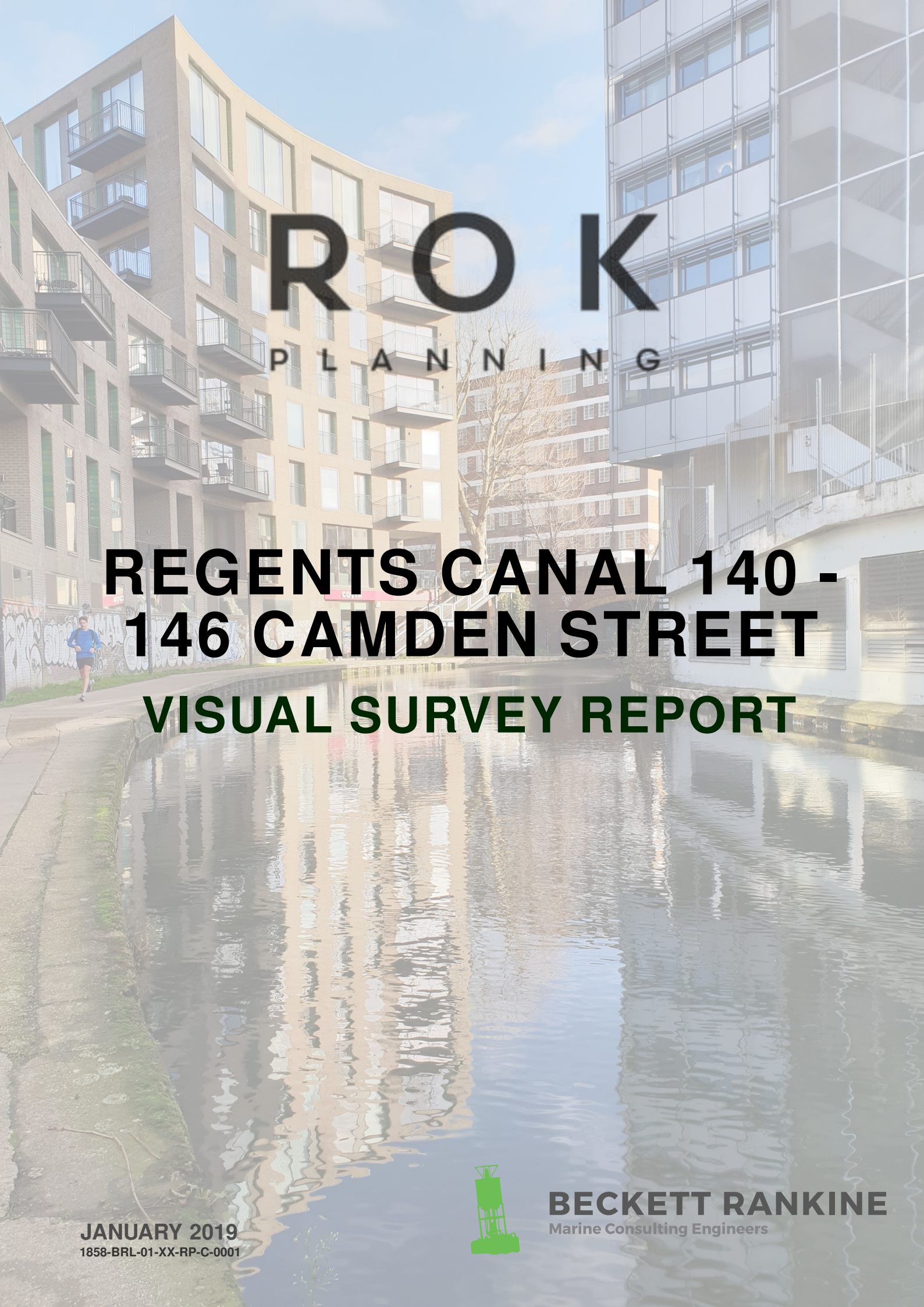

ROK PLANNING

REGENTS CANAL 140 - 146 CAMDEN STREET

VISUAL SURVEY REPORT

JANUARY 2019

1858-BRL-01-XX-RP-C-0001

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Marine Consulting Engineers

CONTROLLED DOCUMENT STATUS

CLIENT	ROK Planning Ltd
PROJECT TITLE	Regents Canal 140 - 146 Camden Street
SUBJECT	Waterway Wall Inspection
DOCUMENT TITLE	Visual Survey Report
DOCUMENT REF	1858-BRL-01-XX-RP-C-0001

REVISION RECORD

REV	STATUS	DATE	SUMMARY OF CHANGES	PREP	CHK	APP
P01	S3 – Suitable for review & comment	11/01/2019		NN	JM	ID
P02	S2 – Suitable for information	22/01/2019		NN	JM	ID
P03	S2 – Suitable for information	20/02/2019	Additional survey information of Section 4 - Concrete Covered Masonry Wall	NN	ID	ID

CONTENTS

1 INTRODUCTION

1.1 General

1.1.1 ROK Planning Ltd (ROK) is planning a new development at 140-146 Camden street, London. ROK appointed Beckett Rankine (BR) to conduct a visual survey of the waterway wall of Regents Canal on the north bank. The site consists of a publicly accessible walkway and a bridge overlapping the canal. This document details the condition of the canal wall prior to the construction of the new development.

1.1.2 The total length of the wall was measured as approximately 32m. The survey was conducted along the full height of the wall reaching the canal bed. At the time of the survey, the wall extended between approximately 25 and 50cm above the water level, depending on the location. The canal bed consists of sand, mud and debris. The location of the site is shown in Figure 1.1.

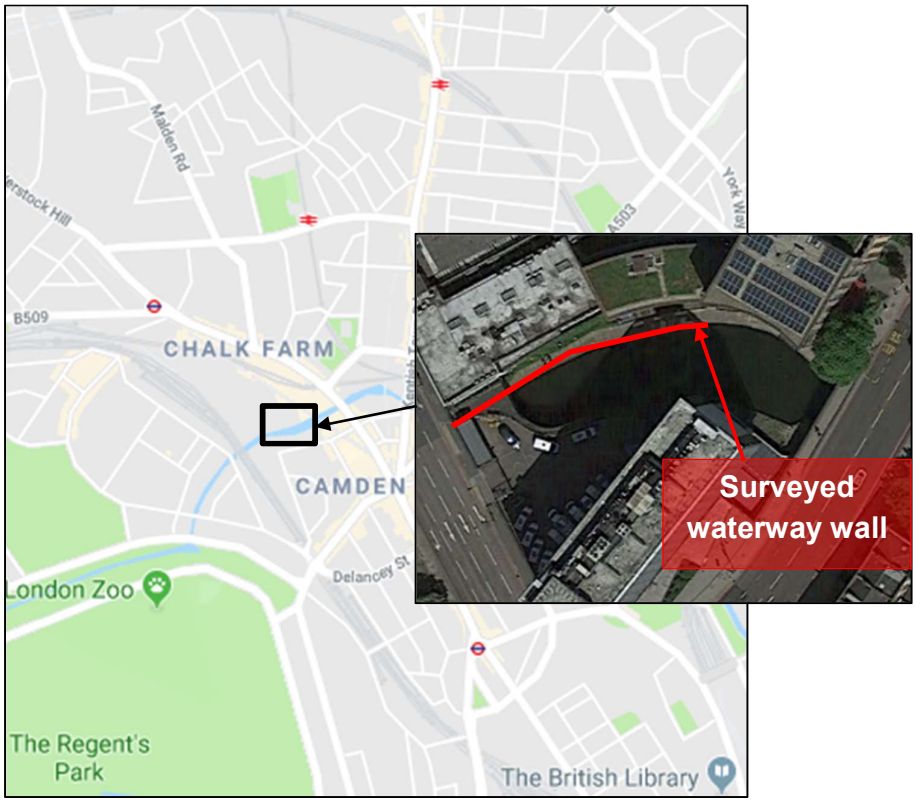


Figure 1.1: Location of site and indication of the inspected wall

2 METHOD OF SURVEY

2.1 General Comments

2.1.1 To assess the condition of the full length of the wall, two separate surveys were conducted by two BR engineers in December 2018 and February 2019. The weather at the time of both surveys was partially cloudy.

2.1.2 The surveys were carried out on foot. The condition assessment of the submerged part of the wall was conducted using surveying tools, an underwater camera and an underwater torch. The video footage was then visually examined in the office, to assess any deficiencies of the wall's surface.

2.1.3 Underwater video recordings of the wall were taken at 1m intervals, allowing for the assessment of the overall condition of the wall. The whole length of the wall was successfully assessed.

2.1.4 The surveyed wall was found to be composed of differing structural make-ups throughout its length. For the purpose of this report, the wall has been split into 4 separate sections as follows (see Figure 2.1):

- Section 1 – Sheet Pile Wall;
- Section 2 – Concrete Capping Beam on top of Masonry Blockwork Wall;
- Section 3 – Masonry Blockwork Wall;
- Section 4 – Concrete Wall.

2.1.5 The chainage datum of the wall survey is indicated in Figure 2.1 and begins 50cm before the end of the south-western side of 35 Camden road building.

2.1.6 In Appendix A, a sketch of the wall section is presented. This sketch also graphically illustrates the summary inspection findings.

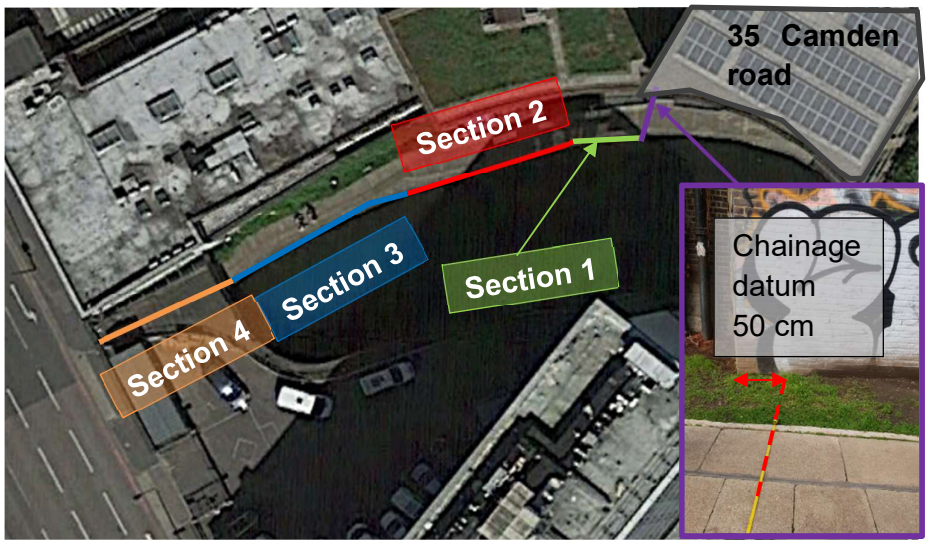


Figure 2.1: Wall Sections under consideration and Datum of Wall survey

3 SITE SURVEY

3.1 Section 1 – Sheet Pile Wall

3.1.1 Section 1 represents approximately 4m of the inspected canal wall at the eastern side of the site. As shown in Figure 3.1, the section is composed of:

- Concrete slab/capping beam cast on top of the wall;
- Steel sheet piles that extend below the canal bed.

Figure 3.1: Photograph indicating Section 1- Sheet Pile Wall above water

3.1.2 The sheet piles were observed to have light surface corrosion on the non-submerged section, while minimal marine growth could be observed throughout the submerged section. During the visual inspection of this section no evident defects were identified. The sheet piles appear to be straight with no perforation, dents or buckling of the steel observed.

3.1.3 Localised damage was observed on the concrete edge in multiple locations, as shown in Figure 3.2. It is thought to be due to local impacts from the canal faring vessels. Additionally, a crack was identified on the top surface of the capping beam. However, due to the size and direction, the damage is thought to be a result of early thermal cracking, or settlement, and is not considered to be an issue

caused by degradation or external event. . Overall the condition of the concrete slab of this section is considered fair.

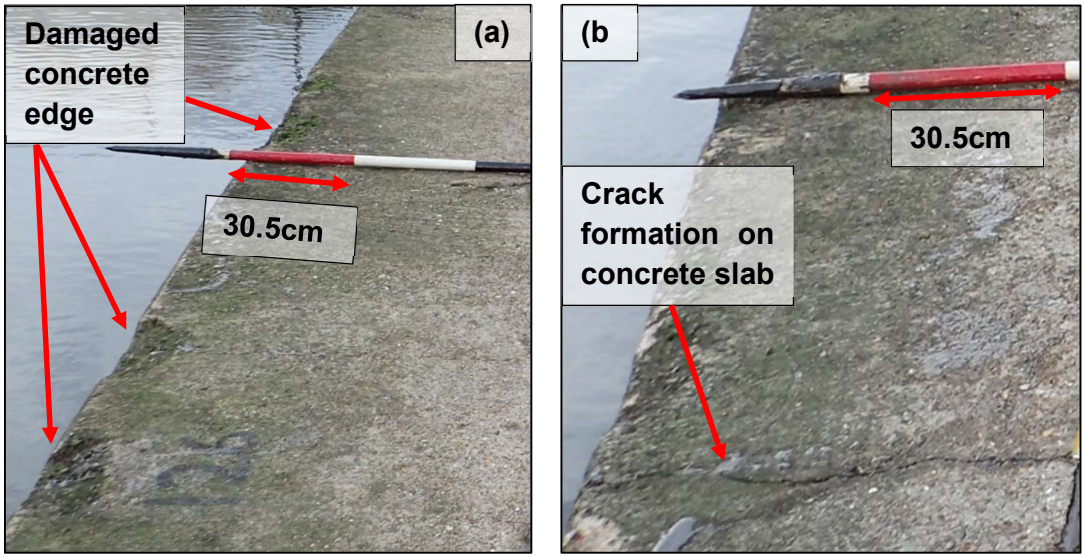


Figure 3.2: (a) Damaged edge and (b) crack of concrete slab for Section 1 - Sheet Pile Wall

3.2 Section 2 – Concrete Capping Beam on top of Masonry Blockwork Wall

3.2.1 This section, represents approximately 10m of the total surveyed wall and is located between Section 1 and Section 3, as shown in **Error! Reference source not found.**. The wall section is composed of two parts:

- Masonry blockwork on the bottom half;
- Concrete capping beam on the top half;

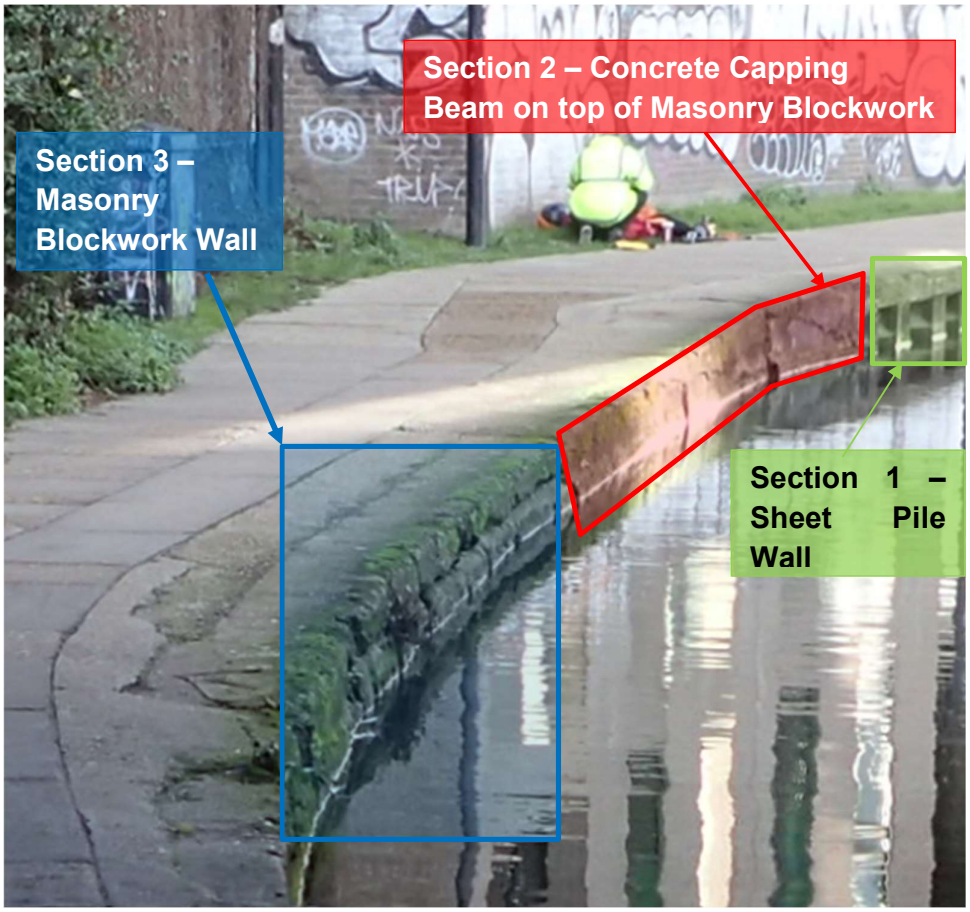


Figure 3.3: Photograph indicating Wall Section 1,2 & 3

3.2.2 The capping beam extends below the water level and its total height is approximately 70cm. During the inspection of the beam, a number of cracks were observed. It is believed these have been caused by the settlement of the masonry wall and are not thought to be a source of concern. The condition of the capping beam is considered fair. A typical crack is shown in Figure 3.4.

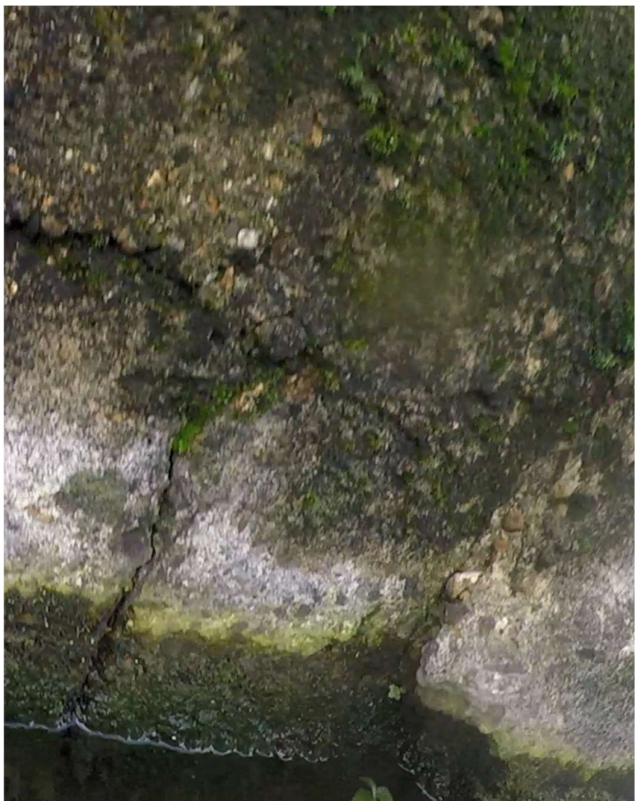


Figure 3.4: Typical formation of cracks on the concrete capping beam of Section 2 Wall

3.2.3 The front face of the masonry blockwork wall was found to be in poor condition. The mortar between the joints is completely eroded, leaving large gaps between the blocks, as shown in Figure 3.5.

Figure 3.5: Typical gaps between blockwork due to mortar loss

3.2.4 Additionally, large gaps were identified on the front face of the wall at numerous locations. These gaps are thought to be missing/displaced masonry. An example is shown in Figure 3.6. The location of the identified gaps are presented in Table 3.1 and in Appendix A.

Figure 3.6: Identified large gap on the masonry blockwork wall

Table 3.1: Location and geometric properties of identified gaps of Section - 2 Masonry Blockwork Wall

No.	Chainage – From edge of Sheet Pile wall (m)	Water depth (m)	Height of gap (m)	Width of gap (m)
1	1-2	~1	~0.2	~0.4
2	3-4	~0.7	~0.15	~0.5
3	4-5	~0.65	~0.5	~0.8
4	5-6	~0.85	~0.2	~0.5

No.	Chainage – From edge of Sheet Pile wall (m)	Water depth (m)	Height of gap (m)	Width of gap (m)
5	6-7	~0.3	~0.15	~0.2
6	7-8	~0.4	~0.15	~0.4
7	8-9	~0.4	~0.2	~0.8
8	9-10	~0.2	~0.45	~0.2

3.2.5 Finally, a visual inspection of the toe of the wall was also performed. The main findings were that the majority of Section – 2 shows signs of minor localised scouring as shown in Figure 3.7. The gaps at bed level may also be due to eroded mortar between blocks above and below the bed level, but this could not be confirmed.

Figure 3.7: Scouring at the base of Section - 2 Masonry Blockwork Wall

3.3 Section 3 – Masonry Blockwork Wall

3.3.1 This section, represents approximately 9m of the total surveyed wall and is located on the west side of Section 2 as shown in Figure 3.8. The wall section is composed of masonry blockwork and concrete topping to finished level.

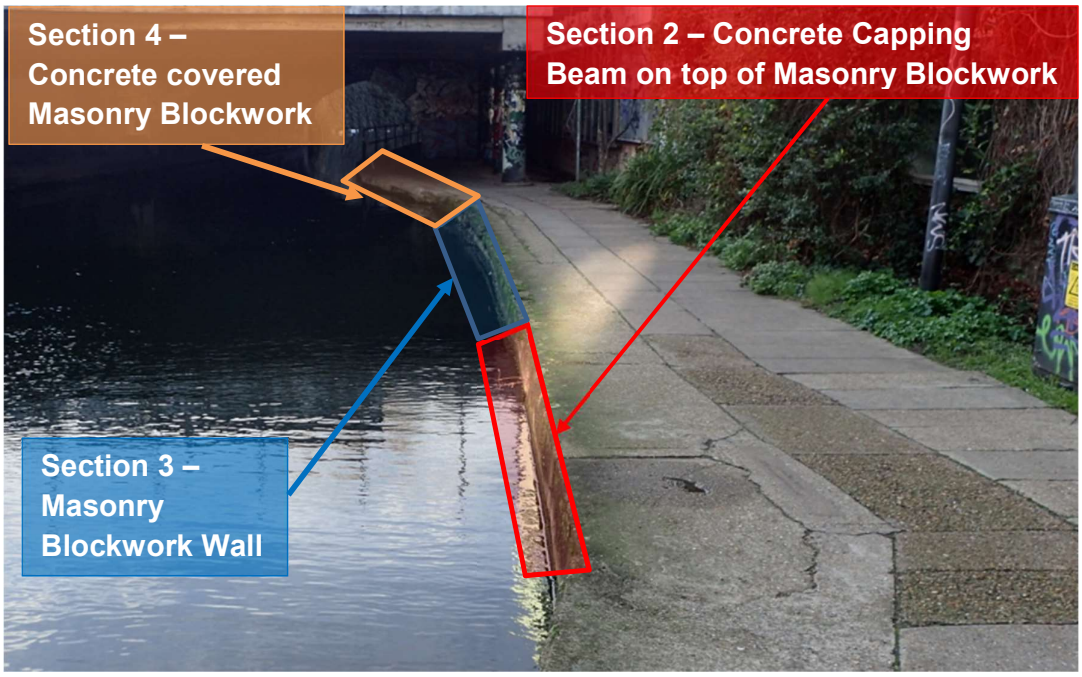


Figure 3.8: Photograph indicating Wall Section 2, 3 & 4

3.3.2 As can be observed from Figure 3.9, 20-50mm gaps have developed between the concrete capping and the masonry blockwork wall below. This is believed to be due to a combination of settlement of the masonry wall, washout of the grout and freeze-thaw action. These caps are not thought to be source of concern.

Figure 3.9: Formation of large gaps between masonry blockworks and concrete topping of Section 3

3.3.3 In addition, during the inspection multiple cracks were identified on the concrete topping as shown in Figure 3.10. The reason for this is believed to be due to the settlement of the masonry blocks, as the cracks coincide with the existing gaps between the masonry blocks. Generally, the condition of the concrete topping is considered fair.

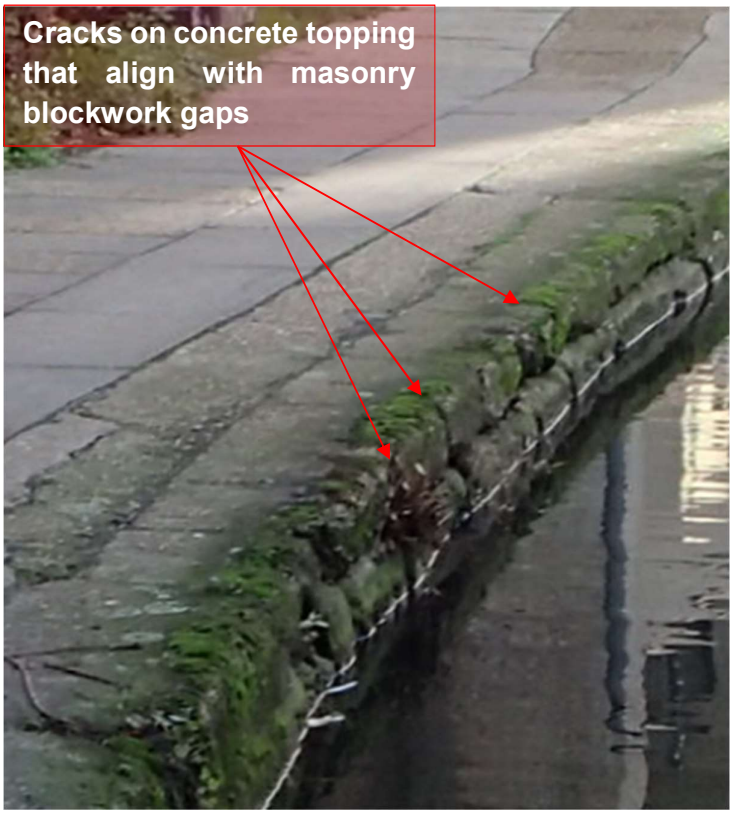


Figure 3.10: Cracks on concrete topping of Section 3

3.3.4 The majority of the masonry blockwork wall was in a fair condition, however in parts the condition was poor. As shown in Appendix A and Table 4.1, at some locations the condition of the masonry of this section was similar with that of Section 2. The mortar between the joints is completely eroded, leaving large gaps between blockwork. However, overall the mortar between the blocks of the wall was observed to be in a fair condition with small signs of erosion.

3.3.5 No missing/displaced masonry was identified during the inspection and no signs of scouring was observed at the toe of the wall.

3.4 Section 4 – Concrete covered Masonry Blockwork Wall

3.4.1 Section 4, shown in Figure 3.11, represents approximately 9m of the total surveyed wall and is located at the western side of the site.

3.4.2 From observations on site it was assessed that this section of the wall is composed of masonry blockwork structure, with a façade of concrete layered over the front blockwork of the wall. The concrete layer is thought to be approximately 20cm thick.

Figure 3.11: Photograph indicating Section 4 - Concrete covered Masonry Blockwork Wall

3.4.3 The submerged surface of the concrete layer is rough, with a thin layer of marine growth.

3.4.4 The concrete layer covering the first 1.5m of the wall (eastern side) did not show any signs of significant damage or deterioration, with no obvious signs of structural deformation, cracking or failure.

3.4.5 Within the first 1.5-3m (eastern side) of the section, a discontinuity in the concrete layer was observed, and the overall thickness of the concrete appears to be reduced. Following the discontinuity, the rest of the wall section (last 6m of its west side) it was observed that the concrete façade has almost completely disappeared. The reason for this is unclear but is believed to have detached from the wall.

3.4.6 A segment of the concrete's discontinuity is shown in Figure 3.12. The discontinuity starts at a water depth approximately equal to 45cm, and is continuous until the bottom of the wall at the canal bed.

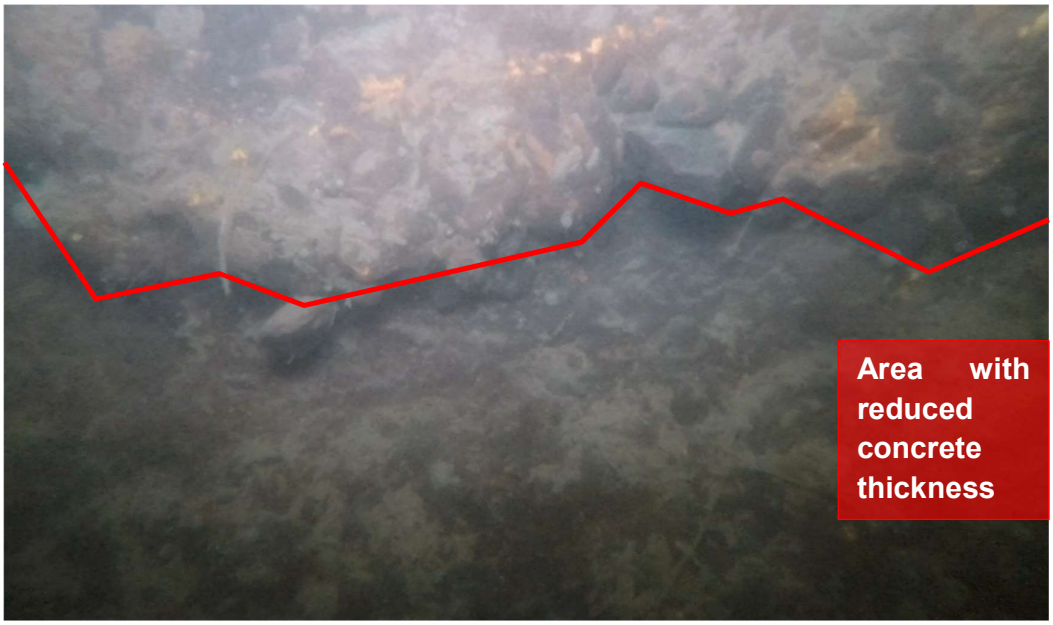


Figure 3.12: Photograph indicating a segment where the concrete layer is discontinued and its thickness is reduced.

3.4.7 The material of the uncovered wall is unclear. As shown in Figure 3.13, it is orange/red in colour and is believed to either be masonry of the historic canal wall or red concrete mixed with gravel/rocks.

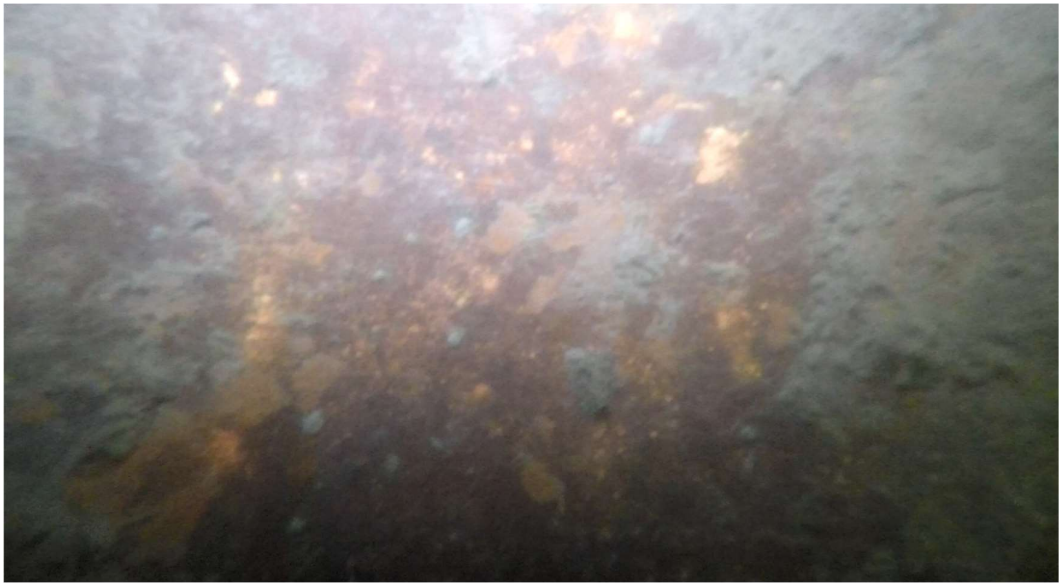


Figure 3.13: Photograph indicating a segment of the uncovered wall of Section 4

3.4.8 No obvious cracks were observed throughout the whole length of Section 4, however, in the uncovered part of the wall section two gaps were identified in two locations. This could be due to missing masonry or damaged concrete. Their location and size are presented in Table 3.2 and in Appendix A.

Table 3.2: Location and geometric properties of identified gaps of Section – 4 Concrete covered Masonry Blockwork Wall

No.	Chainage – From edge of section 3 (m)	Water depth (m)	Height of gap (m)	Width of gap (m)
1	4-5	~0.55	~0.15	~0.25
2	~9	~0.2	~0.25	~0.15

3.4.9 No scouring or undermining of the wall was observed and the overall condition of the wall is considered to be fair.

3.4.10 Finally, the concrete walkway that is also part of the wall was found to be in good condition. Within the first 1-2m of Section 4 (eastern side) the concrete above the water level was damaged locally as shown in Figure 3.14. In addition, the concrete on the top edge of the wall along the full length of the Section was found to have localised damage, possibly due to vessel impacts.

Figure 3.14: Photograph indicating the local damage of concrete extending above water level of Section 4

4 CONCLUSIONS

4.1 Concluding Remarks

4.1.1 In Table 4.1, at the end of this section, a summary of the inspection findings can be found.

Section 1 – Sheet Pile

4.1.2 Wall is generally in a good condition. No evident defects were identified and the sheet piles appear to be straight with no deformation or damage.

Section 2 – Concrete Capping Beam on top of Masonry Blockwork Wall

4.1.3 Wall is in poor condition and is the most degraded of the four wall sections presented in this report. However, given the likely age of the wall, the condition is in line with what would be anticipated and is consistent with overall degradation rather than structural failure. At locations of the section (see sketch in Appendix A), localised scouring was identified at the toe of the wall. In addition, the mortar surrounding the blockwork is eroded resulting in large gaps between the masonry. Finally, underwater masonry blocks that are part of the wall were observed to be locally missing or displaced.

Section 3 – Masonry Blockwork Wall

4.1.4 A large area of the wall is considered to be in a fair condition with the mortar between the blocks showing little signs of erosion. However, localised sections of the wall are in poor condition, where mortar is completely eroded resulting in large gaps between the masonry. Overall the wall is in a condition that would be as expected for a masonry wall of significant age. No signs of scouring were observed at the toe of the wall and no missing/displaced masonry blockworks were identified.

Section 4 – Concrete covered Masonry Blockwork Wall

4.1.5 The concrete layer covering the front face of a part of the wall is likely to have been completed as part of remedial or improvement works. Part of the wall within the first 1.5-3m (from the eastern side) of the section was observed to have discontinuities in the concrete layer and its overall thickness is reduced. Following the discontinuity until the end of Section 4, the concrete layer is almost completely gone and is believed to have been detached. The material of the exposed wall is unclear. Two gaps were identified in this section and could be either damaged concrete or missing masonry. No obvious cracks were identified or signs of scouring were observed and generally Section 4 condition is in a fair condition showing general degradation, but no signs of any compromised structural integrity.

Capping Beam and Concrete topping

4.1.6 The concrete topping and capping beam located at the top of the inspected wall was found to be in a fair condition. The edges of the slab are damaged however the damage is consider to be due to local impacts, and is not a sign of degradation of the capping beam or slab. A number of cracks were identified but these are thought to be due to early thermal cracking and settlement of the masonry and are not thought to be source of concern.

Table 4.1: Summary of survey findings

Chainage from Datum (Figure 2.1) (m) (East of Section 1)	Wall Type/Section	Approximate Water depth (m)	Notes
Datum (0)	Section 1 (Sheet Pile wall)	1.35	Light surface rust above water level and light marine growth below
1		1.20	
2		1.30	
3		1.15	
4		1.00	
5		1.00	-Significant scouring, -Eroded mortar.

Chainage from Datum (Figure 2.1) (m) (East of Section 1)	Wall Type/Section	Approximate Water depth (m)	Notes
6	Section 2 (Concrete Capping Beam on top of Masonry Blockwork Wall)	0.90	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
7		0.90	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
8		0.95	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
9		1.00	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
10		0.90	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
11		0.70	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
12		0.80	-Missing / displaced blockwork, -Eroded mortar.
13		0.80	-Missing / displaced blockwork, -Eroded mortar.
14	Section 3 (Masonry Blockwork Wall)	0.80	-Cracked concrete topping.
15		0.80	-Cracked concrete topping. -Eroded mortar at parts.

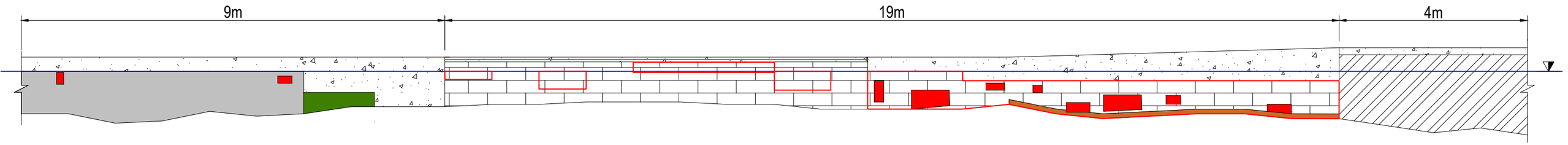
Chainage from Datum (Figure 2.1) (m) (East of Section 1)	Wall Type/Section	Approximate Water depth (m)	Notes
16		0.70	-Cracked concrete topping. -Eroded mortar at parts.
17		0.70	-Cracked concrete topping. -Eroded mortar at parts.
18		0.65	-Cracked concrete topping. -Eroded mortar at parts.
19		0.65	-Cracked concrete topping.
20		0.65	-Cracked concrete topping.
21		0.70	-Cracked concrete topping, -Eroded mortar at parts.
22		0.70	-Cracked concrete topping.
23		0.75	-Cracked concrete topping, -Eroded mortar at parts.
24	Section 4 (Concrete covered Masonry Blockwork Wall)	0.75	Concrete layer in fair condition.
25		0.75	Concrete layer thickness reduced at the bottom part of the wall
26		0.90	Concrete layer thickness reduced at the bottom part of the wall
27		0.95	Concrete layer has detached, exposed wall in fair condition. Missing masonry / damaged concrete

Chainage from Datum (Figure 2.1) (m) (East of Section 1)	Wall Type/Section	Approximate Water depth (m)	Notes
28		0.85	Concrete layer has detached, exposed wall in fair condition.
29		1.05	Concrete layer has detached, exposed wall in fair condition.
30		1.10	Concrete layer has detached, exposed wall in fair condition.
31		0.9	Concrete layer has detached, exposed wall in fair condition.
End of wall (32)		0.9	Concrete layer has detached, exposed wall in fair condition. Missing masonry / damaged concrete

APPENDICES

APPENDIX A SECTION OF INSPECTED WALL AND SUMMARY OF FINDINGS

APPENDIX A SECTION OF INSPECTED WALL AND SUMMARY OF FINDINGS



Sheet Pile

Masonry Blockwork

Concrete

Missing or/and displaced masonry blockwork / Damaged concrete

Scouring of Wall

Concrete thickness reduced

Concrete facade detached

Eroded mortar of masonry blockwork

Significant crack formation on concrete

Water Level