Gondar Gardens

Basement Impact Assessment Report

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Comments

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1. Introduction

1.1 Objectives

This document demonstrates that the proposed development at Gondar Gardens, London, NW6 1QF will not negatively impact the environment and the selected construction techniques for the basement will safeguard the structural integrity of the neighbouring structures and highways.

In accordance with Camden Planning Guidance (CPG4), the proposed underground development should not:

- cause harm to the built and natural environment and local amenity;
- result in flooding;
- lead to ground instability.
- affect the structural stability of the building and neighbouring properties;
- adversely affect drainage and run-offs or cause other damage to the water environment;
- cumulative impacts upon structural stability or the water environment in the local area.

Figure 1: Architect's 3D Visualisation of the Proposed Development

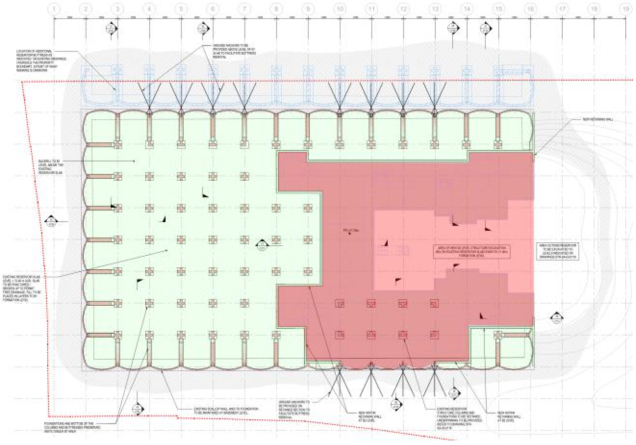
All the geotechnical, ground conditions and hydrogeology advice in this report has been compiled from RSK Environment Ltd. who are competent, certified professionals commissioned by Lifecare Residences Ltd. Refer to Appendices B and C for their full reports.

1.2 Proposed Development

The proposed development will comprise the construction of six apartment blocks, consisting of 4 storeys above ground plus 2 levels of basement. The second, lower level of part basement will include the excavation of a further 1.4 m of soil over the eastern portion, remote from any neighbouring assets and below the existing reservoir floor slab level. Refer to Appendix A for proposed drawings.

The existing reservoir retaining walls will be retained on three sides, (north, west and south), and partly incorporated into the scheme, with the basement and lower basement being constructed within the footprint of the existing reservoir, albeit with the lower (2nd) part lowest basement FFL level being 0.5m below existing, resulting in a 1.4m excavation depth. Localised underpinning of the existing masonry foundations will be required to allow modification to the permanent site grade levels and construction of the ground floor structure. Because of the limited area occupied by the lower basement level, there will be a significant up-filling across the western extent of the reservoir footprint to raise the existing level to the formation level of the first basement level. The existing site surface level will be lowered to be consistent with street level to the west.

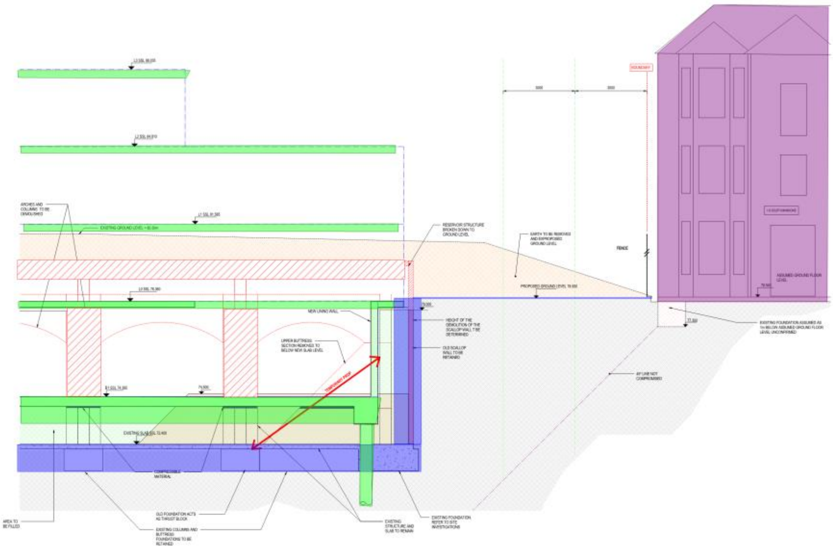
Figure 1.2: Plan showing proposed basement within existing in green. Extended basaement by 1.4m down in Red



The development will include areas of soft landscaping, including construction of a substantial reinforced earth slope in the eastern part of the site, from ground level to lower basement level. The new structures will be supported on piled foundations and are anticipated to be moderate and typical for this scale of development. The Key features of the structural scheme can be summarised as follows:

- Primary concrete framed superstructure comprising in-situ reinforced concrete columns, walls and notionally flat slabs. At this stage, it is assumed that a 250 mm thick RC flat slab on a 6.5 m square grid will be adopted.
- The existing perimeter retaining wall system, made from scalloped masonry will be mostly retained at the western half of the proposed site, the new basement level will be completely within the existing profile. Modifications to the existing buttresses and vaulted roof will be made to open-up basement space. This rigidity shall be replaced with ground anchors and new RC slab with propping in the temporary case. See Figure 2 Below.
- The eastern portion of basement is lowered by 1.4 m. This will require underpinning to the existing foundation. This portion is the only location where the basement is being extended and is beyond the influence zones of any neighbouring properties.
- The proposed foundations throughout will be piled.

Figure 2: Section showing Retained in Blue. Proposed in Green. Temp works in Red. Neighbour in Purple



1.3 Site Location

The site is located on Gondar Gardens, West Hampstead, NW6 1QH, London and is centred at Grid Reference 524838, 185309.

Figure 3: Site Location

1.4 Site Description

The western part of the site comprises a covered reservoir. This was constructed in 1874 and emptied in the late 1990s, being formally decommissioned as a reservoir under the Reservoir Act in 2002.

It is of brick arch construction with a barrel roof and concrete floor, providing an internal height of up to 7 m. It is about 92 m long and 53 m wide, giving an area of 4,900 sq.m, representing approximately 40% of the site.

The reservoir is covered with soil and supported by earth bunds on each side. As a result, it forms a plateau-like feature raised above the level of the surrounding area.

The reservoir and most of the site are covered with grass, which is cut periodically. A strip of scrub and trees runs along the eastern boundary, whilst there are also several trees along the southern boundary. Areas of hardstanding and ruderal vegetation, together with three small buildings, are located close to the western boundary. The surface of the site comprises an open grassed field, designated as a conservation area.

1.5 Site Surroundings

The area around the site is predominantly residential. To the north, terraced houses and their associated rear gardens occupy the full extent of the northern boundary. The western end of the northern border is occupied by southern wall of a residential mansion block. The eastern boundary is marked by a slope leading down to rear gardens of terraced houses. The majority of the southern boundary comprises a slope leading down to the rear gardens of terraced houses. At the western end of the southern boundary is a residential mansion block. Immediately to the west of the site is Gondar Gardens Road, which slopes down to the south.

The nearest neighbouring properties are located towards the western entrance, named Chase Mansions (north) and South Mansions (south). These buildings have not been inspected internally during the study period.

1.6 Site Topography

The eastern boundary of the site is marked by an approximately 19° slope, which reduces the level from 79 m AOD to 75 m AOD, down to rear gardens of residential terraced houses. The southern boundary is marked by an approximately 17° slope at the eastern end, which reduces level from approximately 78.5 m AOD to 72.5 m AOD, down to rear gardens of residential terraced houses. The slope reduces in height from east to west along the southern boundary, adjacent to the mansion block at the western end of the southern boundary, where the slope is reduced in height to approximately 1 m, reducing levels from approximately 80.0 m AOD to 79.0 m AOD. Topographical information is not available for the private rear gardens to the north of the site, but are assumed to be approx 1-2 m lower than the surface elevation across the site.

1.7 Site History

The archive information and historic maps indicate that the reservoir was first constructed in 1874, named as the Shoot-Up Hill reservoir. The first available map from 1896 shows the surrounding area to the east and south developed with the existing housing by this time. By the 1915 map the surrounding area is generally developed with the existing residential properties. The only other notable change to the site and/or surrounding area is the construction of the existing substation in the north-western corner shown on the 1962 map. It is understood the reservoir was decommissioned in circa 2002.

Maps also show a building on the sire just to the North of South Mansions from 1915-1955.

Figure 4: Showing the Existing Masonry Construction

1.8 Unexploded Ordinance

A UXO report for this site should be carried out prior to any site works. As the site has not been developed since World War Two, there is a risk that unexploded ordinance could be encountered.

1.9 Public sewer

A number of Thames Water sewers have been identified in proximity to the site. The adopted main sewers in the area are combined accepting both foul and surface water run-off. The nearest sewer to the site is along the western boundary within Gondar Garden Road, where a 940 mm x 635 mm sewer flows in a southern direction. According to the sewer records supplied by Thames Water, a connection point exists to the south-west corner of the site, it is proposed to utilise this connection for the development.

1.10 LUL Metropolitan Line

The LUL Metropolitan Line is located 200 m to the south-west of our site where it runs above ground from Finchley Road all the way to Amersham. The proposed development will not affect this LUL asset and is well beyond their zone of influence.

1.11 Existing Foundations

A single machine dug trial pit was excavated along the northern wall of the buried reservoir to expose the wall and attempt to locate a potential second reservoir wall. Historical drawings illustrate a retaining wall immediately to the North of our existing wall indicating an additional reservoir. Two hand excavated trial pits were excavated internally, as part of the structural investigation scope of work, to expose the foundations of two internal columns. The full investigation and report is included in Appendix B.

Trial Pit 1 was positioned midway between the fourth and fifth vent cover (from west to east) along the northern boundary of the site. Within the southernmost extent of the trial pit the northern wall of the reservoir structure was encountered at a depth of 1.1 mbgl (79.00 m AOD).

The pit was extended north a total of 3.2 m. At a distance of 1.90 m to the north of the exposed northern wall was a second brick wall, orientated approximately east-west, although the eastern extent of the wall turned slightly toward the north-east. The second wall was found to step down from west to east, from a shallowest depth of 0.5 mbgl to 1.4 mbgl at the eastern end. Between the two brick walls were two approximately east-west aligned concrete masses.

The foundation to both columns was found to be two layers of brick corbels on to a thin 280 mm thick weak concrete base bearing on firm clay at a depth of 1.22 m below slab level.

Figure 5: Showing Trial Pit 1

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2. Site Conditions

2.1 Site Geology

The strata encountered in the latest RSK ground investigation, see Appendix B for full report, were generally consistent with the anticipated geology identified in previous reports.

Figure 6: Ground Conditions Encountered

Strata	Exploratory holes encountered	Depth to top of stratum m bgl (mAOD)	Thickness (m)
Topsoil	All locations	0.00 (79.84 to 80.23)	0.10 to 0.30
Made Ground	All Locations	0.10 to 0.30 (79.64 to 80.03)	2.90 to 5.80
London Clay	BH1, BH2, BH3, WS5 & WS6	3.20 to 10.50 (76.70 to 69.54)	Not proven (>50m?)

Made ground was encountered in all exploratory hole locations, directly below the topsoil, and extended to significant depths of between 3.20 mbgl and 10.50 mbgl (76.70 m AOD to 69.54 m AOD).

London Clay was encountered in BH1, BH2, BH3, WS5 and WS6 beneath the made ground and was proved to the terminal depth in each location of between 7.00 mbgl (72.80 m AOD) and 50.00 mbgl (29.84 m AOD). Note that a historic deep borehole in the Hampstead area penetrated approximately 108 m of London Clay.

In engineering terms, the London Clay is a fine-grained, cohesive soil. The design of foundations in the London Clay is governed by its cohesive, rather than frictional, properties. Although the majority of the London Clay is considered to be a fine grained cohesive soil, there are sandier units present, particularly toward the deeper parts of the London Clay. These tend to be inter-bedded sandy clayey silts and sandy silts with beds up to 5 m thick. The London Clay has a relatively low permeability to ground water. In essence, the London Clay presents an almost complete barrier to groundwater. In practice, this barrier is not complete: groundwater can permeate slowly through intact London Clay, and it can move more quickly along any fissures and cracks in the clay, and through localised zones that contain a higher proportion of silts or sands. However, even in the presence of fissures or silty zones, groundwater flow rates in the London Clay are significantly slower than in the River Terrace Deposits.

2.2 Groundwater

The nature of the geology, together with the locally elevated location, suggests that there is unlikely to be a continuous flow of groundwater across the site. In addition, the reservoir structure is in effect impermeable, with rainwater running off its roof rather than percolating into the soil, thereby limiting the potential for local recharge.

As a result, the development is predicted to have a negligible impact on the groundwater regime, either through localised drawdown during the excavation of the basements or through the obstruction or diversion of flows once the new retaining walls are in place. Secondary effects due to changes in the groundwater regime off-site (e.g. shrinking of the clay or localised flooding) are therefore highly unlikely to occur.

Groundwater was encountered in BH1 at 29.50 mbgl (50.40 m AOD), as a seepage, associated with the presence of a claystone at that depth. Groundwater was not encountered during drilling of BH2, although slurry was noted in the base of the borehole on the morning of the third day of drilling. The borehole was dry on completion. Within BH3, groundwater was encountered within the made ground at a depth of 4.30 mbgl (75.84 m AOD).

Within WS5 and WS6 groundwater seepages were recorded at 3.25 mbgl (76.75 m AOD) and 3.80 mbgl (76.00 m AOD), which on completion of drilling were at 2.60 mbgl (77.30 m AOD) and 6.02 m (73.78 m AOD) respectively.

Figure 7: Results of Groundwater Levels

Monitoring well	TOC elevation (m AOD)	Depth to water (mb TOC)		Groundwater elevation (m AOD)	
		Visit 1	Visit 2	Visit 1	Visit 2
BH1	79.90	7.55	7.37	72.35	72.53
BH2	79.84	6.65	6.62	73.19	73.22
BH3	80.04	4.23	4.28	75.81	75.76

Notes:
mb TOC = metres below top of casing,
m AOD = metres above Ordnance datum

2.3 Hydrogeology and Hydrology

Please see Appendix F for full report. In summary: *"No impacts have been identified"*

There are no ponds, streams or drainage ditches on or adjacent to the site, and with reference to current and historical map data the site is not within the vicinity of any sensitive surface water features or surface water catchment and drainage areas. The nearest identified surface watercourse to the site are the Hampstead Heath Ponds, located approximately 1.5 km north east of the site. Three tributaries of the River Westbourne formerly ran to the north-east and south of the site, some 1500 m to 2000 m from the site, but these watercourses have long since been diverted into the London sewer system.

The geological boundary between the Claygate Beds and the London Clay Formation, which may potentially form a spring line, is mapped as lying approximately 50 m to the north of the site. Although not shown on the historical maps, it is likely that springs were present in the area, feeding two water courses running some 1500m to 2000m to the east and south of the site. Since the urbanisation of the area, these watercourses are no longer shown on the maps, and it is very likely that they are culverted. However, the geological conditions found to prevail at the site and its immediate environs do not appear conducive to the formation of springs.

Stratum	Environment Agency	Hydrogeological Significance
Made Ground	Unproductive Strata	Negligible significance for water supply or river base flow.
London Clay Formation	Unproductive Strata	Low permeability with negligible significance for water supply or river base
Lambeth Group	Secondary A Aquifer	Permeable layers capable of supporting water supplies at a local rather than
Upper Chalk Formation	Principal Aquifer	High intergranular and / or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and / or river base flow on a strategic scale.

The presence of piles as part of the Gondar Gardens Development would create a potential contamination pathway into the Principal Aquifer. However, given that much of the Made Ground would be removed and groundwater in the Principal Aquifer is already in hydraulic conductivity with Made Ground the potential impact on groundwater quality in the Principal Aquifer owing to the presence of piles is assessed as being negligible. All piling works would be undertaken in accordance with the Environment Agency document NC/99/73 'Piling and penetrative ground improvement methods on land affected by contamination: Guidance on pollution prevention'.

2.4 Flood Risk

The RSK flood risk assessment, see Appendix C, has concluded that:

- The proposed area of housing is located within Flood Zone 1, and as such are at a very low risk of flooding from fluvial sources;
- No housing is proposed in Flood Zones 2 or 3;
- The site is far enough inland not to be at risk of any tidal flooding event;
- Flood risk from surface water across the site is considered to range from very low to medium;
- Flood risk from groundwater is considered medium as the lower ground floor level will be set into the clay layer, and therefore potentially below the saturated zone. It is recommended that this area is tanked using a suitable material and/or an exterior land drainage solution to prevent ground water ingress;
- Flood risk from other sources including sewers, reservoirs and artificial sources – is demonstrated to be low;
- The development will have no impact on other forms of flooding;
- There will be an increase in surface water runoff from the site. Runoff from the site will be limited to the equivalent rainfall event to ensure no additional runoff rate will leave the site;
- There will be an increase in surface water runoff from the site. Runoff from the site will be limited to the equivalent rainfall event to ensure no additional runoff rate will leave the site;
- Overall, considering the above points, the development of the site should not be precluded on flood risk grounds, as all onsite flood risk and potential off site flooding risk can be safely and properly mitigated in line with current guidance and regulations. Refer to Appendix E for SUDS report.

Figure 8: Surface Water Flood Risk – Very Low

2.5 Ground Contamination

The results of the investigation have confirmed that no relevant pollutant linkages are present with respect to human health. From RSK's Generic Assessment Criteria no potential significant risk has been identified with respect to the proposed end use. One single isolated sample of elevated benzoapyrene concentration was noted.

The visual inspection at the laboratory identified no materials suspected of potentially containing asbestos and the scheduled laboratory screening for asbestos found no detectable asbestos fibres within the samples of made ground. It should be noted that the potential presence of asbestos containing materials in the made ground on site cannot be ruled out at this stage and further investigation will be required to confirm this. It is essential that groundworkers are made aware of the potential risk of asbestos fibres within the made ground and suitable working practices are in place during groundworks stage to minimise the risks.

The results indicate that there are no relevant linkages in respect to water supply pipes.

It should be noted that at the time of this investigation, the future routes of water supply pipes had not been established, and hence the investigation and sampling strategy may not be fully compliant with UKWIR recommendations. Consequently, a targeted investigation and specific sampling/analytical strategy may be required at a later date once the route(s) of the supply pipe(s) are known.

No plausible pollutant linkages have been identified in respect to controlled waters beneath the site.

3. Basement Design and Construction

3.1 Land Stability Assessment

A Land Stability and ground movement assessment report has been undertaken by RSK, please refer to Appendix D. It is calculated through analyse models that the damage associated from construction works will likely be CATEGORY ZERO (negligible) as per CIRIA C580 (Retaining Walls – Guidance for Economic Design).

"No potentially damaging vertical movements are predicted beyond the site boundary."

For information purposes, the CIRIA C580 Burland damage category definitions are included in below:

0 to 0.1 mm – Category 0 – Negligible – Hairline crack of less than 0.1 mm are classified as negligible

0.1 mm to 1 mm – Category 1 – Very Slight – Fine cracks which can easily be treated during normal decoration. Perhaps isolated slight fracturing in the building. Cracks rarely visible in external brickwork.

1 mm to 5 mm – Category 2 – Slight – Cracks easily filled. Redecoration probably required. Recurrent cracks can be masked by suitable linings. Cracks not necessarily visible externally. Some external repointing may be required to ensure weather-tightness. Doors and windows may stick slightly.

5 mm to 15 mm – Category 3 – Moderate – These cracks require some opening up and can be patched by a mason. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking, service pipes may fracture. Weather-tightness often impaired.

15 mm to 25 mm – Category 4 – Severe – Extensive repair work involving breaking out and replacing sections of walls, especially over doors and windows. Window and door frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted.

25 mm+ - Category 5 – Very Severe – This requires a major repair job involving partial or complete rebuilding. Beams lose bearing. Walls lean badly and require shoring. Windows broken with distortion. Danger of instability.

Construction of the basement and retaining wall modifications has the potential to result in ground movements induced by:

a) Vibration resulting from construction works activities.

b) Lateral deflection of the retaining wall system during and after construction.

c) Heave of underlying soils due to removal of overburden for bulk excavation.

d) Changes to the groundwater regime and soil pore/water pressures resulting from construction.

The industry recognises a damage categorisation based upon the likely extent of repairs required in addition to recognising crack widths. In addition to the nature of the proposed construction works, the prediction of a damage category is also dependent on the condition of the existing structures and their sensitivity to movement. In the absence of specific movements, these aspects have been estimated from their period of construction and experience of similar buildings and will be subject to verification following inspection being undertaken.

3.2 Basement Construction Method

The nearest neighbouring structures are at the western edge of the site, with Chase Mansions to the north west and South Mansions to the south west. All structural basement modifications will be made within the existing profile of the retained retaining wall structure. All temporary and proposed works, acting as props to the existing retaining wall, will be made prior to demolition to minimise ground movements. The neighbouring buildings are all beyond the 45' angle as shown in figures 9 and 10.

Figure 9: Section showing Elmo Mansions in Purple, Retained in Blue. Proposed in Green. Temp works in Red.

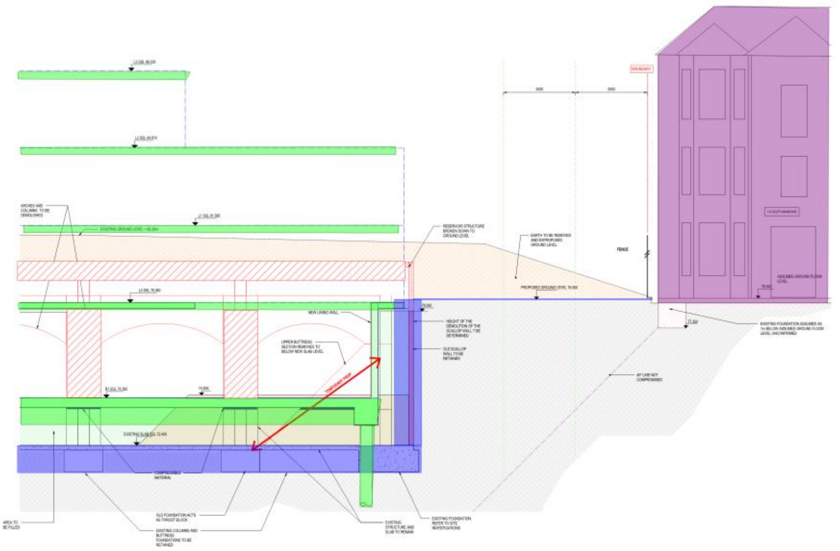
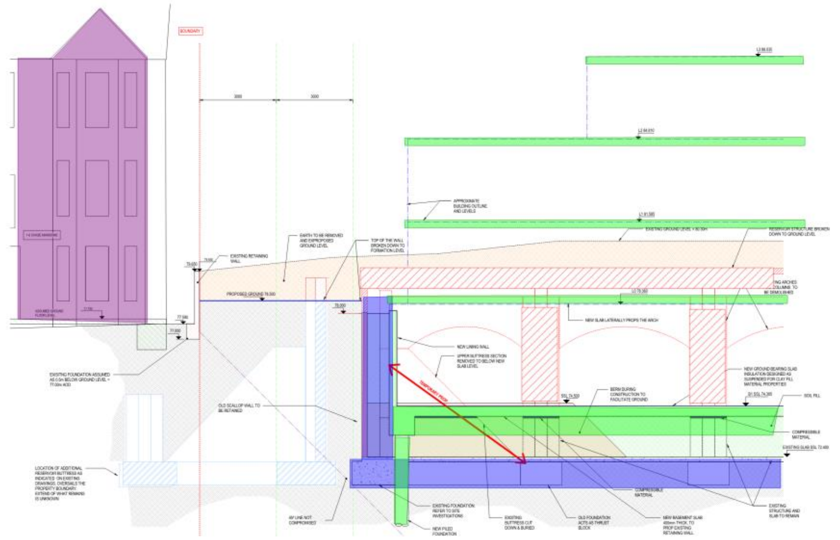


Figure 10: Section showing Chase Mansions in Purple, Retained in Blue. Proposed in Green. Temp works in Red.



Within the profile of the retained existing scalloped retaining wall the proposed foundation piles will be founded within the underlying London Clay strata, adopting traditional continuous flight-auger techniques.

The basement "box" will be completed adopting in-situ reinforced concrete to pile-caps, basement slab, columns, walls and ground floor slabs. The basement slab will be designed as "suspended" although it is to be cast directly on the ground.

Primary in-situ reinforced construction in contact with the ground will be specified to achieve a Grade I environment with respect to resistance to water ingress, in accordance with BS8102: 2009.

3.3 Basement Construction Sequence

Demolition Sequencing for Reservoir

1. Clear soft ground off roof
2. Install underpins to south elevation (east)
3. Place anchors
    a. Anchors installed by 7 Tonne machine (small vehicle size)
    b. requires an 8 m wide ramp placed at the level of the uppermost anchor.
4. Place demolition high reach muncher machines at reservoir level
5. Place raking props (laterally brace top of scallops)
6. Provide retained arch bay ties in 2 directions to stabilise them
7. Remove roof
8. Place berms around perimeter (laterally brace bottom of scallops)
9. Remove buttresses
10. Carry out piling
11. Fill/ excavate down to formation

By installing the anchors and the raking props prior to demolition, this construction sequence minimises movements in the soil and therefore reduces the risk of cracking on the adjacent buildings.

A comprehensive set of drawings describing the earthworks and construction sequence is located in Appendix A.

The proposals and methodologies outlined in this document will be subject to refinement or amendment at later design stages as a result of factors including:

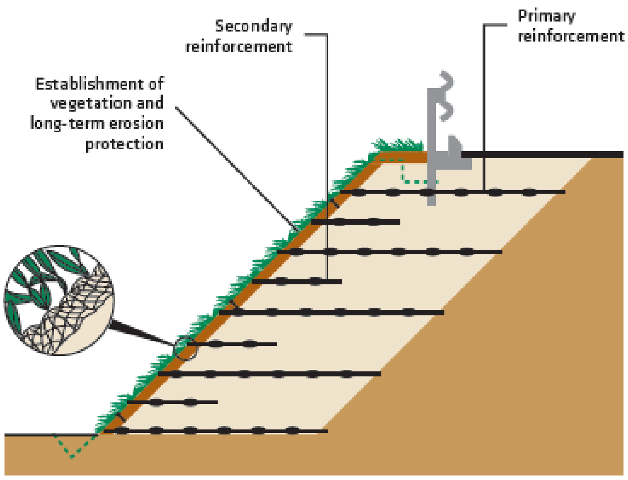
- Design Development;
- Contractor input and programming; and,
- Findings of site conditions during the works hitherto unknown.

Tensar Geogrid for 45° batters is proposed

Areas requiring geogrid slope stabilisation are highlighted in orange below, to the East of the site. Refer to drawing 03-0116 in Appendix A for further details.

Construction Sequencing for Slope Stabilisation

1. Overcut to the reptile exclusion fence down to soil profile required by specialist geogrid supplier/ designer (CPD element). e.g. TensarTech Natural Green Retained Slope solution for slopes up to 45 degrees.
2. Install geogrid mesh in layers (circa 500-750 mm subject to specialist design)
3. Backfill/ construct slope in layers. New concrete retaining wall will be constructed on the eastern building line.



A composite erosion control mat at the surface helps establish and maintain a vegetative cover.

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4. Basement Impact Assessment

From the results of the Ground Movement Elastic Displacement analyses have indicated that in both the short-term and long-term (once building loads are applied) net movements beyond the site boundary will be negligible.

For cumulative ground movements associated with the development resultant horizontal strains and deflection ratios are very small / negligible and are unlikely to be damaging to the identified features.

The analysis undertaken to assess permanent slope stability of the proposed new slopes in the eastern part of the site has revealed that in the long term condition the proposed slope angles are acceptable.

Further discussion of the potential impacts of the proposed basement together with the proposed mitigation measures are provided below.

The proposed eastern portion of the basement would potentially extend marginally below the water table surface.

Appropriate Risk Assessments and Method Statements by the contractor are required to ensure that the surrounding watercourses or drainage infrastructure are not impacted by surface water run-off during development.

The site specific factors affecting the choice of the new basement enclosure construction are:

i. Proximity of the neighbouring structures. Chase Mansions and South Mansions. (Low risk as beyond influence zone of 45’ angle and modifications made within existing retaining wall.)

ii. The form of construction of the neighbouring structures. (Low risk as beyond influence zone of 45’ angle and modifications made within existing retaining wall.)

iii. The sensitivity of the neighbouring structures to vibration during construction. (Low risk as beyond influence zone of 45’ angle and modifications made within existing retaining wall.)

iv. The sensitivity of the neighbouring structures to ground movement. (Low risk as beyond influence zone of 45’ angle and modifications made within existing retaining wall.)

v. Ground conditions.

vi. Ground-water levels. (The development is predicted to have a negligible impact on the groundwater or flooding.)

The construction sequence outlined in this report has been designed to mitigate the potential impacts of the proposed basement excavation on neighbouring structures taking into account these factors.

In order to reduce the potential for any movement over and above that expected, the following methods of safe practice should be considered prior to and during construction: Any temporary propping of the existing reservoir retaining walls should be installed as early as possible in the construction sequence to avoid the potential for destabilising the existing reservoir walls before support from the permanent structure is applied. Stability of cut slopes should be carefully monitored throughout the works. Vibration risk is not unusual in a project of this type within a dense built-up area, and a range of mitigation measures are available. These include the adoption of non-percussive piling techniques, based on continuous flight auger (CFA) methods; the provision of a cushion mat of rubble during demolition; timing of the works to avoid sensitive periods; and liaison with local residents.

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5. Conclusions

There are no potentially damaging vertical movements are predicted beyond the site boundary due to the proposed development. Damage associated from construction works will likely be Category 0 (negligible) as per CIRIA C580.

The risk of groundwater and surface flooding to the development itself, and also to neighbouring sites, is considered to be low.

The development is predicted to have a negligible impact on the groundwater.

The proposed development includes the modification to the existing masonry buttressed basement retaining wall with neighbouring structures beyond the site boundary.

The construction requires focus on both design and construction methods to minimise its impact on the adjacent buildings. This document demonstrates that the proposed design and construction methods will safeguard their structural integrity. Movement monitoring will be undertaken during the works, where required.

Visual inspections to determine the structural condition of neighbouring buildings have not been undertaken during the study period.

The Basement Impact Assessment has set out mitigation measures to manage the potential impacts identified. Implementation of these mitigation measures during the design and construction of the proposed basement would ensure that there would not be negative impacts on the underlying aquifer, groundwater flows, adjacent properties and the highway.

- The design of the basement construction will take into account the results of the groundwater monitoring and the potential of water ingress over the lifetime of the structure.
- The design of the temporary works would take into account the potential for water ingress and would include for control of groundwater during construction and would ensure that the stability of the adjacent public highway and neighbouring structures would be maintained at all times.
- A UXO survey should be carried out prior to site works.
- Localised underpinning of the existing internal masonry piers to allow modification to the permanent site grade levels and construction of the ground floor structure.
- Movement monitoring will be undertaken during the works, where required.

APPENDICES

A. Proposed Drawings

B. RSK Geo-environmental Geotechnical Site Assessment

C. RSK Flood Risk Assessment

D. RSK Land Stability Assessment

E. RSK SUDS Report

F. RSK Hydrogeology and Hydrology Assessment

UK and Ireland Office Locations