Independent Review
of
Basement Impact Assessment for planning application 2014/6845/P
UPDATED
at

Royal Free Hospital Pears Institute
London
NW3 2QG

for
London Borough of Camden

LBH 4302

February 2015

LBH WEMBLEY

Geotechnical & Environmental

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Foreword-Guidance Notes

GENERAL

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The observations and conclusions described in this report are based solely upon the agreed scope of work. LBH WEMBLEY Geotechnical & Environmental has not performed any observations, investigations, studies or testing not specifically set out in the agreed scope of work and cannot accept any liability for the existence of any condition, the discovery of which would require performance of services beyond the agreed scope of work.

VALIDITY

Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances shall be at the client's sole and own risk. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should therefore not be relied upon in the future and any such reliance on the report in the future shall again be at the client's own and sole risk.

THIRD PARTY INFORMATION

The report may present an opinion on the disposition, configuration and composition of soils, strata and any contamination within or near the site based upon information received from third parties. However, no liability can be accepted for any inaccuracies or omissions in that information.

1. Introduction

It is proposed to construct a new four storey hospital building on the site of an existing car park building that will include a two storey basement beneath the full footprint. The new basement levels will be similar to the existing basement levels that are cut into the hillside, but the basements will be extended laterally into the hillside in a southwards direction where they will require around 7m of excavation, and north-westwards where around 4m of excavation outside the footprint of the car park is required.

1.1 Brief

LBH WEMBLEY Geotechnical & Environmental have been commissioned to provide an Independent assessment of information submitted against the requirements of LDF policy DP27 (but also including CS5, CS14, CS15, CS17, CS18, DP23, DP24, DP25 and DP26 – as stated at paragraphs 1.5 and 1.6 of CPG4) and with reference to the procedures, processes and recommendations of the Arup Report and CPG4 2013.

1.2 Report Structure

This report commences with a description of the LDF policy requirements, and then considers and comments on the submission made and details any concerns in regards to:

1. The level of information provided (including the completeness of the submission and the technical sufficiency of the work carried out)
2. The proposed methodologies in the context of the site and the development proposals
3. The soundness of the evidence presented and the reasonableness of the assessments made.
4. The robustness of the conclusions drawn and the mitigation measures proposed in regard to:
    a. maintaining the structural stability of the building and any neighbouring properties
    b. avoiding adversely affecting drainage and run-off or causing other damage to the water environment and
    c. avoiding cumulative impacts on structural stability or the water environment in the local area

1.3 Information Provided

The information studied comprises the following:

1. BIA (Surface Water and Groundwater) by esi dated 21st October 2014, Ref: 62361R1
2. BIA (Land Stability) by Soil Consultants, dated 30th January 2015, Ref: 9679/KOG/AW
3. Site investigation by RSK, dated 22nd October 2014, Ref: 27119-01 (01)
4. Planning Statement by Savills, dated October 2014, unreferenced
5. Design and Access Statement by Hopkins Architects, dated 24th October 2014, Ref: A_RFMR_9253_C
6. Construction Management Plan by Elliott Thomas, dated 17th October 2014, unreferenced
7. Arboricultural Report by Arbtech, dated 17th October 2014, unreferenced
8. Arboricultural Impact Assessment drawing by Arbtech, dated October 2014, Ref: Arbtech AIA 03
9. FRA by esi, dated 14th October 2014, Ref: 62361.01.00R1

10. Heritage appraisal by KMHeritage, dated 15th October 2014, Ref: 1548.6.1
11. Drawing of Existing Trees to be Removed and Retained by BDP, dated 27th October 2014, Ref: (91)LP001 Rev A
12. Tree Protection Plan drawing by Arbtech, dated October 2014, Ref: Arbtech TPP 03
13. Existing Drawings by Hopkins Architects dated 23rd May 2014 Site Location Plan Ref: A_RFMR_0000 RevC, Topographical Survey Ref: 0001 RevC, Level 00 Ref: 0002 RevB, Level 01 Ref:0003 RevB, West Elevation Ref: 0004 Rev B, North Elevation Ref: 0005 RevB, South Elevation Ref: 0006 RevB, Existing Site Sections Refs: 0007 RevB and 0008 RevB East Elevation dated 27th October 2014 Ref: 0009 RevA
14. Site Demolition Plan by Hopkins Architects dated 27th October 2014, Drawing Ref A_RFMR_0050 RevA
15. Proposed Drawings by Hopkins Architects dated 3rd October 2014, Level 00 Ref: A_RFMR_2000 RevE, Level 01 Ref: 2001 RevE, Level 02 Ref: 2002 RevE, Level 03 Ref: 2003 RevC, Level 04 Ref: 2004 RevC
16. Proposed Sections by Hopkins Architects dated 3rd October 2014, Section AA Ref A_RFMR_2200 Ref B, BB Ref: 2201 RevB , CC Ref: 2202 RevB and DD Ref, 2203 RevB
17. Landscaping Masterplan Drawing by BDP, dated 23rd May 2014, ref: (91)LP002 Rev A
18. Letter from BDP to LBH WEMBLEY dated 27th January, ref P2005878 including seven appendices as follows.
19. Appendix 1: excerpt from Employer's Requirements Doc No SPC(20)S101 Rev 1, sub-structure permanent works
20. Appendix 2: excerpt from Employer's Requirements Doc No SPC(20)S101 Rev 1, suggested methodology
21. Appendix 3: Sub-structure drawings (16)SP100 Rev E and (20)SP101 Rev H
22. Appendix 4: excerpt from Employer's Requirements Doc No SPC(20)S101 Rev 1 on ground movements and a "Note on Movements Associated with Excavation" Revision 0, January 2015 prepared by Geotechnical Consulting Group.
23. Appendix 5: excerpt from Employer's Requirements Doc No SPC(20)S101 Rev 1 outlining requirements for condition surveys and vibration surveys.
24. Appendix 6: excerpt from Employer's Requirements Doc No SPC(20)S101 Rev 1, surface water drainage strategy and drawing (52)CP100 Rev A
25. Appendix 7: CV for Alan Watson of Soil Consultants.

2. Policy DP27 – Basements and Lightwells

The CPG4 Planning Guidance on Basements and Lightwells refers primarily to Planning Policy DP27 on Basements and Lightwells.

The DP27 Policy reads as follows:

In determining proposals for basement and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability, where appropriate. The Council will only permit basement and other underground development that does not cause harm to the built and natural environment and local amenity and does not result in flooding or ground instability. We will require developers to demonstrate by methodologies appropriate to the site that schemes:

a) maintain the structural stability of the building and neighbouring properties;
b) avoid adversely affecting drainage and run-off or causing other damage to the water environment;
c) avoid cumulative impacts upon structural stability or the water environment in the local area;

and we will consider whether schemes:

d) harm the amenity of neighbours;
e) lead to the loss of open space or trees of townscape or amenity value;
f) provide satisfactory landscaping, including adequate soil depth;
g) harm the appearance or setting of the property or the established character of the surrounding area; and
h) protect important archaeological remains.

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding. In determining applications for lightwells, the Council will consider whether:

i) the architectural character of the building is protected;
j) the character and appearance of the surrounding area is harmed; and
k) the development results in the loss of more than 50% of the front garden or amenity area.

In addition to DP27, the CPG4 Guidance on Basements and Lightwells also supports the following Local Development Framework policies:

Core Strategies:

- CS5 Managing the impact of growth and development
- CS14 Promoting high quality places and conserving our heritage
- CS15 Protecting and improving our parks and open spaces & encouraging biodiversity
- CS17 Making Camden a safer place
- CS18 Dealing with our waste and encouraging recycling

Development Policies:

- DP23 Water
- DP24 Securing high quality design
- DP25 Conserving Camden's heritage
- DP26 Managing the impact of development on occupiers and neighbours

This report makes some specific further reference to these policies but relies essentially upon the technical guidance provided by the Council in November 2010 to assist developers to ensure that they are meeting the requirements of DP27, which is known as the Camden Geological, Hydrogeological and Hydrological Study, Guidance for Subterranean Development (CGHHS), and was prepared by Arup.

3. Assessment of Adequacy of Information Provided

3.1 Basement Impact Assessment Stages

The methodology described for assessing the impact of a proposed basement with regard to the matters described in DP27 takes the form of a staged approach.

3.1.1 Stage 1: Screening

Screening uses checklists to identify whether there are matters of concern (with regard to hydrogeology, hydrology or ground stability) which should be investigated using a BIA (Section 6.2 and Appendix E of the CGHSS) and is the process for determining whether or not a BIA is required. There are three checklists as follows:

- subterranean (groundwater) flow
- slope stability
- surface flow and flooding

3.1.1.1 Subterranean (Groundwater) Flow

A screening checklist for the impact of the proposed basement on groundwater is included in Document 1.

This identifies the following potential issues of concern:

- **The proposed basement will extend beneath the water table surface.**
- **The proposed development will result in a change in the area of hard-surfaced/paved areas.**

3.1.1.2 Slope Stability

A screening checklist for the impact of the proposed basement on land stability is included in Document 2.

This identifies the following potential issues of concern:

- **London Clay is the shallowest strata at the site.**
- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**
- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**
- **The site is within an area of previously worked ground.**
- **The proposed basement will extend beneath the water table such that dewatering may be required during construction.**
- **The site is within 5m of a highway or pedestrian right of way.**
- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**

3.1.1.3 Surface Flow and Flooding

A screening checklist for the impact of the proposed basement on surface water flow and flooding is included in Document 1.

This identifies the following potential issue of concern:

- **The proposed basement development will result in a change in the proportion of hard-surfaced/paved areas.**

3.1.2 Stage 2: Scoping

Where the checklist is answered with a "yes" or "unknown" to any of the questions posed in the flowcharts, these matters are carried forward to the scoping stage of the BIA process.

The scoping produces a statement which defines further the matters of concern identified in the screening stage. This defining should be in terms of ground processes, in order that a site specific BIA can be designed and executed (Section 6.3 of the CGHSS).

Checklists have been provided in the BIA and there is a scoping stage described in the BIA.

The issues identified from the checklists as being of concern have been assigned bold text in the previous sections and are as follows:

- **The proposed basement will extend beneath the water table surface.**
  The guidance advises that dewatering can cause ground settlement. The zone of settlement will extend for the dewatering zone, and thus could extend beyond a site boundary and affect neighbouring structures. Conversely, an increase in water levels can have a detrimental effect on stability. The groundwater flow regime may be altered by the proposed basement. Changes in flow regime could potentially cause the groundwater level within the zone encompassed by the new flow route to increase or decrease locally. For existing nearby structures then the degree of dampness or seepage may potentially increase as a result of changes in groundwater level.

- **The proposed development will result in a change in the area of hard-surfaced/paved areas.**
  The guidance advises that a change in the in proportion of hard surfaced or paved areas of a property will affect the way in which rainfall and surface water are transmitted away from a property. This includes changes to the surface water received by the underlying aquifers, adjacent properties and nearby watercourses. Changes could result in decreased flow, which may affect ecosystems or reduce amenity, or increased flow which may additionally increase the risk of flooding. The sealing off of the ground surface by pavements and buildings to rainfall will result in decreased recharge to the underlying ground. In areas underlain by an aquifer, this may impact upon the groundwater flow or levels. In areas of non-aquifer (i.e. on the London Clay), this may mean changes in the degree of wetness which in turn may affect stability.

- **London Clay is the shallowest strata at the site.**
  The guidance advises that of the at-surface soil strata present in LB Camden, the London Clay is the most prone to seasonal shrink-swell (subsidence and heave).

- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**
  The guidance advises that the soil moisture deficit associated with felled tree will gradually recover. In high plasticity clay soils (such as London Clay) this will lead to gradual swelling of the ground until it reaches a new value. This may reduce the soil strength which could affect the slope stability. Additionally the binding effect of tree roots can have a beneficial effect on stability and the loss of a tree may cause loss of stability.

- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**
  The guidance advises that there are multiple potential impacts depending on the specific setting of the basement development. For example, in terraced properties, the implications of a deepened basement/foundation system on neighbouring properties should be considered.

- **The site is within an area of previously worked ground.**
  The guidance advises that previously worked ground may be less homogenous than natural strata, and may include relatively uncontrolled backfill zones.

- **The site is within 5m of a highway or pedestrian right of way.**
  The guidance advises that excavation for a basement may result in damage to the road, pathway or any underground services buried in trenches beneath the road or pathway.

- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**
  The guidance advises that excavation for a basement may result in structural damage to neighbouring properties if there is a significant differential depth between adjacent foundations.

3.1.3 Stage 3: Site Investigation and Study

Site investigation and study is undertaken to establish the baseline conditions. This can be done by utilising existing information and/or by collecting new information (Section 6.4 of the CGHSS).

The site investigation submitted comprised a total of thirteen boreholes to depths of up to 40m and three trial pits to expose existing foundations. Standpipes were installed at three locations for water monitoring purposes and monitoring was undertaken on four occasions.

3.1.4 Stage 4: Impact Assessment

Impact assessment is undertaken to determine the impact of the proposed basement on the baseline conditions, taking into account any mitigation measures proposed (Section 6.5 of the CGHSS).

The submitted Documents 1 and 2 include an Impact Assessment stages and the following comments are made.

- **The proposed basement will extend beneath the water table surface.**

Document 1 states *"Groundwater was recorded during the site investigation in BH3 and BH5 respectively to the north east and south west of the Site. The water level in BH5 rose above Level 00 of the proposed basement in October 2014 (73.86 mAOD); however it is believed that this was localised and associated with fractures and sandy lenses within the Clay matrix.*

No water was recorded in BH4, which supports the statement that a consistent water table is not present beneath the Site.
The overall risk from the proposed development is considered to be low, based on the absence of a groundwater table beneath the Site."

"It can be confirmed that the development will not have an impact on groundwater flows or groundwater levels"

- **The proposed development will result in a change in the area of hard-surfaced/paved areas.**

Document 1 states *"The proposed development will alter the area of hard standing at the site however this will not have an impact on the volume of run-off generated by the site as the permeable areas are underlain by impermeable surfaces that direct the run-off into the local sewer. It is therefore unlikely there will be any impact to surface water flows in the surrounding area.*
There is unlikely to be any impact to flood risk in the local area."

"Precautions should be taken against sewer flooding at this location; however it is expected that mitigation measures implemented during the development will mean that the discharge to the sewer post development will be less than pre-development, reducing the impact on the sewer system".

- **London Clay is the shallowest strata at the site.**
- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**

Document 2 states *"The London Clay is generally classified as a soil with a high shrinkage/volume change potential."*

- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**

Document 3 recommends that the new development should be designed to NHBC Standards with regards to trees.

- **The site is within an area of previously worked ground.**

Document 2 states *"ground investigation boreholes have identified Made ground ranging in thickness of between 0.9m and 7.0m, which is indicative of infilled ground immediately behind the existing basement retaining wall."*

- **The site is within 5m of a highway or pedestrian right of way.**

Document 2 states *"…the proposed basement extension will abut against Rowland Hill Street. This means that there will be a new excavation within influencing distance of any footpaths along this road which should be considered during the design of future intrusive ground investigation and during design and construction of the basement structure."*

"The construction methodology must be carefully considered to ensure that adequate support is maintained at all times to avoid significant ground movements."

- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**

Document 2 states *"If there is a differential depth between the proposed foundations of the new and existing basement sections [Question 13] then the design and construction of new basement retaining walls and foundations must be carefully considered to ensure that adequate support is maintained at all times to avoid significant ground movements."*

Document 2 concludes *"the risk to ground stability from this development should be LOW. This is on the condition that the works are undertaken by reputable experienced specialists and the temporary and permanent works are adequately designed and implemented with due consideration to the geology and hydrogeology of the site and surrounding areas. Ground movements should thus be kept within normal tolerable limits. "*

3.2 The Audit Process

The audit process is based on reviewing the BIA against the criteria set out in Section 6 of the CGHSS and requires consideration of specific issues:

3.2.1 Qualifications / Credentials of authors

Check qualifications / credentials of author(s):

Qualifications required for assessments

Surface flow and flooding	A Hydrologist or a Civil Engineer specialising in flood risk management and surface water drainage, with either: • The "CEng" (Chartered Engineer) qualification from the Engineering Council; or a Member of the Institution of Civil Engineers ("MICE"); or • The "C.WEM" (Chartered Water and Environmental Manager) qualification from the Chartered Institution of Water and Environmental Management.
Subterranean (groundwater) flow	A Hydrogeologist with the "CGeol" (Chartered Geologist) qualification from the Geological Society of London.
Land stability	A Civil Engineer with the "CEng" (Chartered Engineer) qualification from the Engineering Council and specialising in ground engineering; or A Member of the Institution of Civil Engineers ("MICE") and a Geotechnical Specialist as defined by the Site Investigation Steering Group. With demonstrable evidence that the assessments have been made by them in conjunction with an Engineering Geologist with the "CGeol" (Chartered Geologist) qualification from the Geological Society of London.

Surface flow and flooding: The report appears to meet the requirements.

Subterranean (groundwater) flow: The report appears to meet the requirements.

Land stability: The report appears to meet the requirements.

3.2.2 BIA Scope

Check BIA scope against flowcharts (Section 6.2.2 of the CGHSS).

The BIA scope is considered appropriate.

3.2.3 Description of Works

Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?

The submission does not include a specific Construction Method Statement and a full description of works has not been provided.

The architectural drawings (Document 16) suggest that piled foundations are to be adopted, and it would appear from drawings contained within the Construction Management Plan (Document 6) that a sheet-piled wall is to be installed around part of the southern site boundary suggesting that the new building is to be formed within an open cut. However, the same document also makes reference to secant piling.

A more recent submission (Document 20) appears to show the new building to be constructed in open cut, with a short section of temporary retaining *"sheet, piles or similar"* at the southern end of the site, and with a steep (approximately 45^{o}) battered temporary slope along the western site boundary.

The two BIA submissions (Documents 1 and 2) include design considerations and conclude with general recommendations but they do not describe any specific design proposal. Neither document seems to have been able to progress to a detailed consideration of residual impacts as the adopted mitigation measures have not been concluded.

Document 23 requires the contractor and their design team to "*Complete a ground movement analysis to demonstrate acceptable impact of excavation and basement works on the church*" and to "*Engage with the St Stephen's Restoration and Preservation Trust to demonstrate that the continuing design and construction methodology will have no impact on the Church building."*

St Stephen's church, given the de facto inadequacy of its original foundations, must be regarded as an extremely sensitive structure, and the assessment of the adequacy of the proposed construction methodology and temporary works design must therefore be regarded as a material planning consideration. In the absence of definitive temporary works proposals this assessment cannot be concluded at this stage.

3.2.4 Investigation of Issues

Have the appropriate issues been investigated? This includes assessment of impacts with respect to DP27 including land stability, hydrology, hydrogeology.

The potential impacts on the hydrology and hydrogeology of the area appear to have been investigated sufficiently. However, there appears to be uncertainty whether there is any potential for the proposed works to affect the ground stability of any neighbouring structures. A conclusive statement on this is required.

Document 22 includes a report entitled 'Notes on Movements associated with Excavation' by Geotechnical Consulting Group, dated January 2015, that appears to have been commissioned in order to "*allay any concerns about the impact of the sub-structure works on the Church including the Church grounds*". It is not clear whether the Hampstead Hill School building located in St Stephen's Church Hall was included in this brief. This report considers heave movements and the potential for lateral and vertical movements associated with inward movement of the ground around retaining structures. However, given the natural slope across the site, the long history of movement to the church and the apparent indication from Document 20 of a proposed steep unsupported temporary batter to the section of excavation nearest to the church it would seem that considerations of slope stability, not included in the report, could be an important movement issue.

3.2.5 Mapping Detail

Is the scale of any included maps appropriate? That is, does the map show the whole of the relevant area of study and does it show sufficient detail?

Yes, albeit the submission would benefit from boundary sections showing more clearly the relationship between the proposed works and existing nearby structures and foundations.

3.2.6 Assessment Methodology

Have the issues been investigated using appropriate assessment methodology? (Section 7.2 of the CGHSS).

The stability assessments do not appear to include consideration of slope stability and progressive slope failure.

3.2.7 Mitigation

Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme? (Section 5 of the CGHSS)

At this stage the design of the temporary works has not been concluded and hence it is not clear exactly what mitigation methods incorporated in the scheme.

3.2.8 Monitoring

Has the need for monitoring been addressed and is the proposed monitoring sufficient and adequate? (Section 7.2.3 of the CGHSS)

Document 23 requires the contractor to undertake structural condition surveys of selected surrounding buildings at least every 12 weeks.

No detailed monitoring or contingency plan appears to have been developed as yet.

3.2.9 Residual Impacts after Mitigation

Have the residual (after mitigation) impacts been clearly identified?

At this stage the design of the temporary works has not been concluded and hence it is not clear exactly what residual impacts may be.

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

The submission does not include a specific Construction Method Statement and a full description of works has not been provided. There is insufficient information contained within the submission to conclude exactly what construction methodologies are intended.

Document 18 states that "*The construction methodology will be developed by the contractor during the next stage of design."*

4.2 Soundness of Evidence Presented

Although what evidence has been presented appears in itself to be reasonably sound, the submission would benefit from more evidence regarding the relationship between the proposed works and neighbouring structures and foundations.

Document 1 states that "*The proposed development will alter the area of hard standing at the site however this will not have an impact on the volume of run-off generated by the site as the permeable areas are underlain by impermeable surfaces that direct the run-off into the local sewer".*

The FRA (Document 9) appears to describe a large area of permeable ground in the south of the site that is to be lost. It is not clear how this area is currently drained to the sewer as described, for the site investigation boreholes (Document 3) do not seem to have encountered these impermeable surfaces.

Document 1 also states that *"it is expected that mitigation measures implemented during the development will mean that the discharge to the sewer post development will be less than pre-development".* The FRA (Document 9) suggests that a 50% reduction in the predicted existing peak surface water discharge rate is to be achieved by means of vortex flow control. However, it is noted that this existing rate may have been overestimated on the basis of an assumption that 100% of the existing site is hardstanding, leading to an apparent approximate 15% underestimate of the volume to be managed and (in Document 24) to an apparent approximate 25% overestimate of the allowable flow rate. The assertion made in Document 18 that the whole existing site has not been classed as impermeable for the purposes of calculation is questioned and further clarification is required.

4.3 Reasonableness of Assessments

The assessment of ground movement does not appear to have addressed the possibility of slope stability issues during the excavation.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

The conclusions made regarding potential impacts appear robust. However it is not clear exactly what mitigation methods are to be incorporated in the design of the works. Document 18 states that *"Temporary works information will be prepared by the contractor in the next stage. The Employer's Requirements set out clearly the need for the contractor to mitigate any impact on neighbouring buildings. The contractor will therefore develop the temporary works within the technical parameters set out in the Employer's Requirements document."*

5. Conclusions

It was considered that the initial submission did largely reflect the processes and procedures set out in DP27 and CPG4 but that in the absence of a definitive construction methodology and sequence the assessment could not be regarded as complete.

Additional information has been provided and it is clear that the temporary works design has not yet been concluded and that this is intended to be left to the contractor at a later stage.

At present therefore, while assurances are provided that the completed scheme will address the issues that have been raised, the present submission unfortunately does not demonstrate sufficient detail and certainty to ensure accordance with DP27 in respect of

a. Maintaining the structural stability of any neighbouring structures

b. Avoiding adverse impact on drainage and run-off or causing other damage to the water environment

c. Avoiding cumulative impacts on structural stability or the water environment.

Given the undoubted standing of the professional team involved in the application, the council may be minded in this case to rely upon the assurances provided and to allow for the outstanding issues to be addressed by way of condition.

If so, such a condition might read:

"**Prior to the commencement of any works, the applicant is to submit and obtain written approval of**

1. **Ground movement analyses, including considerations of slope stability, to demonstrate acceptable impacts of excavation and basement works on the church and school.**

2. **A detailed construction methodology and sequence demonstrating how the stability of the surrounding buildings and ground is to be ensured at all stages of the works.**

3. **A detailed structural monitoring and contingency plan.**

4. **Surface water drainage calculations indicating how the risk of sewer flooding is to be mitigated."**