- 2 Ground monitoring wells
- Geotechnical and chemical laboratory testing
- Factual and interpretative report

On Appendix A Factual and Interpretative reports are included

The ground conditions encountered during the investigation are summarized below:

- Topsoil/surfacing: Topsoil was encountered in A_BH04 and was present to a depth of 0.10m BGL. The remainder of the exploratory holes had Tarmac surfacing present to a depth of 0.10m BGL.
- Made ground: Made Ground deposits were encountered beneath the Topsoil/Surfacing and were present to a relatively consistent depth of between 1.20m and 1.70m BGL in the majority boreholes, and up to a maximum depth of 2.50m BGL in A_BH01. These deposits were described generally as dark brownish grey sandy gravelly CLAY with fragments of concrete, red brick, glass, and metal.
- Cohesive deposits: Cohesive deposits were encountered beneath the Made Ground and were described typically as brown slightly sandy gravelly CLAY

overlying grey slightly sandy gravelly CLAY. The secondary sand and gravel constituents varied with depth. The strength of the cohesive deposits increased with depth and was firm to stiff or stiff below 3.0m BGL in the majority of the exploratory holes. These deposits had rare cobble content were noted on the exploratory hole logs.

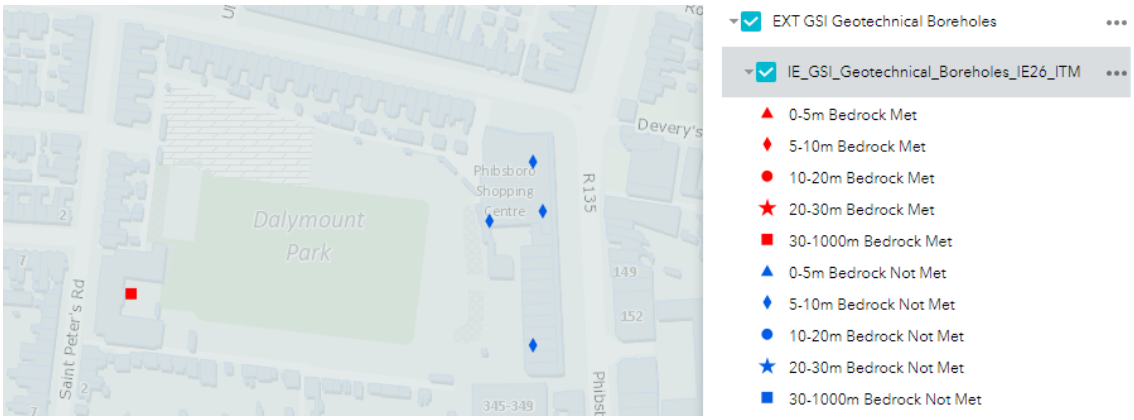
During the site investigation, groundwater strikes were noted (7mbgl). However, during monitoring no ground water was encountered.

A complete site investigation is to be carried out in the summer 2023. The result of this investigation will be used to confirm the preliminary investigation results and finalise the design.

## 4.4. GEOLOGICAL AND HYDROGEOLOGICAL SETTING

Mapping from the Geological Society of Ireland indicates the bedrock underlying the site is part of the Luncan Formation and made up of dark limestone and shale. The lithological description comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar.

Bedrock was not encountered in any borehole undertaken by GII, which had a maximum exploration depth of 20mbgl. The GSI geotechnical map presents a database of geotechnical boreholes across Ireland. In the area there are 5 boreholes close to the plot. In one of them bedrock was found at more than 30mbgl. See the image below

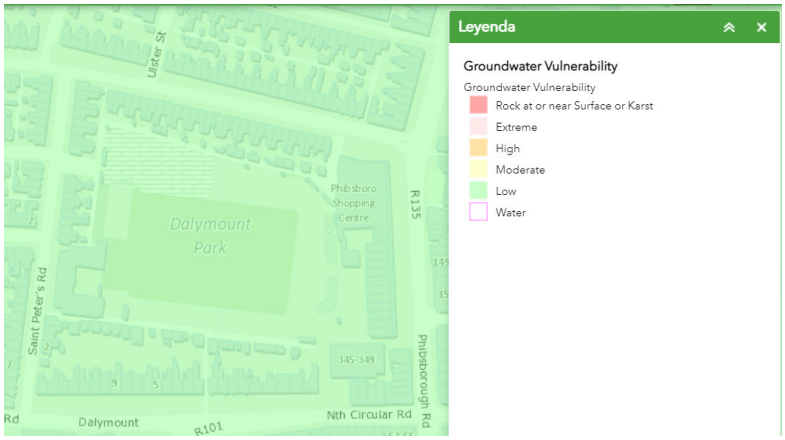



The GSI also classifies the principal aquifer types in Ireland as:

- Lk: Locally Important Aquifer – Karstifie
- Ll: Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Lm: Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Pl: Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu: Poor Aquifer - Bedrock which is Generally Unproductive
- Rkd: Regionally Important Aquifer (karstified diffuse)

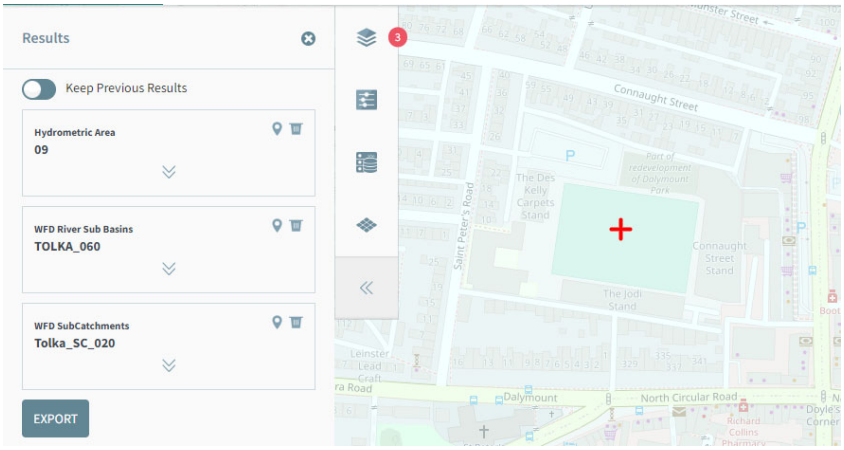
According to the GSI maps, the bedrock aquifer beneath the subject site as a 'Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones'.

The GSI also classifies the groundwater vulnerability, which represents the intrinsic geological and hydrological characteristics that determine the ease with which groundwater may be contaminated generally by human activities.
The GSI aquifer vulnerability class in the region of the site is presented below.




## 4.5. HYDROLOGICAL SETTING

According to the EPA maps, the site is located on the hydrometric area of Liffey and Dublin Bay (09) and the Tolka River sub-catchment.




A Flood Risk Assessment was carried out by IE Consulting on 2022, there is no risk of fluvial, coastal or groundwater flooding as the proposed development falls within a fluvial and coastal Flood Zone C.

# 5.0 DESCRIPTION OF THE PROPOSED REDEVELOPMENT

The redevelopment proposed for the site consists of the demolition of the existing stadium and the construction of a new stadium of c. 8000 patrons and associated facilities (spectators, players and club), with an additional c. 500sqm dedicated for a Community Facility.

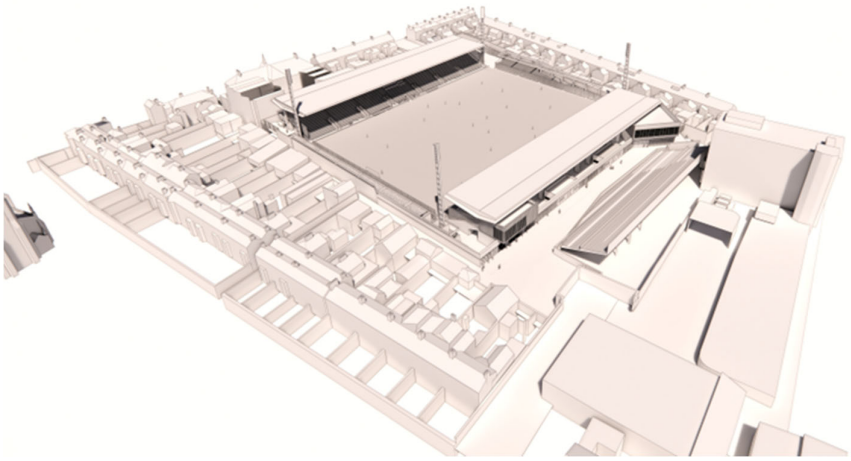
The proposal consists of a new four-sided stadium which features a natural pitch, aligned north-south to meet best practices in stadia design, two main new stands -to the east and west of the site, with a capacity of c. 3000 seats each-, and two terraces to the north and south of the site with a capacity of c. 1000 each.

The proposal also includes a new pedestrian boulevard connecting North circular road and Connaught Street, aiming at creating a new public space.

The scheme is designed to allow for level access on ground floor. To activate the new boulevard and attract movement on non-match days, the east stand features new concessions facing public realm areas, a fully independent community facility building with a gym and multipurpose room and a club shop.

The west stand is dedicated to stadium operations, including a bar on the first floor that can be used on non-match days by club members, and the competition facilities located on a basement below ground to facilitate the patron access on ground floor.

The basement is a single-storey structure of c. 630m2, and houses the locker rooms, referee rooms, officials, medical areas, physiotherapy, doping control, stores and plant rooms.



## 5.1. STRUCTURAL DESIGN OF THE PROPOSED DEVELOPMENT

A steel solution has been chosen for the roofs, stand frames and multi-storey accommodation. For single-storey buildings for concessions and the perimeter wall of the plot, concrete blocks walls are used.

The structural solution for the first-floor level and ground-floor levels of the building are composite steel decking. The horizontal floor of the basement will be a concrete slab. The basement walls of c. 3.5m height, are in-situ concrete.

## 5.2. BASEMENT CONSTRUCTION

The basement is a single-storey structure of c. 630m2, measuring c. 3.5m in height, which houses the locker rooms, referee rooms, officials, medical areas, physiotherapy, doping control, stores and plant rooms.

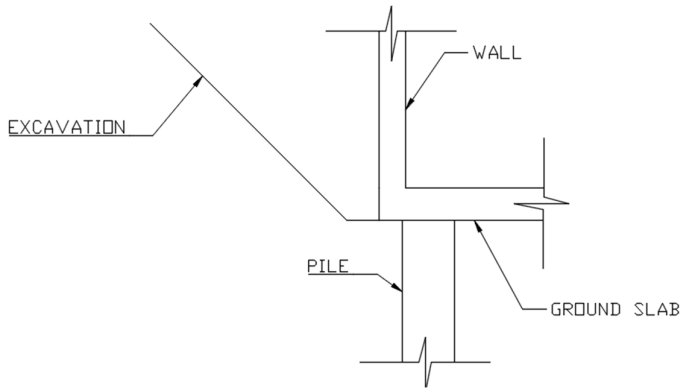
The basement slab level is proposed to be +27.00m AOD. No groundwater is expected to ingress to the excavation area (These are to be further confirmed after reception of the full GI report). However, given the characteristic of the subsoil, localized dewatering of the subsoils is expected during the excavation works. These will be required to address perched groundwater, even if the site investigations at the site did not encounter any groundwater (These are to be further confirmed after reception of the full GI report).

Based on the ground conditions, the Ground Investigation Interpretative Report suggests a solution based on a kingpost or pile retaining wall for temporary retention of the excavation or a batter of 2H:1V in made ground and form brown cohesive deposits and 1H:1V in the very stiff dark grey cohesive deposits.

As there is enough space for the excavation a batter of 2H:1V or 1H:1V depending on the ground characteristics is used.

Once the excavation is done, the piles, ground slab and walls are executed.

The typical section of the basement perimeter is presented below.




## 5.3. CONSTRUCTION WORK PROGRAMME

The outline basement construction sequence is outlined below:

1) Demolition of the existing stands:

   Demolition works have already commenced on site, comprising the demolition of the Connaught Stand. The demolition of the remaining the stands are part of the scope of works and will be completed by the appointed contractor in accordance with the relevant standards and guidelines.

2) Basement construction:

   A full site investigation will be carried out prior to the commencement of the construction works. A specialist ground works contractor will be appointed to carry out the excavation and any rock breaking works that may be required. The appointed specialist contractor will carry out a full risk assessment prior to the commencement of work.

A ground works operation will be carried out in order to ensure that material removed from the ground is taken away at regular intervals in order to reduce the amount of material that will be stored on site.

Localised sump pumps will be installed to remove the water through settlement tanks and after appropriate treatment into the local drainage network infrastructure for discharge. On completion of the excavation works to the formation level of the basement slab, this will be blinded to the final design levels. A typical basement piled slab construction is as follows:

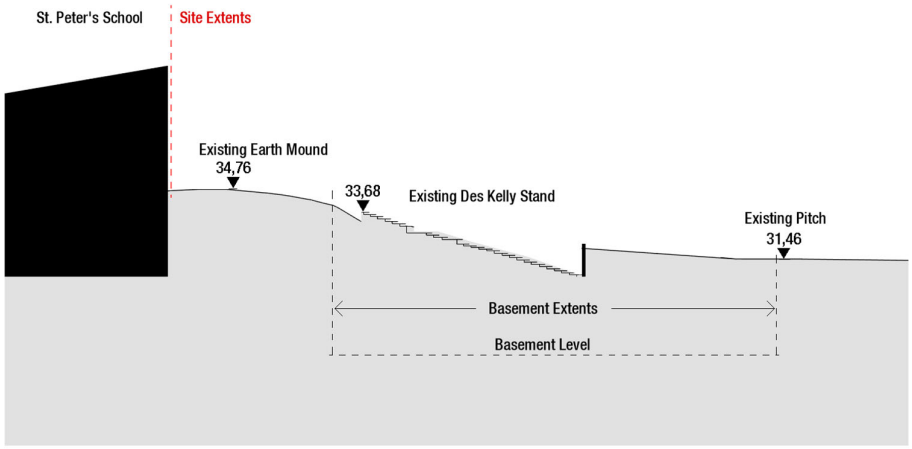
- Execute the piles
- Pour cleaning concrete
- Install slab reinforcement and formwork where necessary
- Pour concrete

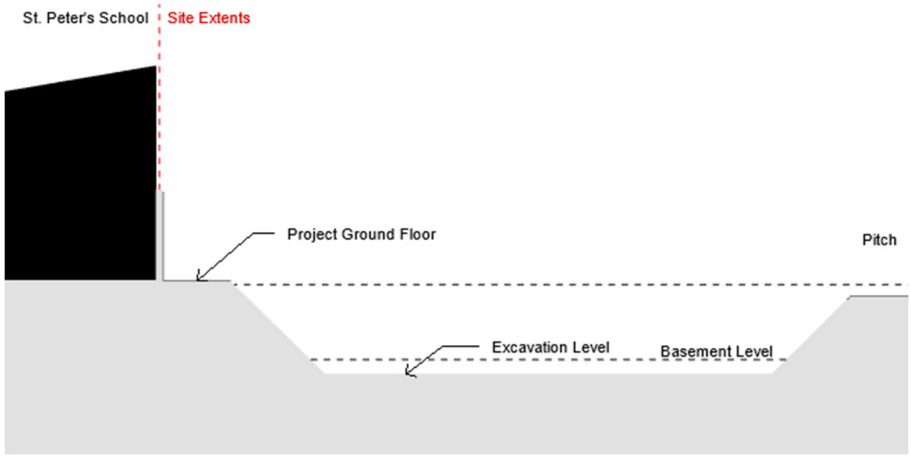
A typical basement wall construction is as follows:

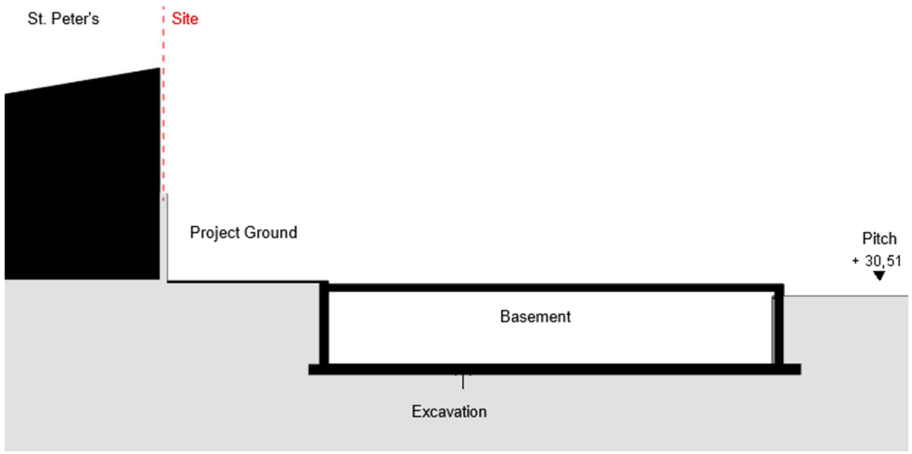
- Install formwork
- Install wall reinforcement
- Pour concrete
- Install water proofing layer and fill the excavation

# 6.0 CONCEPTUAL SITE MODEL

Based on the existing site conditions and the description of the proposed development, conceptual cross section for the current situation, the construction phase and operation phase are shown below.




St. Peter's
Site
Project Ground
Pitch
+ 30,51
Basement
Excavation

# 7.0 POTENTIAL IMPACTS

There is no expected long-term impact on groundwater levels around the proposed site development as a result of the installation of a retaining wall (These are to be further confirmed after reception of the full GI report).

The basement does not intersect bedrock. No continuous perched water table was encountered during site investigation (These are to be further confirmed after reception of the full GI report). The excavation will likely require collection of minor groundwater inflows and any collected rainwater.

As stated above, the proposed development will not result in any changes in the local groundwater and surface regime.

The regional water table within bedrock will not be affected by the basement construction.

The proposed basement construction, which would involve c. 4.0m deep excavations, has the potential to cause minor ground movements inside and outside the excavated area as a result of changes in vertical load on the ground. The construction sequence outlined before aims at controlling any potential movement to within acceptable limits.

# 8.0 POTENTIAL CONTROL MEASURES

The following standard construction measures will be included in the design to protect water quality:

There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the trenches are kept relatively dry. Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures and hydrocarbon interceptors. The use of silt traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to water. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to water or sewer.

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas.

Where feasible all ready-mixed concrete will be brought to the site by truck. A suitable risk assessment for wet concrete will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated stormwater to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In addition, monitoring of groundwater levels pre-construction of basement works and monitoring of vibration and noise during the excavation and construction of the walls will complement the measures described above.

# 9.0 CONTINUOUS SITE INVESTIGATION

Site investigations are to be carried out at several stages, including pre-construction phase and during construction.

## 9.1. PRE-CONSTRUCTION STAGE

A preliminary ground investigation was carried out in summer 2022 and a complete ground investigation is to be carried out in summer 2023.

- Ground water monitoring

Two (2) standpipes were installed in summer 2022. Two (2) additional standpipes are to be installed during the complete ground investigation in summer 2023.

Groundwater monitoring was carried out on the preliminary GI and groundwater was not found, except for the ground water strike 7mbgl. Ground water monitoring of the four (4) standpipes will be carried out on the complete GI.

- Ground conditions

The result of the preliminary GI suggests a solution based on a kingpost or pile raining wall for temporary retention of the excavation or a batter of 2H:1V or 1H:1V (depending on the ground conditions) for excavations. Excavation requirements to guarantee stability during works are to be confirmed after the complete GI.

## 9.2. CONSTRUCTION STAGE

Based on groundwater monitoring results of the preliminary GI, it is considered that there is a low risk of inflow during construction works. However, this will be review after the complete GI. Also, water level data collection should be undertaken before and during construction when possible.

# 10.0 CONCLUSIONS

The proposed basement will have no long-term impact on water levels. The bedrock water table will not be affected by the excavation works. Temporary dewatering of the perched water table within the clay deposits to facilitate excavation works is expected to be minor and it will have a temporary local impact only.

The basement will need to be fully waterproofed to ensure no groundwater enters the finished basement. Site investigation has not detected groundwater (These are to be further confirmed after reception of the full GI report).

Management of any collected rainwater and any groundwater seepage during basement excavations will be pumped to existing sewers (following appropriate treatment) in agreement with the regulatory authority.

Overall, the impact on the environment as a result of the proposed basement development in the area is predicted to be long term-imperceptible and neutral, provided the mitigation measures above described are implemented.