



Structural Appraisal Report

On

91 Dunford Road, Holmfirth

Commissioned by Mr Ilyas Ramjan



Report 20496-L-RP-001-R0

Date 28-04-2022

CONTENTS

- 1.0 INTRODUCTION
- 2.0 GENERAL DESCRIPTION
- 3.0 OBSERVATIONS & COMMENTS
- 4.0 PHOTOGRAPHIC EVIDENCE
- 5.0 CONCLUSIONS / RECOMMENDATIONS
- 6.0 DEFINITIONS
- 7.0 LIMITATIONS

Appendices 1 – Location Plan.

2 – Typical Cross Section.

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1.0 INTRODUCTION

- 1.1 We have received instructions from Ilyas Ramjan of Kirklees Council to survey the property at 91 Dunford Road, Holmfirth, HD9 2DU following a report of the partial collapse of a section of dry stone retaining wall at the rear of the garden.
- 1.2 Our brief is to undertake a visual inspection of the property, in the area of the reported collapse, and report on the possible reasons for the collapse together with recommendations on remedial works. We have not inspected or reported on areas of the property beyond our brief.
- 1.3 The inspection took place on Friday 22nd April 2022. The area of collapse in question was inspected and record photos were taken.
- 1.4 The location of the collapsed section is as shown on a copy of the topographical plan in the appendices.

2.0 GENERAL DESCRIPTION

- 2.1 The retaining wall in question is situated at the rear south east corner of the garden of number 91 Dunford Road, Holmfirth. The original construction of the wall is understood to be sometime in the 19th century.
- 2.2 The rear garden is terraced such that the base of the wall is on a level area approximately 5.8 metres above road level (change in level shown in photo 1).
- 2.3 The land above the wall is owned by Kirklees Council and this area slopes upwards from the top of the wall at an angle of approximately 18 degrees.
- 2.4 To the rear of the collapsed area there is a mature tree (possibly sycamore) with a girth of 3.3 metres and therefore an average diameter of 1.0 metre.
- 2.5 The collapsed length is approximately 2.0 metres and at the northern (left hand) edge of the collapsed area the wall is 1.9m tall.
- 2.6 The wall structure is dry stone and the thickness is approximately 500mm.
- 2.7 The area adjacent to the collapse is on average 225mm out of plumb over the height of the wall and is therefore itself in a potentially unstable condition.
- 2.8 We understand that the collapse occurred during the last winter after severe stormy weather.
- 2.9 The point where the wall comes back into a reasonably plumb condition is approximately 8.0 metres from the southern boundary of the property (right hand side).
- 3.0 There were no signs of any developing structural problems on the remainder of the wall within this property.
- 3.1 It can be seen on photo 4 that there is topsoil at the rear of the wall between the wall and the tree and that tree roots are present for the full height of the collapsed area.

3.0 OBSERVATIONS & COMMENTS

- 3.1 The most obvious feature of the boundary wall is that the collapsed section and the adjoining unstable section are in front of the tree.
- 3.2 The remaining wall, 8.0m away from the right hand edge, remains reasonably plumb.
- 3.3 Some basic calculations indicate that it would be difficult to prove that the existing dry stone wall was adequate for it's purpose based on modern methods and standards.
- 3.4 However the evidence on site that most of the wall is still reasonably plumb indicates that the wall has not been subject to it's maximum theoretical design loads. This situation has been in existence for approximately 150 years.
- 3.5 The collapse occurred during wet stormy weather. This would have undoubtedly have caused an increase in the loading on the wall mainly from increased ground water. However the additional load that this applied would have been applied to the whole wall but only caused the collapse on the section below the tree.
- 3.6 The difference with the majority of the wall and the collapsed section is the added pressure applied by the tree roots increasing the lean on the wall beyond the limit of stability.

4.0 PHOTOGRAPHIC EVIDENCE



Photograph 1 – Collapsed section visible at rear of garden.



Photograph 2 – Collapsed section in corner, close up.



Photograph 3 – Collapsed section showing proximity of tree.



Photograph 4 – Enlargement of collapsed section showing root growth.



Photograph 5 – Increase in lean adjacent to tree, with original line visible at left hand side of photo.

5.0 CONCLUSIONS / RECOMMENDATIONS

5.1 Conclusions

- 5.1.1 Consideration has been given to the likely causes of the collapse. While it is theoretically possible that earth pressure could be a contributing cause the evidence that the remainder of the wall remains intact indicates that this is not the principal factor.
- 5.1.2 In our opinion the collapse has been caused by the additional pressure on the wall from the roots of the adjacent tree. The additional pressure from the tree roots applied over this section only has moved the top of the wall outwards beyond the limit of stability.

5.2 Recommendations

- 5.2.1 There are two principal ways to approach remedial works.
- 5.2.2 One is to remove the tree and reinstate the retaining wall to resist earth pressure alone. This would be in line with the original and remaining structure. The second is to leave the tree in place and reinstate the wall in front of it to an enhanced state capable of resisting future growth.

5.2.3 Option 1. Remove tree first

This has the advantage of simplicity and would allow the bank where the tree currently stands to be battered back to make a safe working area for rebuilding to take place.

The disadvantages of this method is the environmental loss of a mature tree together with an increase in ground water.

These disadvantages can be offset by the planting of a new tree somewhere else on the plot and building in suitable drainage into the new wall.

5.2.3 Option 2. Leave the tree in place.

We have included in the appendix a sketch cross section of the wall in front of the tree.

The base of the wall is at the level indicated in the soils investigation for the presence of natural ground. The face of the wall and foundation is on the line of the land owned by Kirklees Council (i.e. the face of the original wall). The width of the base of 1200mm is the minimum that we would expect for the stability of a new retaining wall.

The disadvantages of this option can be seen in this cross section and include ; excavation of all of the earth and roots in front of the tree ; it will be impossible to batter back the excavation for a safe working area therefore there will be a minimal width to install temporary sheet piles as an alternative to battering back ; extensive temporary support would be required to maintain stability of tree during construction.

These disadvantages will be difficult and expensive to overcome. Within the scope of this report we have not carried out a trial design for temporary works. However we can see that even to make the area safe to carry out sheet piling will be difficult since there is also a retaining wall at the south corner of the plot where the level drops into the back garden of No. 93.

However, the most significant disadvantage that we see with this option is the stability of the tree immediately after the re-construction of the new wall. The tree roots would effectively be lost during the excavation for the new wall foundation. There would be some time lapse after re-construction before the roots re-established themselves. Within this initial period the tree would be at risk from easterly winds. If the tree collapsed during this period it would be into the rear gardens of No.s 91 and 93 Dunford Road.

5.2.4 **Summary.**

In our opinion, since it is not possible to be sure of the safety of the tree after re-construction using option 2 then we recommend that option 1 is followed. We therefore recommend that the tree should be removed prior to re-construction and that the new wall should then be constructed in line with current design loads and standards.

Signed:

David Griffiths BTech(Hons) MICE

Senior Engineer

for MASON CLARK ASSOCIATES Ltd

6.0 DEFINITIONS

6.1 General reference to the building and its surrounds are given as viewed facing the front elevation of the property.

6.2. Specific references to individual parts of the property are given as viewed directly at that part.

6.3. Where reference to cracks are made, the following classification is used:

Hairline	:	up to 0.1 mm wide
Fine	:	over 0.1 mm up to 1 mm wide
Slight	:	over 1 mm up to 5 mm wide
Moderate	:	over 5 mm up to 15 mm wide
Severe	:	over 15 mm up to 25 mm wide
Very Severe	:	over 25 mm wide

6.4. Where reference to movement is made, the following classification is used:

Slight	:	up to 10 mm/metre
Moderate	:	10 mm to 25 mm/metre
Severe	:	over 25 mm/metre

7.0 LIMITATIONS

7.1 *Our inspection and report are concerned with the structural aspects of the building such as foundations, walls and floors. We have not concerned ourselves with the condition of items such as doors, windows, and other fittings; or items such as timber infestation / decay, dampness, and testing of services to the property, unless specified in the report.*

7.2 *Sampling and testing of materials is beyond the scope of this report.*

7.3 *We have not inspected woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.*

7.4 *This report is applicable to the condition and state of the building at the time of inspection. The building may be subject to deterioration in the future and the opinions expressed in this report may need to be revised accordingly.*

7.5 *This report is limited to the property under consideration. It does not consider the effects that adjoining properties may have, unless with prior agreement, a detailed inspection of all adjoining properties can be made.*

- 7.6 *The above recommendations do not constitute a full list of works to be carried out and refer to the main areas of work associated with structural aspects of the building, based on a visual inspection only and under the limitations of our inspection*
- 7.7 *All building and construction works are covered by the requirements of the CDM regulations. Owners/Clients have legal responsibilities to engage persons and companies with appropriate level of skills knowledge and experience to ensure that the requirements of the CDM regulations are met. The works required will be covered by the CDM regulations 2015 and you should understand your obligations and act accordingly*
- 7.8 *Unless specifically mentioned no comment is made in the report as to the presence of new or old mine workings or tunneling, heavy metals, chemical, biological, electromagnetic or radioactive contamination or pollution, or radon methane or other gases, underground services or structures, springs and water courses, sink holes or the like, noise or vibratory pollution, mould, asbestos and asbestos products.*
- 7.9 *The report has been prepared for the client alone and no third party should rely on it. For the avoidance of doubt, the Contracts (Rights of Third Parties) Act 1999 shall not apply to this contract.*
- 7.10 *The inspection and report will not include any liability in respect of Advice/Design in fire safety to the structure and/or any liability whatsoever in respect of any losses (whether direct or indirect) arising from combustibility of cladding in delivery of our Services. We shall not be liable for that part of any claim which relates to loss of profits, loss of use, loss of production, loss of contract, liquidated damages or for any cost of decamping or rehousing.*
- 7.11 *This report applies to the area of a specific defect and should not be taken to include the whole of the building*

Appendices

1 – Location Plan

2 – Typical Cross Section



DUNFORD ROAD. B6106

Client	Kirklees Metropolitan Council	Surveyed By	BS	Approved By	AS	Scale	1:100 @ A1	Rev	1
Project Title	Conford Road	Drawn By	BS	Checked By	AS	Scale	1:100 @ A1	Rev	1
Drawing Title	Topographical Survey	Drawn By	BS	Checked By	AS	Scale	1:100 @ A1	Rev	1

Mantra

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Rev 1

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masonclarkassociates
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Project
91 DUNFORD ROAD, HOLMFIRTH.

Job No.
20496-L.

Calc Sheet No.
SK01.

Part of Structure
REAR BOUNDARY, RETAINING WALL.

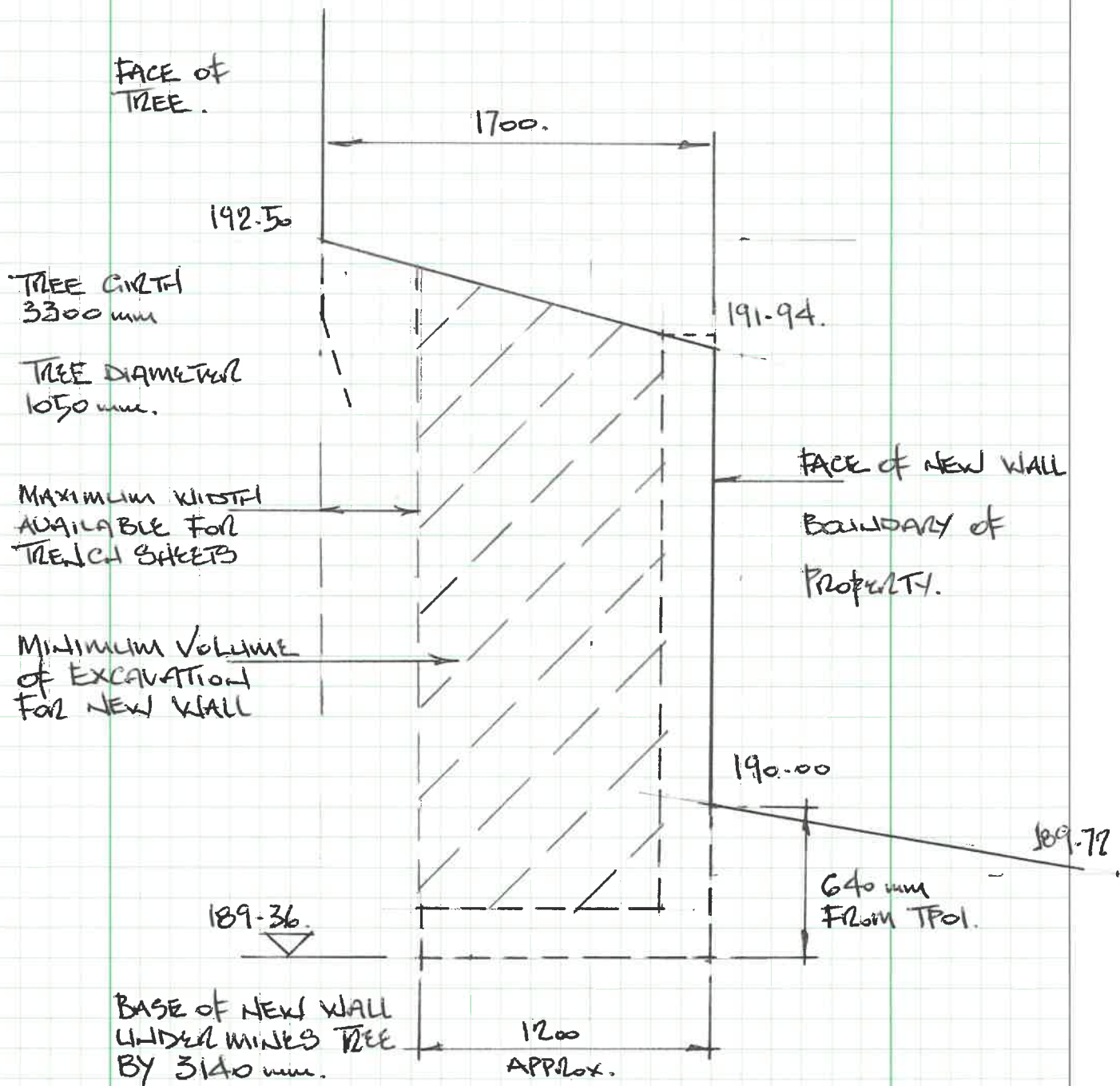
Date
25/04/2022.

Calc By
DL.

Ref

Calculations

Output



TYPICAL CROSS SECTION.

SCALE 1:25.



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Monks Cross
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01904 438005
www.masonclark.co.uk

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Section 98 and 185 Agreements

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Stormwater attenuation
SUDS
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CDM SERVICES

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Building Regulations and Planning Applications

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Modular building design
Blast design

Subsidence management and resolution
Temporary works design and specification
Site and soils investigation
Sulphate attack specialists
Confined spaces assessments

CONSERVATION ENGINEERING

Engineer Accredited in Building Conservation CARE
Registered Engineer
Heritage and conservation engineering
Listed Building refurbishment
Historic Parks and Gardens
Scheduled Ancient Monuments
Monitoring and investigations
Liaison with Local Conservation Officers
Buildings at Risk and Managed Ruins

3D LASER SCANNING AND DATA CAPTURE

Latest Generation 3D Laser Scanning
Measured Building Surveys
Topographical Surveys
Monitoring Surveys

3D modelling (Revit, CAD, Inventor, Solidworks)
M & E Modelling
Volumetric / Level analysis
Scan to BIM
Scan data cloud hosting
Hi-Def HDR photographic surveys