Bankfield Drive Site
Holmbridge
Holmfirth

STRUCTURAL ENGINEERS REPORT ON EXISTING BOUNDARY RETAINING WALL

21_158_SR_01

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Director
Sawyer Consulting Engineers Ltd

CONTENTS

SAWYER CONSULTING ENGINEERS

STRUCTURAL ENGINEERING CONSULTANCY

1.0 Introduction

1.1 Further to instructions received from Advant Engineers, Sawyer Consulting Engineers Ltd have carried out a Structural Engineers survey of an existing boundary retaining wall to a proposed development site at Bankfield Drive, Holmbridge, Holmfirth

1.2 The purpose of the Structural Engineers survey was to carry out a visual inspection of the boundary retaining wall, assess its structural condition and advise on remedial measures considered likely to be necessary to maintain the long term stability of the wall.

1.3 The structural inspection was carried out on 01 June 2022 by Dan Sawyer MEng CEng MIStructE on behalf of Sawyer Consulting Engineers Ltd.

1.4 Structural inspections were limited to visual inspection of readily accessible elements of structure, and no attempt was made to carry out opening up works or intrusive survey, or make special access arrangements, which were beyond the scope of our current instruction.

1.5 All visual inspections were made from Dobb Top Road, from street level with the aid of surveyors ladders where necessary.

1.6 For the purposes of reporting references to left and right are as viewing the wall from Dobb Top Road.

1.7 A selection of photographs taken during the structural inspection are included in Appendix A of this report. The photographs are not intended to provide an exhaustive record of structural defect to the wall, but are intended to supplement the text of the report.

1.8 A sketch location plan is included in Appendix B of this report, to help describe the location of the subject boundary retaining wall.

2.0 Existing Boundary Retaining Wall – Description

2.1 The existing boundary retaining wall is located to the North West boundary of the proposed development site at Bankfield Drive, Holmbridge, Holmfirth (refer to location plan sketch, Appendix B).

2.2 The subject boundary retaining wall runs parallel to and adjacent Dobb Topp Rd, separated to the carriageway by an overgrown and self vegetating soft verge strip of between approximately 1.2 and 1.6 metres wide.

2.3 The site boundary extends over a length of just over 50 metres, but the retaining wall continues well beyond the site boundary lines to both left and right. Our structural inspections were limited to the section of wall forming the boundary with the proposed development site.

2.4 Over the boundary length, the wall height varies, from a maximum of approximately 3.0 metres to a minimum of approximately 2.1 metres. Dobb Topp Rd, located to the low side of the wall, slopes upwards, from left to right; the top of wall level varies over the wall length, but there is a general tendancy for the overall height of the wall to reduce from left to right.

2.5 Ground to the proposed development site side of the wall (to the high side of the wall) generally appears to be approximately level with the top of wall. Land to the development site slopes upwards, away from the subject boundary retaining wall.

2.6 Land to the proposed development site of the wall is generally heavily vegetated immediately adjacent to the head of the subject boundary wall, with trees, bushes and hedgerow. In particular, a self seeded semi-mature oak tree is growing directly from the head of the wall *(Photo 4)*, positioned approximately 6 metres from the left site boundary with No. 4 Bankfield Drive.

2.7 The boundary retaining wall subject of our survey is generally of drystone wall construction, built using random coursed natural stone with stone cappings. A short length (approximately 5 metres) of wall appears to have been rebuilt in the past (between approximately 8 metres and 13 metres from the left boundary); here the wall remains constructed from random coursed stonework, but joints have been cement mortared *(Photo 5).*

2.8 The thickness of the wall could not be determined through visual inspection.

2.9 The random coursed dry stone wall construction has many open joints and appears free draining. The rebuilt section of wall with closed mortared joints incorporated plastic pipe weepholes at regular centres, positioned just above ground level to the soft verge of Dobb Topp Lane.

2.10 A straight joint exists in the subject boundary retaining wall at its junction with the boundary to 4 Bankfield Drive (the boundary to the left of the subject wall) *(Photo 2)*. In contrast, at the right boundary, the wall continues, fully bonded with the stonework to the wall beyond the boundary line *(Photo 10).*

2.11 Dry stone field boundary walls are built along the left and right development site boundaries, built directly abutting the subject boundary retaining wall and extending away from the subject wall at approximately right angles *(Photo 3).*

3.0 Existing Boundary Retaining Wall – Condition

3.1 The boundary retaining wall has clear evidence of lateral, out of plane movement. The movement is evident throughout the wall length - the amount of movement varies along the wall, but is particularly evident at the interface between the rebuilt section of wall (the rebuilt section corresponding to a distance of approximately 8 metres to 13 metres from the left boundary) and the original wall *(Photo 7)*. Further lateral movement is also particularly evident in the form of outward bowing of the wall at distances of between approximately 42 metres and 49 metres from the left boundary *(Photo 9).*

3.2 The interface between original and rebuilt sections of retaining wall is poorly bonded *(Photo 6)*.

3.3 Between approximately 14 metres and 30 metres from the left boundary, the wall has a very 'open' construction, with large voids present between walling stones *(Photo 8).*

3.4 Whilst survey of the existing retaining wall beyond proposed development site boundaries was beyond the scope of our inspections, it was noted that a further rebuilt section of wall is clearly evident at approximately 25 metres from the right boundary of the subject wall *(Photo 11)*.

4.0 Discussion and Recommendations

4.1 Traditional, dry stone retaining wall construction is inherently vulnerable to lateral, out of plane movement and there is clear evidence of movement in the subject wall.

4.2 There is clear evidence of rebuilding of sections of wall that has been carried out in the past- a rebuilt section of approximately 5 metres length is evident along the length of the proposed development site, with a further rebuilt section of wall evident beyond the boundary line of the site. The rebuilt sections of wall suggest there has been local failure of the wall in the past that has required remedial action.

4.3 Whilst there does not appear to currently be significant damage caused directly by the self-seeded semi mature oak tree at the head of the wall, the presence of the tree does present future risk of causing direct physical damage from root growth. The close proximity of tree, hedge and bush planting generally at the head present further risk of physical damage to the wall - either through future root growth, or through physical damage and disturbance to the wall from any removal of the existing vegetation.

4.4 Any rebuilding of the wall immediately adjacent to Dobb Top Lane will require an Approval in Principle (AIP) to be in place with the local authority highways department. The AIP process will agree the most appropriate form of construction of any replacement wall, but is likely to comprise either reinforced or mass concrete wall construction with stone facing where necessary to match adjoining wall construction.

4.5 Any rebuilding of the wall along the boundary of the proposed development site will require care to be taken to maintain stability of adjoining sections of

ll (beyond the proposed development site boundary) and field walls running along the left and right boundaries of the site and away from the subject retaining wall. Temporary shoring and propping of adjoining sections of wall will be necessary to help provide temporary support of walls beyond the development site boundary, but it is also likely that an element of rebuilding of walls beyond the boundary lines will become necessary as part of any rebuilding works. An allowance for rebuilding an element of walling beyond the boundary lines should be made in any budget costings.

Appendix A

Photographs

Photo 1 – Boundary Retaining Wall, From Dobb Top Lane, looking from left to right.

Photo 2 – 'Straight' Joint between subject wall and continuation of wall beyond, at left boundary.

Photo 3 - Stone boundary field wall between 4 Bankfield Drive and proposed development site, adjacent head of subject retaining wall.

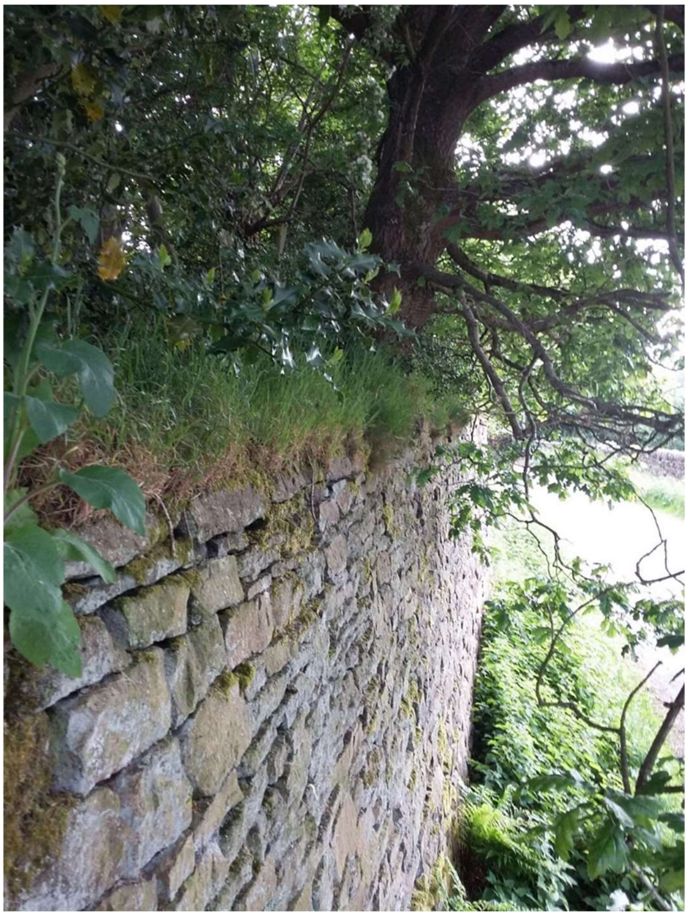

Photo 4 - Self seeded semi mature oak tree growing from head of wall.

Photo 5 - Rebuilt section of wall, cement mortar jointed (approx. 8 - 13 metres from left boundary)

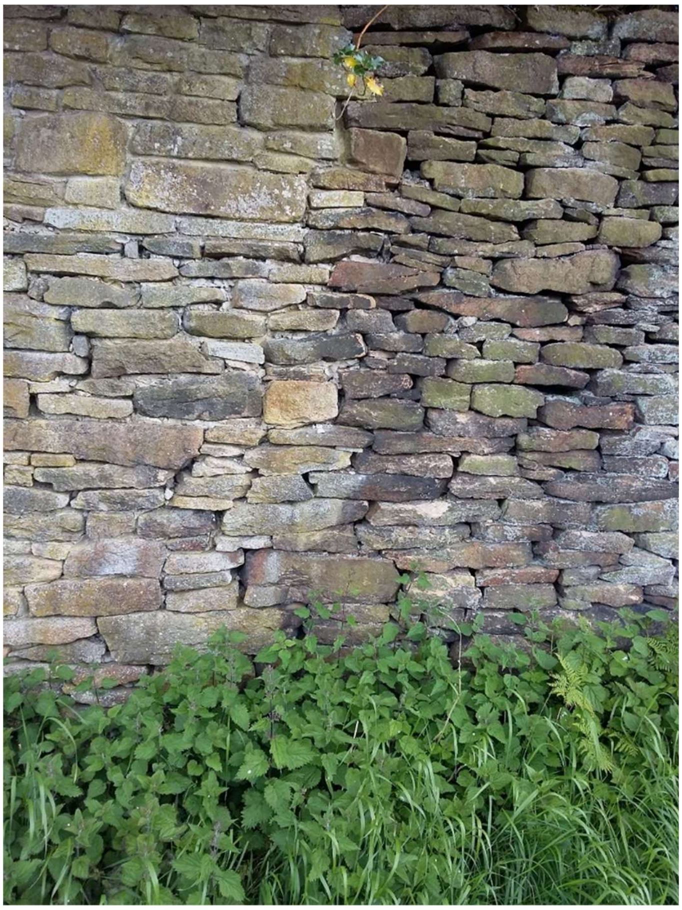

Photo 6 - Poor bonding between rebuilt section of wall and original wall.

Photo 7 - Lateral movement of wall between rebuilt section of wall and original wall.

Photo 8 - 'Open' construction of wall and presence of voids in construction.

Photo 9 - Lateral movement/bowing of wall towards right boundary (looking from right to left)

Photo 10 - Continuation of wall beyond right boundary.

Photo 11 - Wall beyond right boundary - note rebuilt section of wall (approximately 20 metres from right boundary).

Appendix B

21_158_SK001 - Sketch Location Plan