OUR REF: 24-065-240704-01L

COYLE KENNEDY
Consulting Engineers

English Office:
Third Floor
GW Business Centre
Great West House
Great West Road
Brentford TW8 9DF
England

Tel: +44 (0)203 393 1174
Fax: +44 (0)203 004 1234

website: www.coylekennedy.com
email: mail@coylekennedy.com

Directors:
Brian Coyle BE CEng MIEI MIStructE
Tadhg Kennedy BE MEngSc CEng MIEI MIStructE

Structural Report on Spring Walk Boundary Wall

at

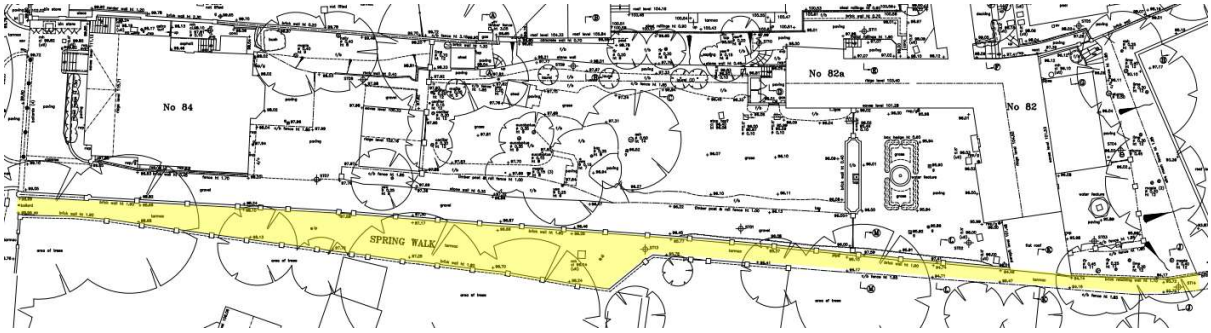
Abbey Rose,
82 Fitzjohn's Avenue,
London
NW3 6NP

July 2024

Contents

1 - Introduction

JL Construction Consultancy instructed Coyle Kennedy Consulting Engineers to carry out a structural assessment of the boundary wall along Spring Walk adjacent to 82 and 84 Fitzjohn's Avenue in Hampstead North London. The assessment is to confirm the suitably of the existing wall considering it is leaning substantially towards the lane.



Plan View of Spring Walk

Google Map View of Spring Walk

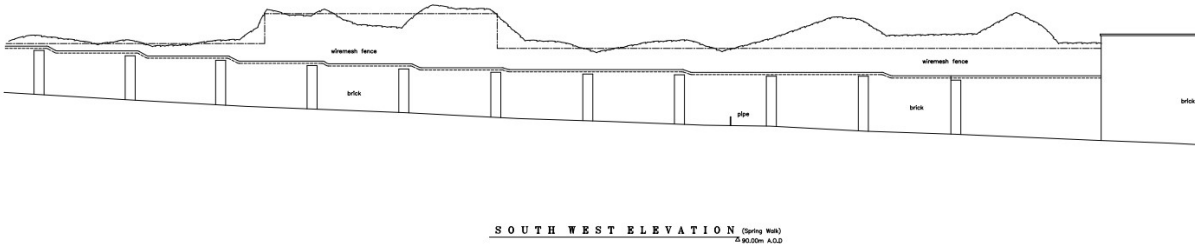
Spring Walk is a pedestrian access route which connects the western Fitzjohn's Avenue to Shepherds Walk and Pilgrim's Place to the east.

2 - Existing Condition

The boundary wall along Spring Walk consists of a solid masonry construction which is 9 inches thick with piers which vary in spacing of 4 to 5m. The top of the wall steps at approximately the same location of the piers following the fall of the route as it drops from the western to eastern end.

The average height of the wall outside Spring Walk ranges from 2.2m at the top end down to 2.6m at the bottom of the site.

Spring Walk drops a total of 4.6m from the front of 82 Fitzjohn's Avenue to the end of the boundary wall over a distance of 100m. This is a gradual fall of 2.2% on average.



Typical Elevation of Wall from Spring Walk

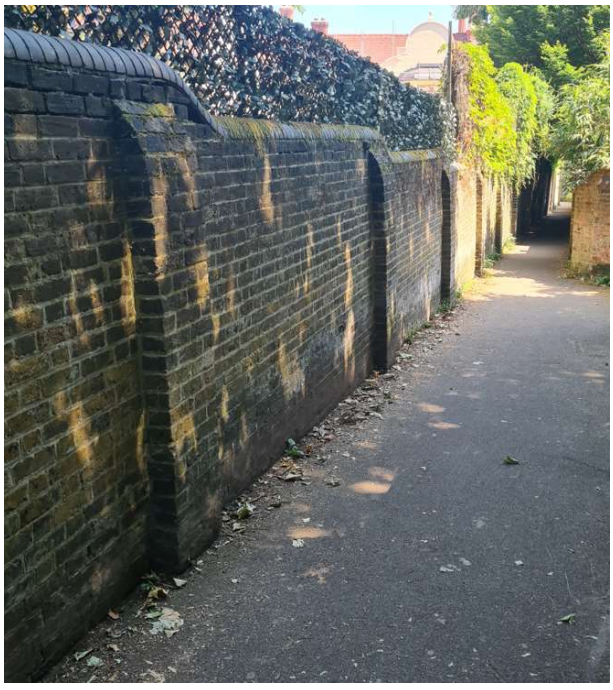
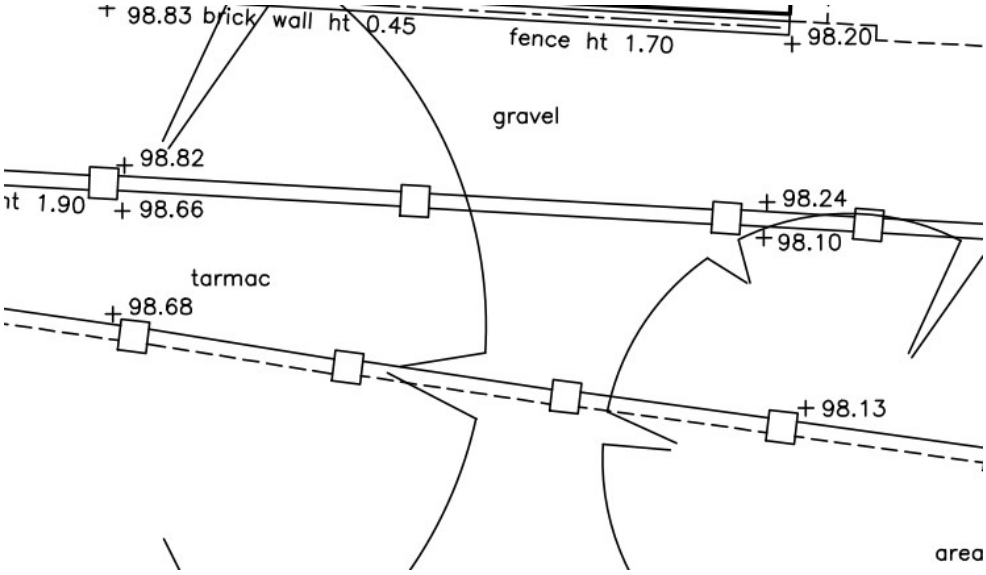


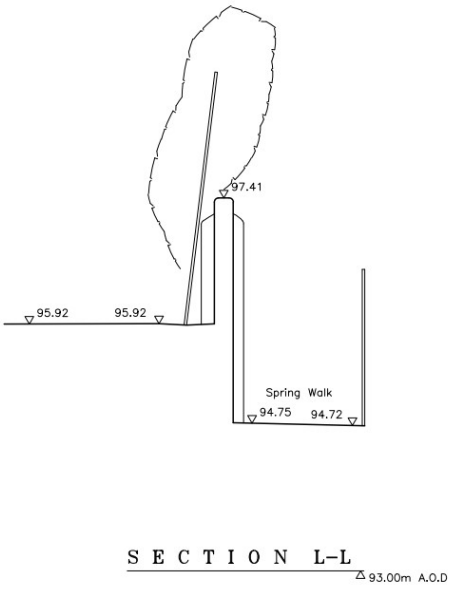
Photo of Wall along Spring Walk

Retaining Wall

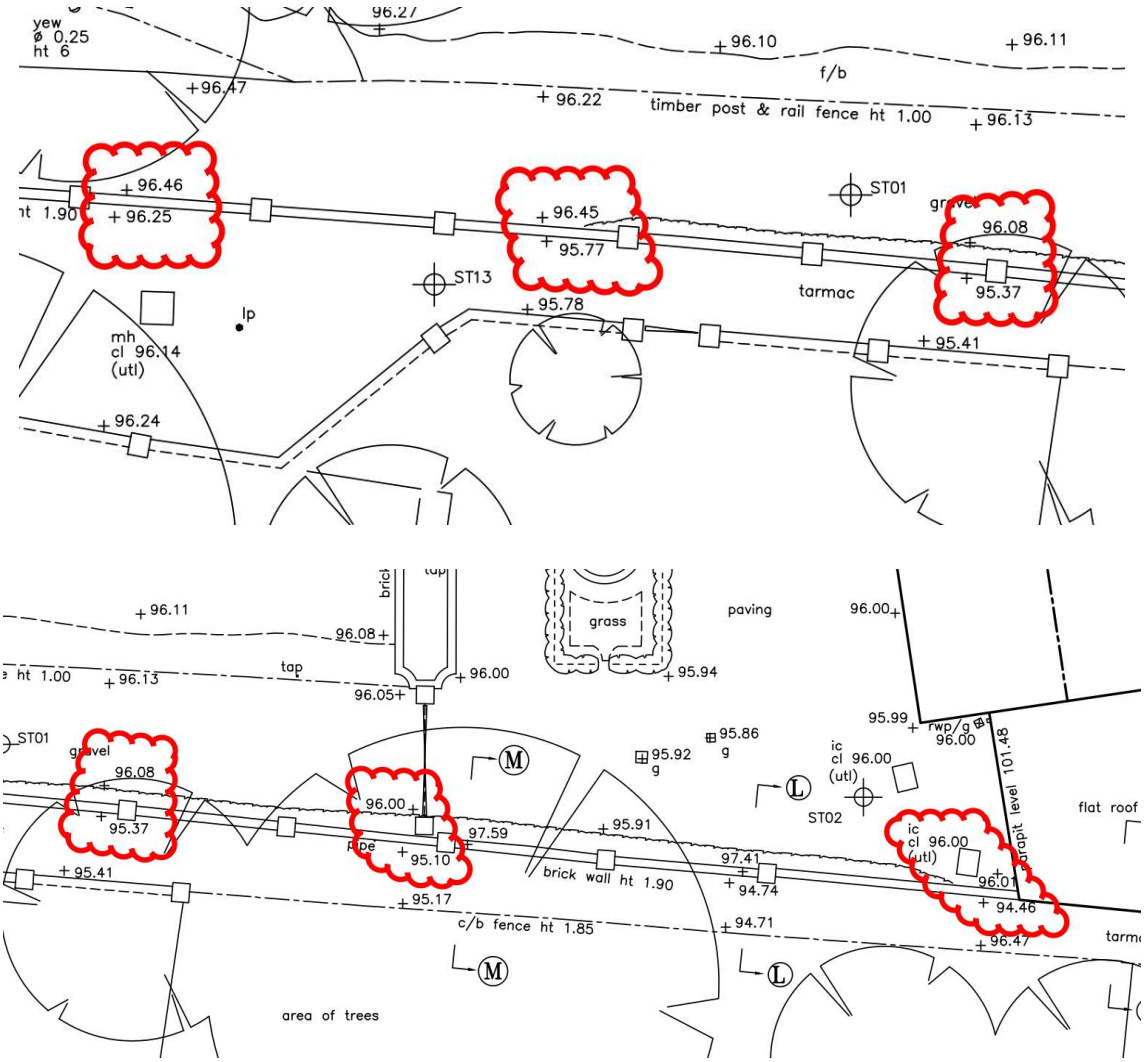
Internally within the property, the existing site levels from the survey drawing that has been provided, show the ground falling similar to the adjacent Spring Walk at the top of the site. However, the ground starts to flatten out 60m within No. 82 and 84 which begins to mark a change in height difference from the external levels out on Spring Walk. At the bottom end of the boundary wall, there is a 1.54m difference in height.



Capture of Survey showing slight difference in levels at top section of Spring Walk



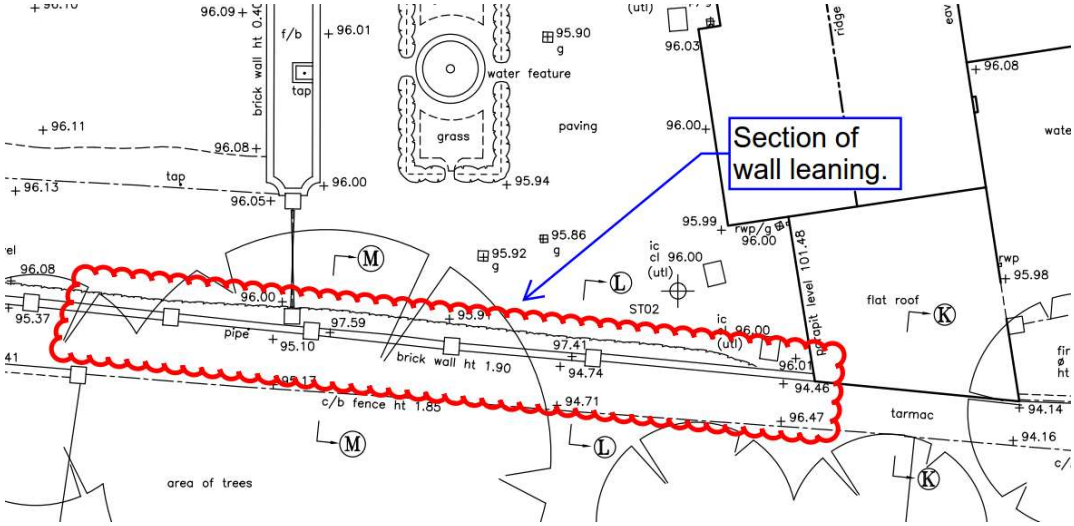
Section taken from Survey of Typical Retaining



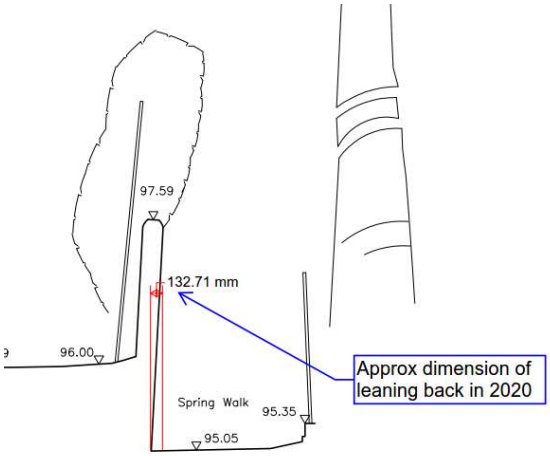
Capture of Survey showing increasing difference in levels at bottom section of Spring Walk

Evidence of Wall Leaning

From inspection of wall externally from Spring Walk it is quite evident that the wall is leaning outward for the bottom 20m along Spring Walk. A 3D survey of the wall was carried out on the 26th of June 2024 by Vessell Ltd, which shows the wall leaning a maximum of 157mm from top to bottom. A survey was also carried out back in 2020 by On Centre Surveys Ltd. which also identified the wall as leaning approximately 130mm. This is a difference of 27mm in the 4-year period for the same section of wall which confirms that the wall is constantly moving.



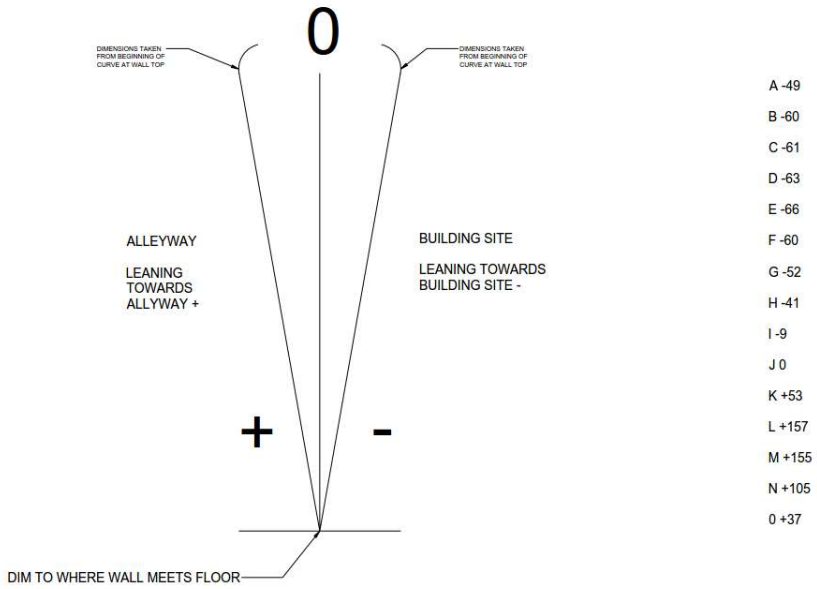
Section of Boundary Wall leaning

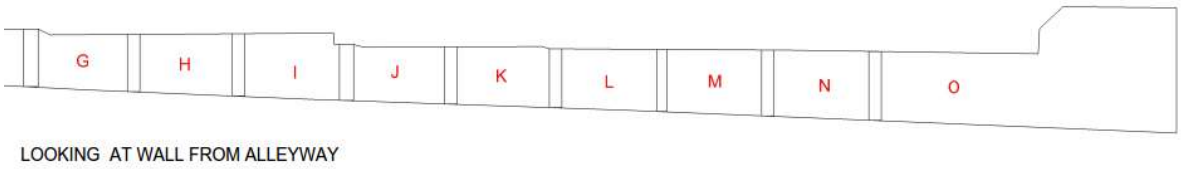


SECTION M-M

93.00m A.O.D

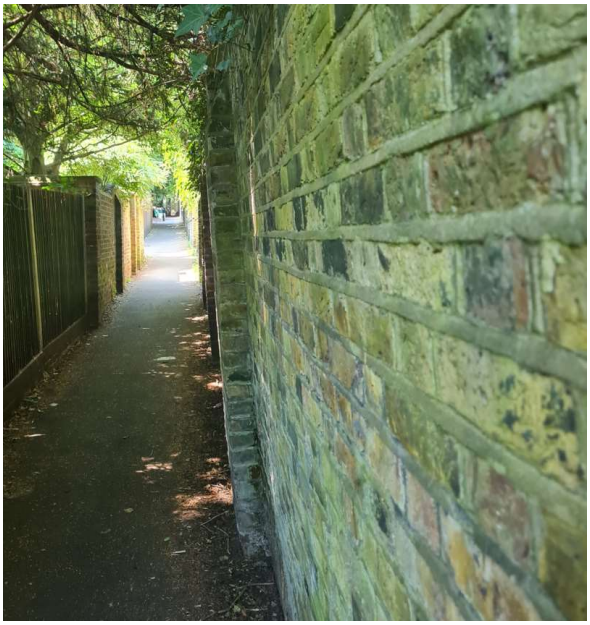
Section of Boundary Wall leaning from Survey in 2020





Extract from Survey completed in June 2024

Bay M same location as Section M-M on original survey



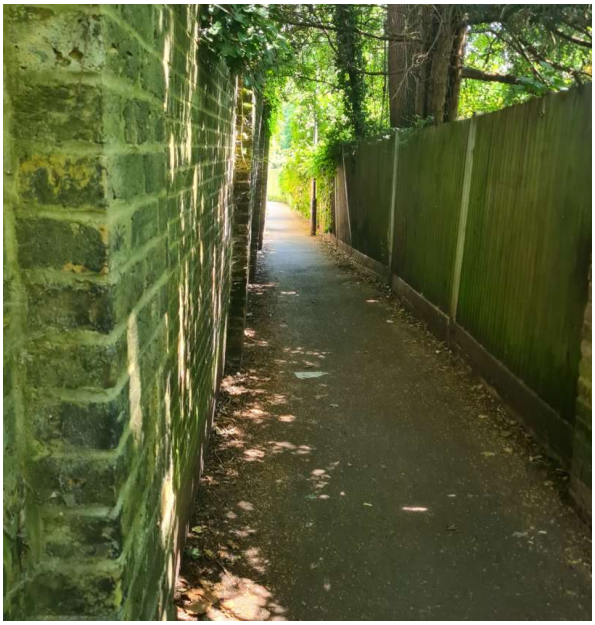
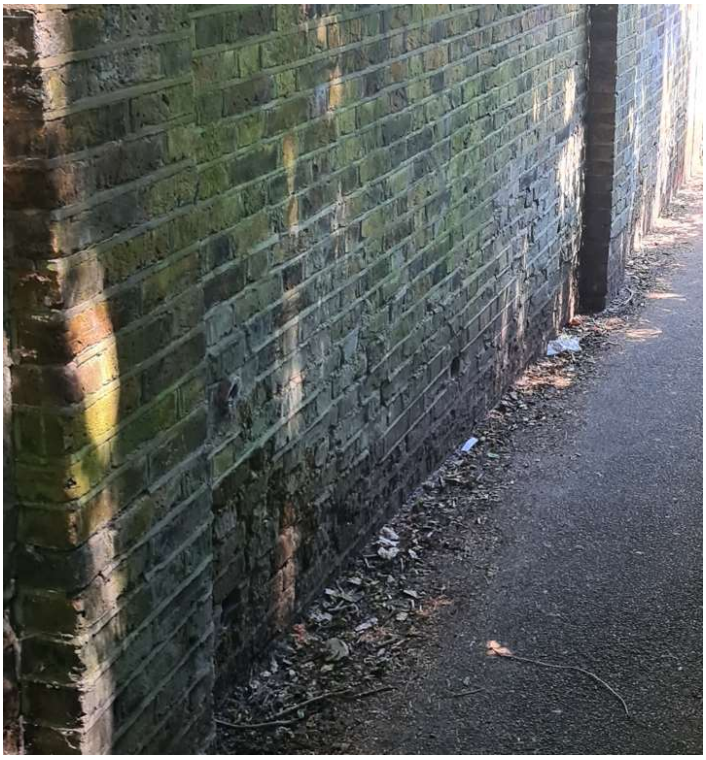


Photo Evidence of Wall leaning

Weep Holes

Weep holes in the boundary wall are visible at the bottom end of Spring Walk (where the leaning is occurring) and are placed sporadically along the wall and varying centres of roughly 2.0m. It is also evident that these weep holes have been installed post construction as they seem to have been cored through the wall. This confirms to us that these weep holes were installed as a post construction measure due to the leaning of the wall. However as per building regulation (BRE GBG 27), weep holes should be at a maximum of 1.0m centres. Therefore, any water behind the wall is not discharging sufficiently due to the lack of free draining soils.



Weep Holes

Impact of Trees

From the soil investigation report supplied by the client, which was prepared by GEA Ltd, the boreholes confirm that the area is within a London CLAY profile area. Which is common for this area of North London. The clay is a shrinkable soil type which can cause subsidence issues to surrounding structures.

GEA

Geotechnical & Environmental Associates

Project				BOREHOLE No
82 Fitzjohn's Avenue, London NW3 6NP				BH1
Job No	Date	Ground Level (m OD)	Co-Ordinates ()	
J20158	23-07-20 24-07-20	96.07	E 526,619.0 N 185,416.0	
Client		Engineer		Sheet
Harrison Shortt Structural Engineers Ltd				1 of 2

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				95.67		0.40	Dry TOPSOIL	
0.30	D1							
0.50	B2			95.07		(0.60) 1.00	MADE GROUND (Dry brown clay with bricks)	
1.00	D3						Firm brown sandy CLAY	
1.20	D4	4,4/4,3,3,3 N60 = 15						
1.75	D5							
2.00	U6	18 blows						
2.75	D7		▼					
3.00	D8	1,1/2,2,3,4 N60 = 12						
3.75	D9					(5.70)		
4.00	U10	20 blows						
4.50	D11							
5.00	D12	1,2/3,3,4,4 N60 = 16						
6.00	D13							
6.50	U14	20 blows		89.37		6.70	Stiff to very stiff grey sandy CLAY	

BARY.GLB || Date: 30 July 2020

Borehole Information

3 Capacity of Wall

On review of the soil investigation report, it can be assumed that the boundary wall is sitting on the made ground above the clay level. Trial Pit 12 was carried out at the top end of Spring Walk (see below). The edge projection of the corbelled base is only 160mm. It is assumed that this is the same profile along Spring Walk. The clay profile is assumed to be just below the foundation level.

Trial Hole along Boundary Wall

The wall in its current state has the following forces acting against it.

1. Soil
2. Full Height Water Table
3. Wind Load.
4. Surcharge (5 kN/m^2)

Soil:

With a maximum retaining height of 1.54m, the made ground against the wall will exert a pressure of 0.4(k) x 18 kN/m^3 x 1.54m = 11.1 kN/m^2.

Water:

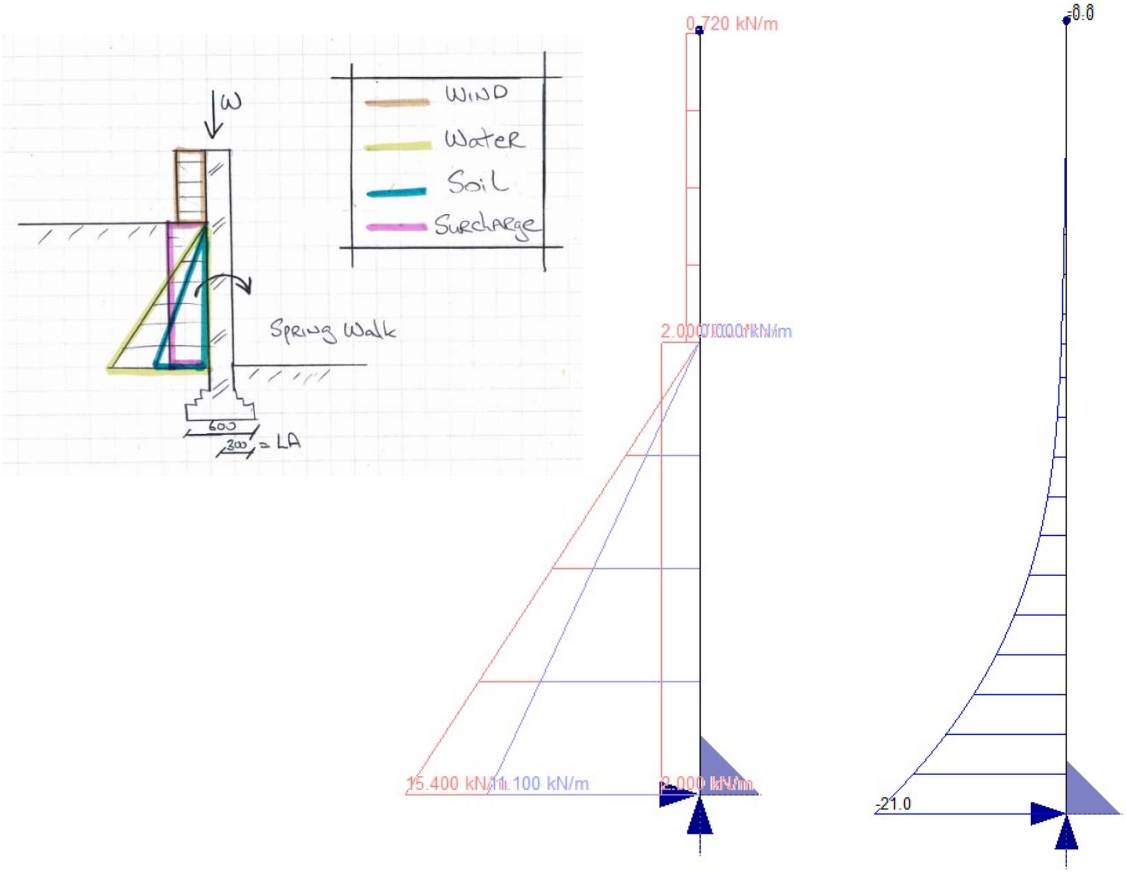
Ground water against the retaining wall will perch above the clay profile due to its impermeable state. It can be anticipated that the ground water will reach ground level. The maximum pressure against the wall will be 10 kN/m^3 x 1.54m = 15.4 kN/m^2.

Wind

Wind will act on the upstand section of wall. An assumption of 0.6kN/m^2 can be anticipated with a factor of safety of 1.2. Therefore, a maximum wind loading of 0.72kN/m^2 can be reached.

Surcharge:

0.4(k) x 5 kN/m^2 = 2.0 kN/m^2.



Maximum Overturning Moment of Wall = 21 kNm/m excluding moment from out of plumb wall.

The restoring moment of the current wall is as follows.

Self Weight of Wall (W) = 18kN/m^3 x 3.0m x 0.25m = 13.5 kN/m

Lever Arm (LA) = 0.3m

Restoring Moment = 13.5 kN/m x 0.3m = 4.05 kNm/m

Which is therefore considerably less than than the Overturning Moment

4. Conclusion

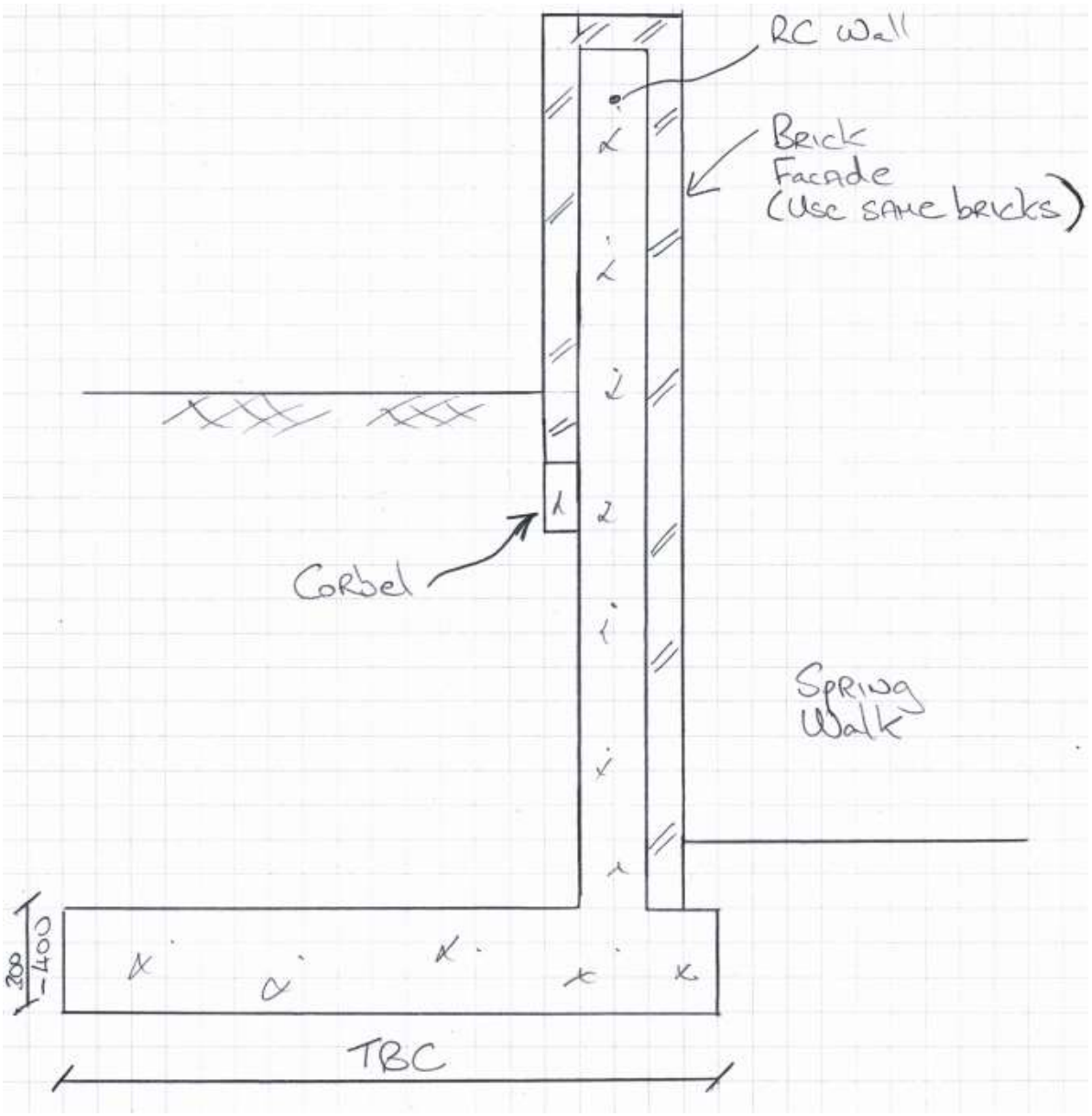
From not only a visual inspection and 3D survey of the wall, basic design claculations confirm that the boundary wall to Spring Walk is failing.

Considering the movement of the wall over the last 4 years, we would have serious concerns about the stability of this wall, which could fail without notice. There is clearly a health and safety risk to the people using Spring Walk.

5. Recommendation

It is our recommendation that this wall is demolished and replaced with a new concrete retaining wall system.

With our recommendation that the wall be demolished, we are proposing to install a new RC retaining wall to current Eurocodes standards. The external and internal face of the wall will have a brick facade which could use the existing bricks, so that the wall will still have the same finish as it currently does.



New Retaining Wall Proposal