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-02-XX-RP-C-0001

REVISION RECORD

REV	STATUS	DATE	SUMMARY OF CHANGES	PREP	CHK	APP
P01	S2 – Suitable or information	01/08/2022	First Issue for Client Comment	MM	JM	JM
P02	S4 – Suitable or Stage Approval	01/08/2022	Final Issue	JM	JM	JM

CONTENTS

1 INTRODUCTION

1.1 General

1.1.1 ROK Planning Ltd (ROK) has undergone a development at 140-146 Camden Street, London. J. Murphy & Sons Limited (JMS) 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 after the construction of the new development, comparing the observations made with those from the previous wall inspection in 2019 (1858-BRL-01-XX-C-001 P02).

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 15 and 40cm 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.

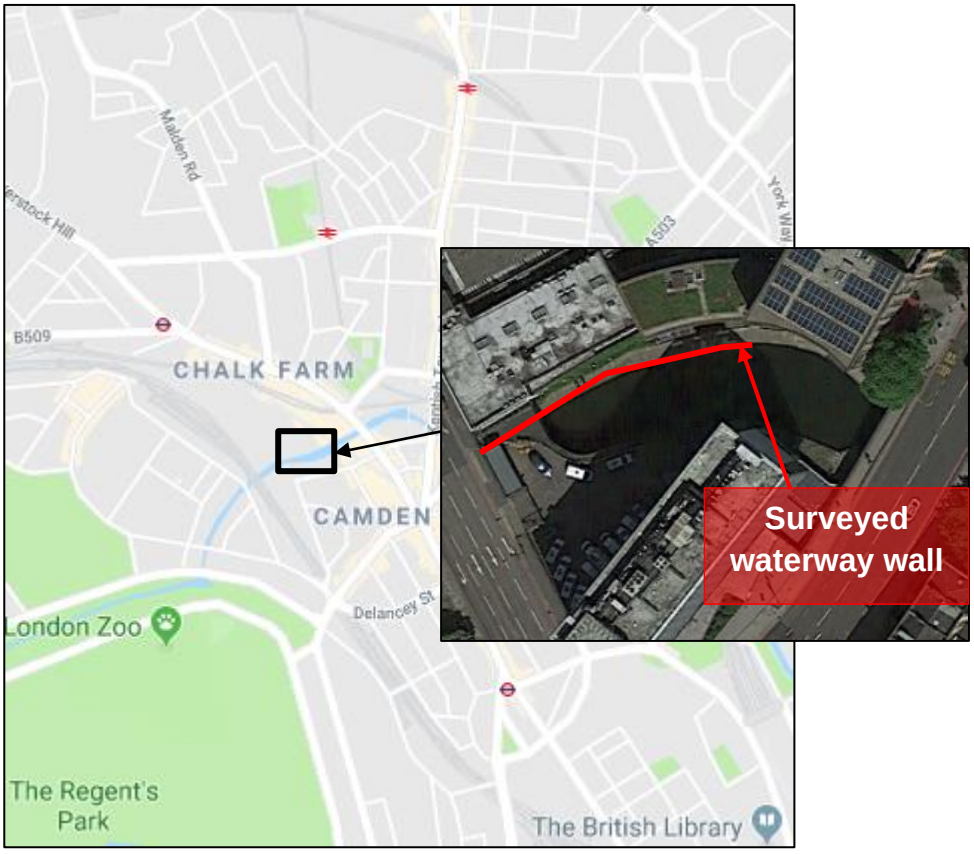

Figure 1.1: Location of site and indication of the inspected wall

2 METHOD OF SURVEY

2.1 General Comments

2.1.1 To assess the condition of the full length of the wall, a survey was conducted by two BR engineers in July 2022. The weather at the time of the survey was clear.

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 and an underwater camera. The video footage was then visually examined in the office and compared with previous footage to assess whether any new damage or deterioration had occurred since the previous inspection.

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 video recordings were taken at a larger distance from the wall compared with those from the initial inspection. This led to minor discrepancies in the locations and dimensions of the faults observed along the length of the wall.

2.1.5 The chainage datum for the reinspection began an additional 0.8m before the end of the southwestern side of 35 Camden Road building, with the following chainage points being displaced by approximately 0.2m compared with the previous inspection. This discrepancy was accounted for when processing the data and chainages presented in this report follow the previously established convention.

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 There were no observable changes to the integrity of the sheet pile wall over the period during which works were being undertaken, with the sheet piles remaining without perforation, dents or buckling.

3.1.3 The localised damage to the concrete edge did not appear to have worsened over the period between the two site inspections. The extent of the damage observed during each visit is depicted in Figure 3.2. Additionally, the crack identified on the top surface of the capping beam has not increased in size and no other noticeable cracks have formed.

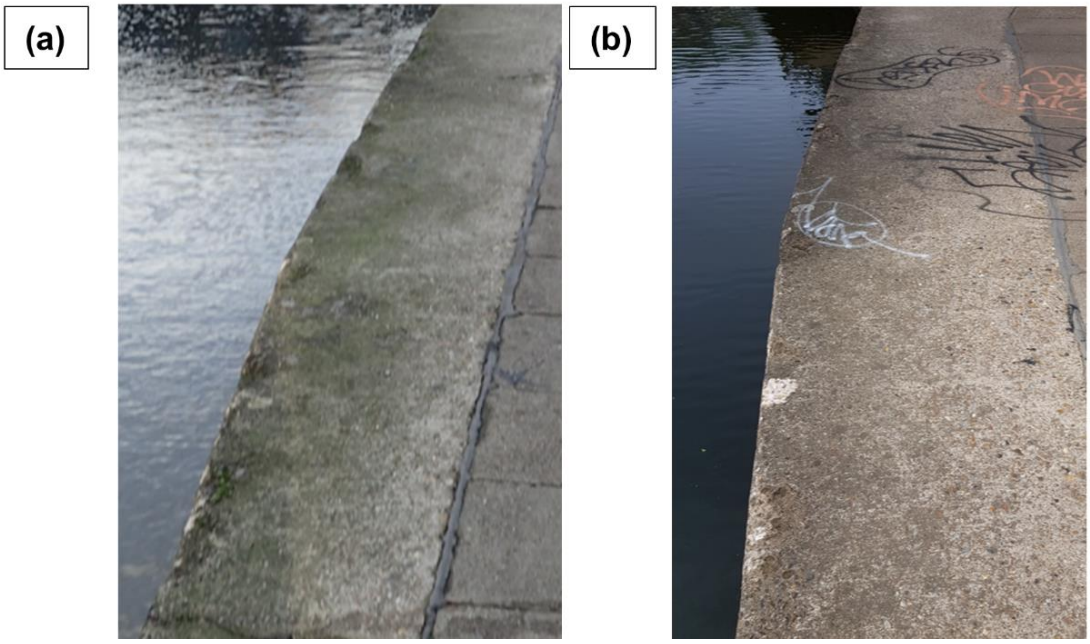

Figure 3.2: (a) Damaged edge observed during (a) 2019 initial inspection (b) 2022 reinspection

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 Figure 3.3

The wall section is composed of two parts:

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

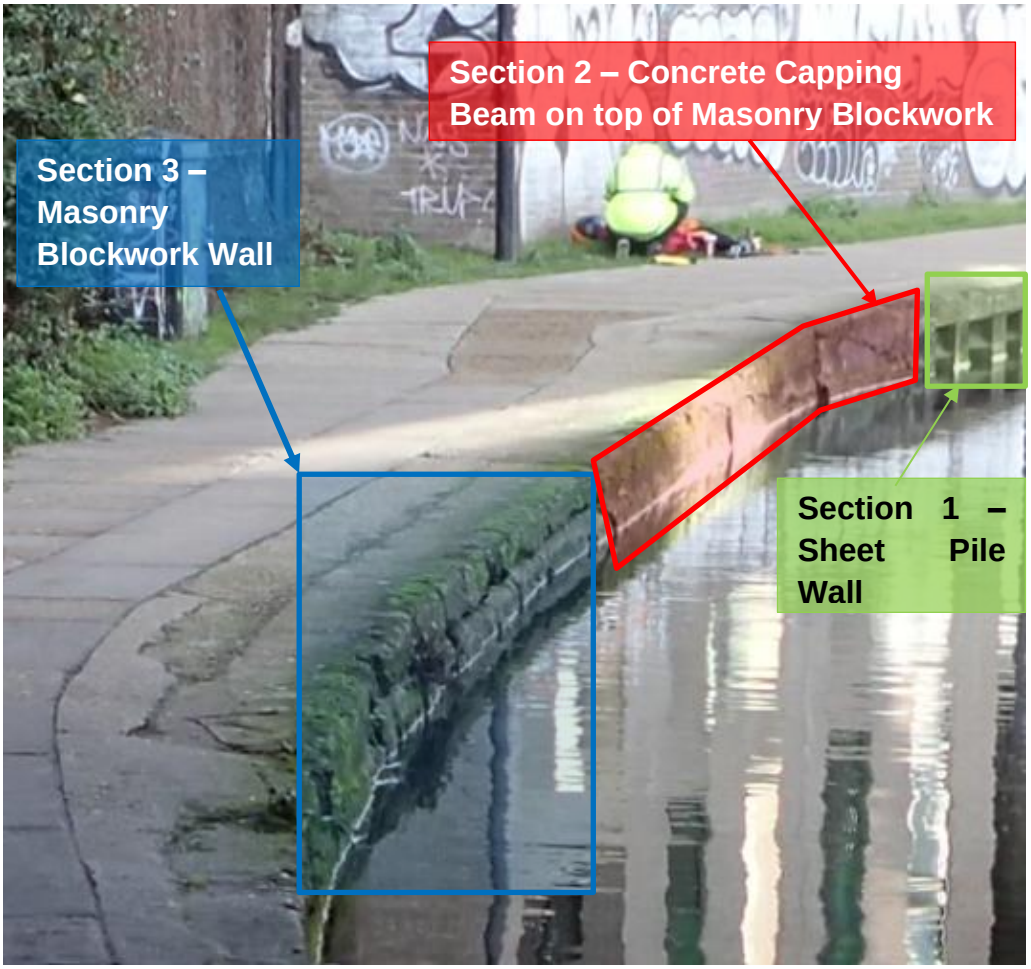

Figure 3.3: Photograph indicating Wall Section 1,2 & 3

3.2.2 The capping beam extends below the water level and its total height is approximately 70cm. The size and number of cracks observed along the top of the capping beam has not changed, indicating that no significant settlement has occurred as a result of the nearby works. The beam was more damaged however, particularly along its edge. A comparison between the damage to the capping beam is shown in Figure 3.4.

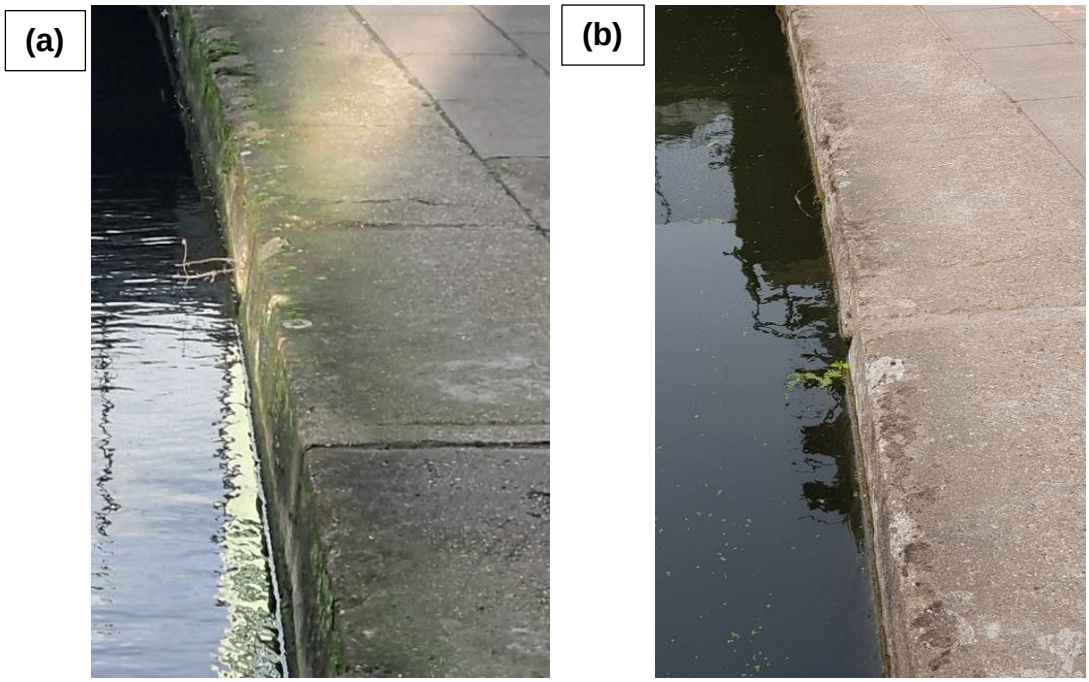

Figure 3.4: Extent of damage to capping beam edge observed during (a) 2019 initial inspection (b) 2022 reinspection

3.2.3 The condition of the masonry blockwork wall was poor during the initial inspection in 2019, with mortar being completely eroded between the blocks in numerous areas. During the reinspection, only a small amount of newly eroded mortar was identified, in the latter half of the section surrounding areas where masonry blocks had already been missing previously.

Figure 3.5: Typical gaps between blockwork due to mortar loss

3.2.4 Only one new gap in the masonry wall was identified, thought to be newly missing/displaced masonry, at a chainage of approximately 7 metres. This is

shown in Figure 3.6. The updated locations and dimensions of the gaps are presented in Table 3.1 and in Appendix A. Due to the increased distance from the wall and water depth during the reinspection, slight variations in the observed locations and sizes of the faults identified have arisen between the two inspections. However, these were not deemed significant, and the previously reported values are more conservative; the extent of disrepair of this section is not believed to have worsened significantly over the course of the works.

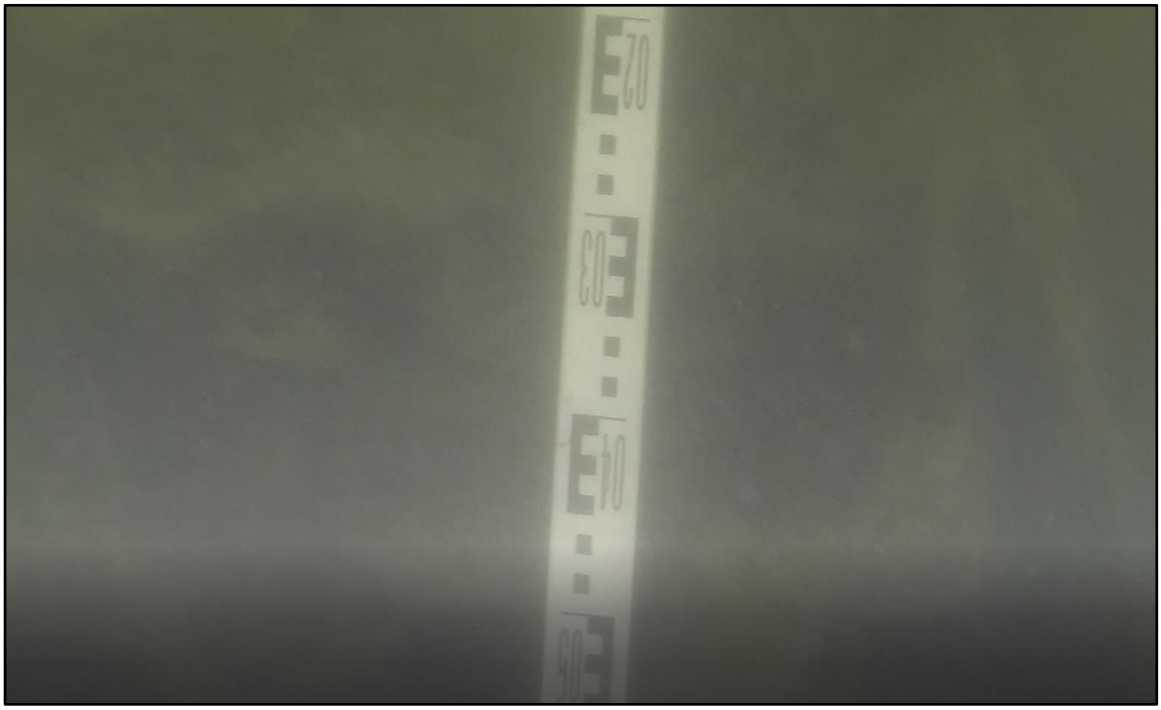

Figure 3.6: Newly identified gap on the masonry blockwork wall at a chainage of 7m

Table 3.1: Location and geometric properties of identified gaps of Section 2

No.	Chainage – From edge of Sheet Pile wall (m)	Water depth (m)	Height of gap (m)	Width of gap (m)
1	1-2	~0.7	~0.2	~0.4
2	~3	~0.76	~0.14	~0.2

No.	Chainage – From edge of Sheet Pile wall (m)	Water depth (m)	Height of gap (m)	Width of gap (m)
3	~3.5	~0.61	~0.15	~0.5
4	4-5	~0.65	~0.35	~0.8
5	5-6	~0.85	~0.2	~0.5
6	6-7	~0.3	~0.2	~0.2
7	7-8	~0.4	~0.15	~0.4
8	~8	0.66	~0.31	~0.21
9	8-9	~0.4	~0.29	~0.8
10	9-10	~0.42	~0.45	~0.25

3.2.5 No significant increase in the extent of scouring at the toe wall was observed across the entirety of this section.

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3.3 Section 3 – Masonry Blockwork Wall

3.3.1 This section represents approximately 11m of the total surveyed wall and is located on the west side of Section 2 as shown in Figure 3.7. The wall section is composed of masonry blockwork and concrete topping to finished level.

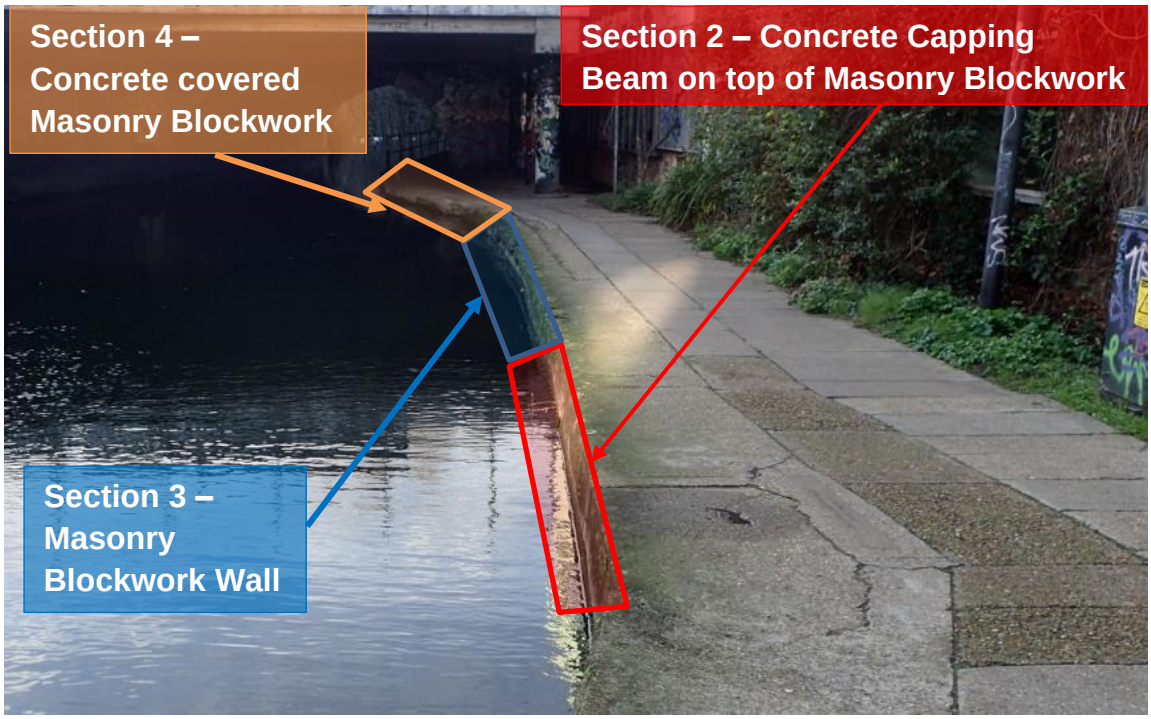


Figure 3.7: Photograph indicating Wall Section 2, 3 & 4

3.3.2 Within Section 3, areas featuring localised poor conditions have been observed across the length of the wall. The mortar between the joints in these areas is completely eroded, leaving large gaps between the blockworks. The amount the missing mortar has increased, particularly within the first 15cm below water surface level. This erosion, originally spanning approximately 2.5m of the section, has developed horizontally and now spans almost the entirety of the section between chainages of 15-24.5m. The typical extent of this localised erosion is shown in Figure 3.8. Mortar erosion was also observed at a lesser extent closer the bed at chainages of approximately 23-24m. The remainder of the wall exhibited only minor signs of erosion and remains in a fair condition.

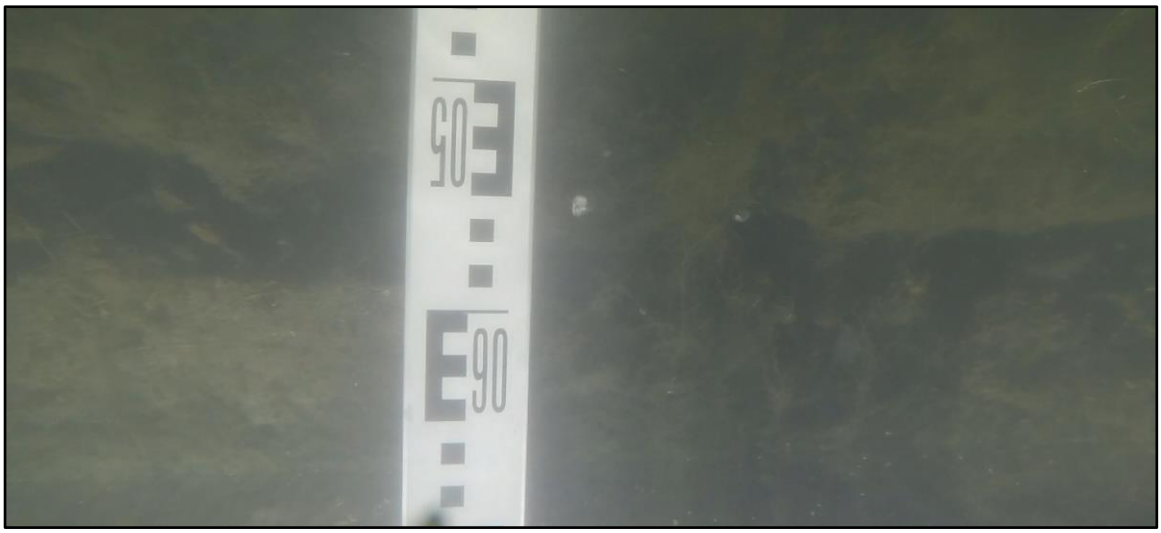
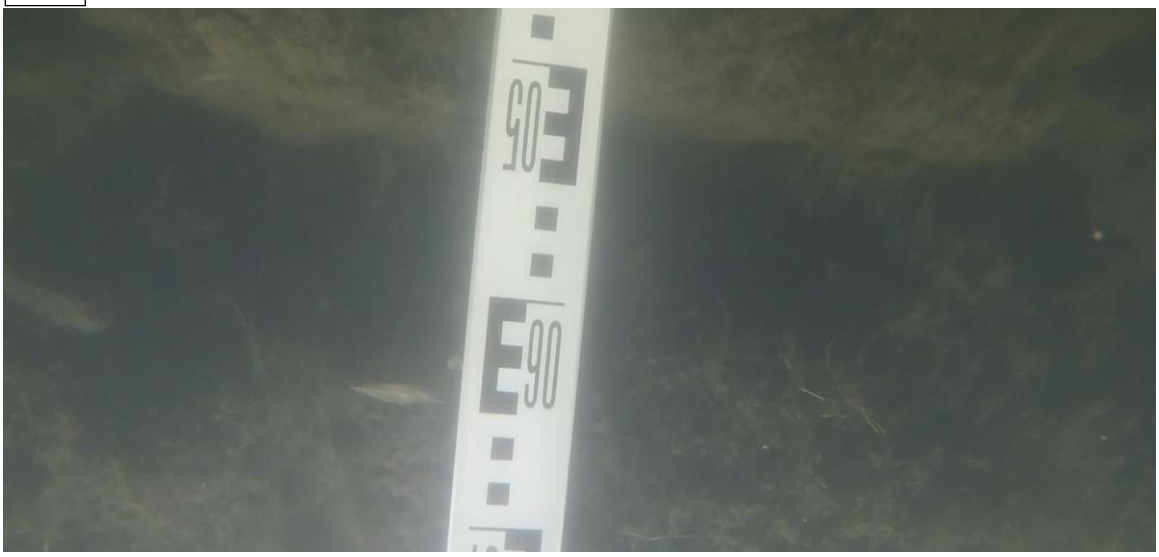


Figure 3.8: Typical mortar erosion observed across the majority of Section 3.

3.3.3 The level of deterioration close to water level was observed to be more severe at chainages 23.5-25m. Whereas the thickness of eroded mortar did not typically exceed 5cm across the section, here the size of the gaps between blocks were approximately 10-12cm tall, occurring at similar depths to the rest of the erosion. These larger gaps are shown in Figure 3.9. With some of the masonry blocks used in this part of the wall being of similar height, it is believed that a few blocks of masonry have been displaced, potentially preceded by erosion of the surrounding mortar. The dimensions and locations of the missing masonry are presented in Table 3.2. The remainder of the section did not feature any missing masonry.

(a)



(b)

Figure 3.9: Images from recorded footage showing new missing masonry blocks at chainages of (a) 24m and (b) 25m.

Table 3.2: Location and geometric properties of identified gaps of Section 3

No.	Chainage – From edge of section 2 (m)	Water depth (m)	Height of gap (m)	Width of gap (m)
1	~10	~0.2	~0.11	~0.35
2	~11	~0.12	~0.1	~0.18

3.3.4 No scouring at the wall toe of section 3 was identified during the reinspection.

3.4 Section 4 – Concrete covered Masonry Blockwork Wall

3.4.1 Section 4, shown in Figure 3.10, represents approximately 7m of the total surveyed wall and is the westernmost section 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 3.70: Photograph indicating Section 4 - Concrete covered Masonry Blockwork Wall

3.4.3 The discontinuity previously observed during the last inspection was identified as shown in Figure 3.1, however due to the increased distance of the camera from the wall and lower visibility closer to the riverbed its size could not be ascertained.

Figure 3.11: Image from video footage showing part of wall where the concrete layer is discontinued, and its thickness is reduced.

3.4.4 No obvious cracks were observed throughout the whole length of Section 4.

3.4.5 The two gaps within the area of reduced concrete thickness observed during the initial inspection were confirmed during the reinspection, and a third gap of similar size was also identified. The updated locations and dimensions of the gaps in this section are presented in Table 3.2 and Appendix A.

Table 3.3: 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	0-1	~0.2	~0.15	~0.3
2	~4	~0.13	~0.15	~0.45
3	~5	~0.12	~0.25	~0.15

3.4.6 No scouring or undermining of the wall was observed and the overall condition of the wall remains fair.

3.4.7 The concrete walkway remains in good condition. The extent of the localised damage above water level had not increased noticeably since the last inspection.

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 There were no observed changes since the initial inspection that impact the wall's structural integrity. The wall was found to be generally in a good condition; no evident defects were identified, and the sheet piles appeared to be straight with no deformation or damage.

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

4.1.3 This section of wall remains in the poorest condition, with significant degradation from local scouring, eroded mortar and missing masonry (see Appendix A). Since the previous inspection the condition of the wall has slightly deteriorated, with one new piece of masonry missing and minor increases to mortar erosion in some areas. Given the likely age of the wall, the extent of the new degradation is not exceptional when considering its overall condition, as previously reported and may be due to age-related deterioration.

Section 3 – Masonry Blockwork Wall

4.1.4 A large area of the wall is in a fair condition with the mortar between the blocks showing little signs of erosion. However, sections of the wall close to the water surface exhibited localised mortar erosion where large gaps are present and so are in a poor condition. The extent of this erosion has increased since the initial inspection, having spread across almost the entire length of the section. Towards the end of the section, a few small pieces of masonry have also been newly identified as displaced or missing, potentially due to erosion of the surrounding mortar. No signs of scouring were observed during the reinspection of this section. Besides the localised damage close to the river surface, the wall was in a condition that would be expected for a masonry wall of significant age.

Section 4 – Concrete covered Masonry Blockwork Wall

4.1.5 The layer of reduced concrete thickness was confirmed although the underlying material could not be confirmed. Alongside the gaps identified previously, a new gap was found in the concrete section, bringing the total up to three, which could be due to damaged concrete or loose masonry. No obvious cracks were identified or signs of scouring observed and the overall structural integrity of Section 4 remains uncompromised.

Capping Beam and Concrete topping

4.1.6 The concrete topping and capping beam located at the top of the inspected wall were found to be in a fair condition. The damage to the concrete capping beam and topping has increased since the initial inspection, with additional minor abrasions and chippings along the edge being observed. These are considered to be due to local impacts and are not a sign of degradation of the capping beam or topping. The larger cracks previously thought to have been caused by thermal cracking or settlement have not developed and no new major cracking that could have resulted from construction works was observed.

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)	1.115	Light surface rust above water level and light marine growth below
1		1.02	
2		0.97	
3		0.995	
4		1.095	
5		0.875	-Significant scouring, -Missing / displaced blockwork, -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)	0.86	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
7		0.975	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
8		1.00	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
9		0.86	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
10		0.945	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
11		0.94	-Significant scouring, -Missing / displaced blockwork, -Eroded mortar.
12		0.89	-Significant scouring -Missing / displaced blockwork, -Eroded mortar.
13		0.855	-Significant scouring -Missing / displaced blockwork, -Eroded mortar.
14		0.75	-Cracked concrete topping.

Chainage from Datum (Figure 2.1) (m) **(East of Section 1)**	**Wall Type/Section**	**Approximate Water depth (m)**	**Notes**
15	Section 3 (Masonry Blockwork Wall)	0.78	-Cracked concrete topping. -Eroded mortar at parts.
16		0.72	-Cracked concrete topping. -Eroded mortar at parts.
17		0.85	-Cracked concrete topping. -Eroded mortar at parts.
18		0.83	-Cracked concrete topping. -Eroded mortar at parts.
19		0.8	-Cracked concrete topping. -Eroded mortar at parts.
20		0.71	-Cracked concrete topping. -Eroded mortar at parts.
21		0.75	-Eroded mortar at parts.
22		0.605	-Cracked concrete topping. -Eroded mortar at parts.
23		0.61	-Cracked concrete topping, -Eroded mortar at parts.
24		0.635	-Cracked concrete topping. -Missing/displaced masonry blockwork -Eroded mortar at parts.

Chainage from Datum (Figure 2.1) (m) **(East of Section 1)**	**Wall Type/Section**	**Approximate Water depth (m)**	**Notes**
25		0.695	-Cracked concrete topping. -Missing/displaced masonry blockwork -Eroded mortar at parts.
26	Section 4 (Concrete covered Masonry Blockwork Wall)	0.77	-Damaged concrete above water level.
27		0.88	-Missing masonry / damaged concrete -Damaged concrete above water level.
28		1.07	-Concrete layer has detached, exposed wall in fair condition -Damaged concrete above water level.
29		1.185	-Concrete layer has detached, exposed wall in fair condition.
30		1.33	-Missing masonry/damaged concrete
31		1.305	-Missing masonry/damaged concrete
End of wall (32)		0.9	Lack of visual clarity to determine integrity of wall.

APPENDICES

APPENDIX A SECTION OF INSPECTED WALL AND SUMMARY OF FINDINGS

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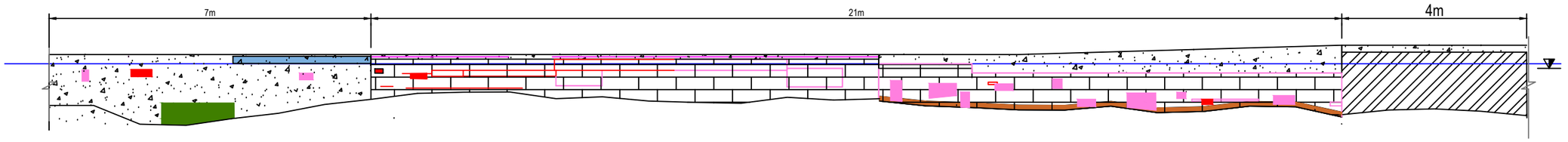

NOTES :

1. ALL DIMENSIONS ARE IN METRES U.N.O.
2. ALL DIMENSIONS ARE INDICATIVE FROM SITE MEASUREMENTS.
3. DRAWINGS ARE FOR SURVEYING AND ASSET INTEGRITY MANAGEMENT ONLY. NOT TO BE USED FOR SCALING OR CONSTRUCTION.

LEGEND

- Sheet Pile
- Masonry Blockwork
- Concrete
- Identified during previous inspection - Missing or/and displaced masonry blockwork / Damaged concrete
- Newly identified during reinspection - Missing or/and displaced masonry blockwork / Damaged concrete
- Scouring of Wall
- Concrete thickness reduced
- Damaged concrete above water level
- Identified during previous inspection - Eroded mortar of masonry blockwork
- Newly identified during reinspection - Eroded mortar of masonry blockwork
- Significant crack formation on concrete
- Water Level

CLIENT

REV	DATE	DRN	DoChk	EngChk	APP	DESCRIPTION
S2	02.08.22	MM	JM	JM	JM	ISSUED FOR INFORMATION

REVISION

BECKETT RANKINE
Marine Consulting Engineers

TITLE

Camden Street
River Wall Re-inspection

PROJECT DRAWING No.	SCALE	S. CODE	REV
185-BRL-02-XX-DR-C-0001	1:100	S2	S2