

Former Highgate Chapel Retaining Wall

Structural Engineer's Report to Support Listed Building Consent

1.0 Introduction

The design team of Cobb & Company and Donald Insall Associates were provided with an engineering report on the Former Highgate Chapel Retaining Wall by Structures Group (SG Report) dated 10th June 2021 by Subashi Amendra. The SG report's aim was to provide suggestions for repair to "extend the life" of the wall and improve safety in the short/medium term. Donald Insall Associates and Cobb & Company inspected the site in July and November 2022.

This note is intended as a record of decision making as the work has progressed and to provide information on the approach to repairs to support a Listed Building Consent application.

The historic development and significance of the wall is detailed in Donald Insall's Heritage Statement dated November 2022, and for brevity the details will not be repeated here.

2.0 Design Brief Summary of Team Brief: SG Report Recommendations

The team were provided with the SG Report which provided a summary brief for the repair of the wall to include (pp6):

"Recommendations to extend the lifespan of the wall are as follows:

- 1. Pollarding the trees and maintain the height which may need consent from the council.*
- 2. Repair damaged and spalled brickwork by re-stitching and repointing to suit existing. The wall face to be repaired by 'stitching in' bricks. Always use bricks and mortar that are compatible in strength, colour, size, and durability with the existing wall, and maintain existing bond patterns. Many old walls are built with bricks to old size standards, and it may be difficult to find supplies, particularly in small quantities. It is worth trying architectural salvage companies for reclaimed bricks.*
- 3. Repair or replace damaged or moved coping stones to suit existing.*
- 4. The brick wall can be temporarily strengthened by introducing masonry reinforcement in bed joints from the path side to strengthen it at the cracked points.*
- 5. Weep holes should be drilled to prevent a build-up of hydrostatic pressure, these are normally 50mm in diameter at 1m centres.*
- 6. Remove vegetation from the masonry."*

The report also acknowledges that a full repair scope is not necessarily possible:

"Our recommendations for repair or strengthening works are restricted due to:

- i. This wall falls under grade 11 listed structure.*
- ii. The presence of the graves and the contractual issues relating to the ground's maintenance."*

3.0 Development of Design Brief

Following a site visit by Cobb & Company and Donald Insall Associates in July 2022 and a Teams meeting in October 2022, a modified repair brief was agreed to provide additional detail on several areas:

- There may be many graves (not just headstones) immediately adjacent to the wall which significantly restricts the type of repairs which can be carried out if graves are to be undisturbed.
- Large tree roots have pushed bricks out of the wall in at least two locations. This damage has not been caused by spalling as stated in the SG Report. It is likely that the wall is riddled with live tree roots, which will grow and cause further damage/undo any future repairs.
- Bays 1 to 3 (North east corner of the site) are tall wall panels with signs of historic bulging and movement, but no recent monitoring results to indicate if movement is ongoing and/or a problem which requires repair. It is likely to be difficult to justify any intrusive works without proof/monitoring results to show that the wall is moving/unstable. If monitoring and other investigation works are not possible then trial pits would be needed to confirm wall strength and foundations, which, in turn raise the need for archaeologist/exact understanding of grave positions.
- The top parts of Bays 1 to 3 are tall and leaning, although previous repair still appears plumb. It could be that a sensible proposal is to lower the height of this section of wall to match others and introduce more railings.
- A drain from the Chapel exits through wall onto pavement at the base of Bay 2 and drainage issued behind the wall may be exacerbating problems. No drainage records had been located for the Chapel by the client.
- The railings appear contemporary to the Chapel, yet in some locations are bedded in a concrete beam affixed to a concrete coping. This will make it nearly impossible to remove and is visually obtrusive. The railing elsewhere is fixed in lead pockets, which, would be preferred detail to reinstate.
- The wall has many campaigns of repair including a particular stretch of assumed 1980s engineering bricks along the west side. The detail and longevity of this historic repair is unknown but it appears stable at present and therefore the team agreed that repair should only be carried out where defects were identified.
- From an Structural Engineering perspective if the wall wasn't listed, the recommendation would be the demolition and rebuilding of Bays 7 to 9 primarily due to the penetration of roots into the wall structure which makes repair unfeasible.
- The insertion of weep holes as suggested by the SG report would be intrusive and unattractive.

An options study was prepared by Cobb & Company and discussed at a team meeting on 29th September 2022. The client stated that re-building would not be possible due to the site constraints/archaeology and no trees would be removed at this time. It was agreed that the design brief for the repair work would have to be a moderate/pragmatic solution to minimise intervention in the historic fabric, meet the client's budget and avoid disturbing the graves. It was understood that this would reduce the possible design life of the repairs, especially if the tree roots within the wall are not adequately dealt with. Subsequently the tree officer advised Haringey that it would not be possible to drench the wall with weed killer to kill roots within the wall, without harming the trees. Haringey agreed to seek advice on an alternative root inhibitor treatment. The agreed scope of work is summarised in Section 4.

4.0 Agreed Repair Brief: Amended

The following amended moderate scope of works was agreed by the Haringey client team on 29th September (subject to agreement of principles and method statements with the tree officer):

- Pollard all trees - reducing crown and maintaining their height with regular maintenance
- Replace all spalled and failed brickwork. Leave sound pointing in place even if cementitious.
- Where bricks are missing and tree roots visible, allow for roots to be cut back and treated with a root inhibitor (specification to be confirmed by Haringey tree consultant) before stitching bricks back into the wall.
- Retain existing copings and railings in-situ. Replace copings where missing. Redecorate railings and point up cracks in the concrete copings.
- Introduce brick stitching to strengthen areas of cracked brickwork (including the tall panel of wall on the north east corner of the site).
- Remove vegetation from the masonry.
- Install movement monitoring in Bays 1 to 3 and take readings every 2 months for 18 months.

Omitted from the scope of works were the following items which may form the basis of a future package of work should the movement monitoring indicate need:

- Lower section of high wall and introduce railings
- Improve drainage along only the south and east elevations only by adding weep holes at increased centres, say 1.2m.

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