Thameside West

River Wall Structural Survey

May 2020

PREAMBLE

Silvertown Homes Limited (SHL) and Greater London Authority Land and Property (GLAP) have submitted a hybrid planning application to the London Borough of Newham (LBN) for the redevelopment of the Thameside West site, accessed off Dock Road in Newham (the Site).

SHL is a property development company and joint land owners of the Site. SHL has over 65 years combined experience at delivering high quality regeneration projects across London. GLAP is a subsidiary corporation of the Greater London Authority (GLA) and took over assets and liabilities from the London Development Agency (LDA) in 2012. GLAP is primarily focused on delivering genuinely affordable homes and jobs for London.

The proposal is to construct a new high-quality residential-led mixed-use development comprising new homes, new industrial floorspace, a new local centre, a new primary school and nursery school, new community facilities, a new public park (with associated outdoor play facilities), enhanced SINC and over 800m of new riverside walk along the River Thames with ecological / biodiversity enhancements. This development has been designed to focus its community hub around the delivery of a new Dockland Light Rail (DLR) station that is proposed to be constructed on the Site by Transport for London's (TfL) in 2023.

The proposals have been designed by Foster & Partners, John McAslan & Partners, Patel Taylor and the wider project team (listed, right) taking into account comments provided by local residents during summer and public exhibition events and comments provided during pre-application discussions with a variety of statutory and non-statutory interests, including LBN and its Design Review Panel (DRP), the Greater London Authority (GLA), Transport for London (TfL), Environment Agency (EA), Port of London Authority (PLA) and London City Airport (LCA).

This document is one of a suite of planning application documents submitted to LBN, including an Environmental Statement. The planning application is available to review at LBN's office or using LBN's online services:

Search for planning application reference number 18/03557/OUT at: https://pa.newham.gov.uk/online-applications/search.do?action=simple

The planning application can also be viewed on the GLA's website at: https://www.london.gov.uk/what-we-do/planning/planning-applications-and-decisions/public-hearings

PROJECT TEAM

GREATERLONDONAUTHORITY

BARTON WILLMORE

Foster + Partners

JOHN McASLAN + PARTNERS

Patel Taylor

Tavernor

BUROHAPPOLD ENGINEERING

MEINHARDT

AnsteyHorne

SYSTRA

Aviaire WILDLIFE HAZARD MANAGEMENT CONSULTANTS

Winckworth Sherwood

MOLA

JLL Achieve Ambitions

LONDON COMMUNICATIONS AGENCY

realm

BUROHAPPOLD ENGINEERING

Thameside West

Masterplan River Wall Structural Condition Surveys

0035668

1 April 2020

Revision 00

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Revision	Description	Issued by	Date	Checked
00	DRAFT For Planning	JF	12/11/2018	DKP
01	Update to for March 2020 amendments	JF	01/04/2020	DKP

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author	**Jack Foster**
date	**1st April 2020**
approved	**David Palmer**
signature	
date	**1st April 2020**

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Contents

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Glossary

Term	Definition

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1 Introduction

This Thameside West River Wall Structural Condition Report contains two sources of information, summarised as follows:

1. Condition surveys carried out by Atkins in June/July 2015 and described in their report dated December 2015 (Rev.P03); and
2. Surveys of Dohm Wharf, a 32m section of the river wall at the downstream extent of the Thameside West site, carried out by BuroHappold Engineering between December 2017 and December 2019;
3. A visual inspection of the full Thameside West river frontage, carried out by BuroHappold Engineering in January 2020.

It should be noted that surface repairs to Dohm Wharf were carried out in September/October 2017. These repair works largely consist of steel plates welded over worn areas of the steel piling river wall. After these works were carried out it was agreed with the Environment Agency that BuroHappold would carry out visual surveys of Dohm Wharf on a quarterly basis.

It was subsequently agreed with the Environment Agency in May 2019 that since the quarterly inspections carried out in 2018 indicated that the river wall at Dohm Wharf appears to be stable, the frequency of the inspections could be reduced to six month intervals.

BuroHappold has carried out visual surveys of Dohm Wharf on the following dates:

- 19th December 2017
- 22nd March 2018
- 25th June 2018
- 26th September 2018
- 6th February 2019
- 24th May 2019
- 16th December 2019

The Atkins 2015 survey report is contained within Appendix A of this report. The BuroHappold Dohm Wharf survey reports are contained within Appendix B. The January 2020 visual survey report of the full Thameside West river frontage is contained in Appendix C.

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Appendix A Atkins 2015 Survey

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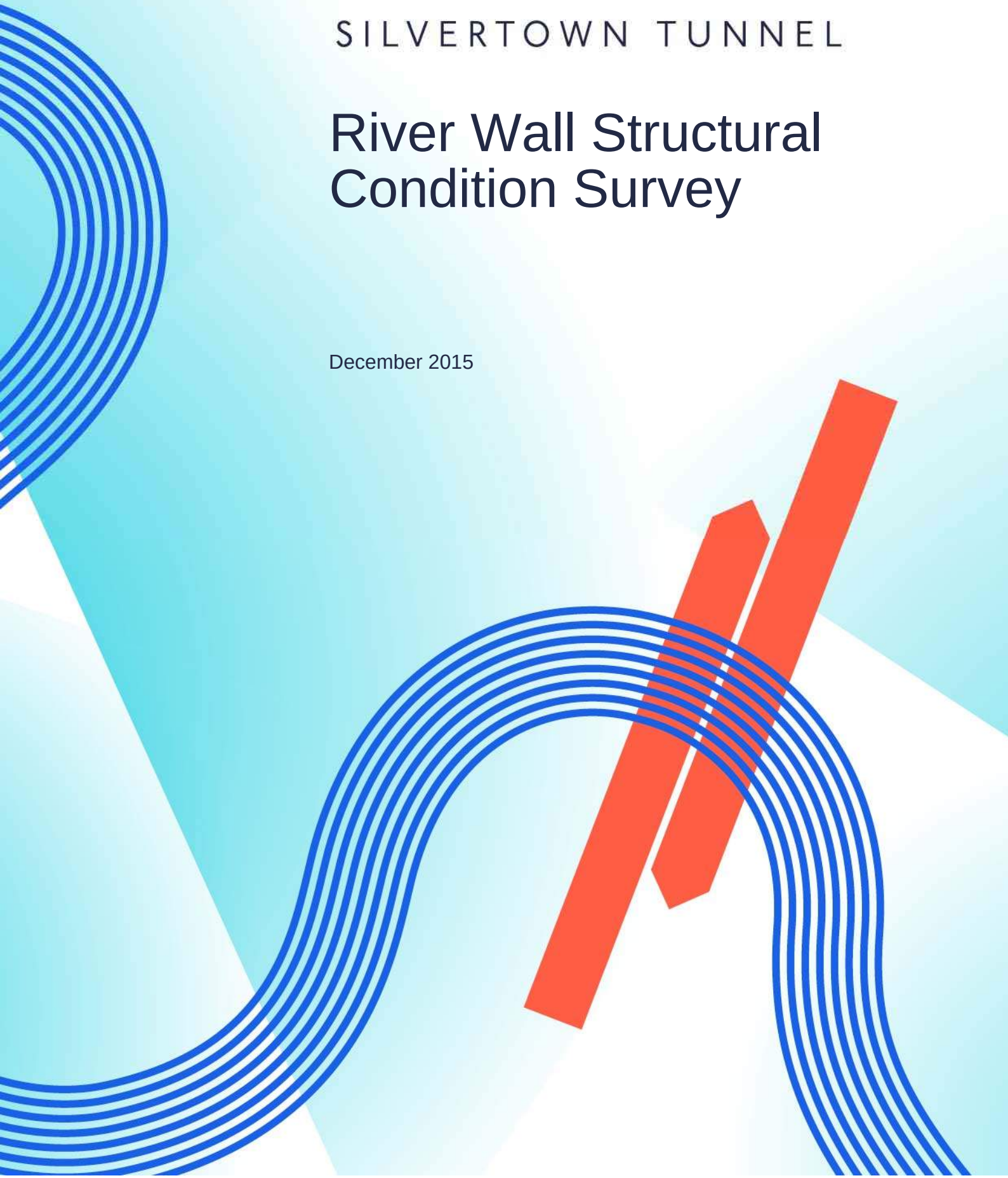
SILVERTOWN TUNNEL

River Wall Structural Condition Survey

December 2015



MAYOR OF LONDON

TRANSPORT FOR LONDON

EVERY JOURNEY MATTERS

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
P01	For TfL Review	PV	MAH	CA	MM	08/07/15
P02	For Information	PV	MAH	CA	MM	01/10/15
P03	Incorporating TfL Comments	JB	MAH	CA	MM	16/12/15

Silvertown Tunnel

River Wall Structural Condition Survey

Document Reference: *STWTN-ATK-VES-XXXX-RP-Y-0001*

Author: *Transport for London*

Revision	Date	Description
P01	July 2015	Submission version
P02	October 2015	For Information
P03	December 2015	Incorporating TfL Comments

Contents

Appendices

Abbreviations & Glossary

AOD	Above Ordnance Datum (Newlyn)
CAM	Condition Assessment Manual
EA	Environment Agency
HGV	Heavy Goods Vehicle
SSP	Steel Sheet Piling
TfL	Transport for London

1. EXECUTIVE SUMMARY

1.1.1 TfL Silvertown team are coordinating with the Environment Agency (EA) to assess the condition and standard of protection offered by the river walls along the North and South banks of Thames adjacent to the Greenwich Peninsula.

1.1.2 To assist in this engagement, TfL procured a visual survey for the lengths of the river wall located within the red line boundary on the both sides of the river as indicated in Appendix A.

1.1.3 TfL commissioned consultants Atkins to complete the visual inspections. The objectives of the visual inspections were to:

- Investigate the condition of the flood walls: the walls along Bow Creek had been identified as failing;
- Report on any observations of settlement;
- Identify the need to raise specific defences to meet the current and future flood defence levels of +5.18m AOD and +6.20m AOD respectively;
- Comment on whether the existing defences could be raised, if required, to achieve the current or future flood defence levels of +5.18m AOD and +6.20m AOD respectively.

1.1.4 The condition of the river walls has been reported using the guidance outlined in the EA's Condition Assessment Manual (CAM), which utilises the following condition grading system:

Grade	Description of Condition	Extent of deterioration/defects in existing structure
1	Very Good	Cosmetic defects that will have no effect on performance.
2	Good	Minor defects that will not reduce overall performance of asset.
3	Fair	Defects that could reduce the performance of asset.
4	Poor	Defects that would significantly reduce performance of asset.
5	Very Poor	Severe defects resulting in complete performance failure.

1.1.5 The table below summarises the condition of the river walls, which has been assessed in accordance with the EA's CAM. The condition grade assigned to each river wall is generally taken to apply to the whole length of the asset. However, in some instances it is appropriate to assign a second score which takes account of a localised section of the frontage which is in worse / better condition than the rest of the asset. In the table below, this "sub-score" is expressed as the number in parenthesis. Where walls are composed of more than one construction type of varying condition grades, the condition is expressed thus: "X / Y" where X and Y are condition grades for the different construction forms.

Land Interest	Plan Tag	EA Map ID (see Appendix C)	Environment Agency Asset ID (see Appendix C)	Condition Grade	Crest Settlement observed	Raising extent req'd to meet defence levels		Flood wall able to support raising to +6.20m AOD?
						Current: +5.18mAOD	Future: +6.2mAOD	
ASD Ltd / Crossrail (Bow Creek asset marked *)	1	8508	06304TH000303L03	3 / 2	No	0.1m	1.12m	Yes
	2 *	14898 *	06304TH000303L02 *	4	No	0.13m	1.15m	Yes
	3	8507	06304TH000303L01	2 (3)	No	0.12m	1.14m	Yes
ASD Ltd	4	14897	06304TH000302L39	4	No	0.08m	1.1m	Yes
	5	14896	06304TH000302L38	4 (5)	Yes	0.17m	1.19m	Yes
	6	8506	06304TH000302L37	4	No	0.1m	1.12m	Yes
	7	14895	06304TH000302L36	3 (4)	No	NONE	0.9m	Yes
	8	8505	06304TH000302L35	4	No	0.08m	1.1m	Yes
European Metal Recycling Ltd / Keltbray Ltd	9	14894	06304TH000302L34	4	No	0.15m	1.17m	Yes
	10	8504	06304TH000302L33	4	No	0.15m	1.17m	Yes
Quintain Ltd	11	14782	06304TH000302L32	2 / 3 (4)	No	0.08m	1.1m	Yes
	12	14781	06304TH000302L31	3 / 2 / 3 (4)	No	NONE	0.77m	Yes
	13	8503	06304TH000302L30	2 (3) / 3	No	0.13m	1.15m	Yes
	14	14780	06304TH000302L29	4	No	0.04m	1.06m	Yes
Nuplex Ltd	15	8502	06304TH000302L28	4 / 3	No	NONE	0.9m	Yes
GL Authority	16	South Bank		2	No	NONE	0.63m	Yes

1.1.6 As part of this commission, a desk study review of available topographic survey data covering the river walls within the red line boundary was also completed. This was to assess whether the river walls met the current required flood protection level of +5.18m AOD. The findings of this study are summarised in the table above. It should be noted that the topographic survey used was completed by Atkins in 2013 and consequently the crest levels of the flood walls might have varied since the survey. During Atkins' visual inspection, any indications of recent settlement or other lowering of the flood defence level (such as damage to flood parapets) was recorded against each of the flood walls inspected. Such observations are logged in the table above. The table further indicates the flood defence walls' potential ability to accommodate future raising to a flood defence level of +6.20m AOD.

1.1.7 The remainder of this document presents the findings of the inspection in greater detail, together with a qualitative commentary on the potential of the existing river walls to accommodate future raising to +6.20m using standard construction techniques. Appendix B presents a summary of the areas surveyed as part of this commission.

1.1.8 The river walls covered by this condition survey have been categorised into six structural forms, as follows:

- Sheet piled river wall without existing capping beam or flood parapet;
- Sheet piled river wall with existing capping beam or flood parapet;
- Masonry / concrete gravity wall or sloping revetment with or without existing flood parapet;
- Backfilled dock gates;
- Existing dock structure;
- Stone revetment with existing masonry flood wall.

1.1.9 Appendix D provides outline sketches showing possible options for raising the height of each of the structural forms described above to a level of +6.20m AOD. The sketches present pros and cons for each option.

2. INTRODUCTION

2.1 Objectives

2.1.1 TfL Silvertown team are coordinating with the Environment Agency (EA) to assess the condition and standard of protection offered by the river walls along the North and South banks of Thames adjacent to the Greenwich Peninsula.

2.1.2 To assist in this engagement, TfL procured a visual survey for the lengths of the river wall located within the red line boundary on the both sides of the river as indicated in Appendix A.

2.1.3 TfL commissioned consultants Atkins to complete the visual inspections. The objectives of the visual inspections were to:

- Investigate the condition of the flood walls: the walls along Bow Creek had been identified as failing;
- Report on any observations of settlement of the flood defence level;
- Identify the need to raise specific defences to meet the current and future flood defence levels of +5.18m AOD and +6.20m AOD respectively;
- Comment on whether the existing defences could be raised, if required, to achieve the current or future flood defence levels of +5.18m AOD and +6.20m AOD respectively.

2.1.4 This document presents the findings of the inspections and desk studies completed as part of this commission. Appendix B presents a summary of the areas surveyed.

2.1.5 Appendix D provides Outline Design Sketches showing possible options for increasing the flood defence walls to a level of +6.20m AOD. Each of the structural forms for the different river walls have been considered and pros and cons for each have been provided, subject to the limitations described in section 2.3.3 of this document.

2.2 Exclusions

2.2.1 This commission does not cover the following items:

- Structural analyses relating to existing structures or possible modifications to raise flood defence levels;
- Residual life assessments;
- Recommendations for repairs or remedial works.

2.3 Assumptions & Limitations

2.3.1 Topographic Data - a desk study review of available topographic survey data covering the river walls in the project area was completed. This was to assess whether the walls met the current required flood protection level of +5.18m AOD. The topographic survey used was completed by Atkins in 2013 and consequently the crest levels of the flood walls might have varied since the survey. During Atkins' visual inspection, any indications of recent settlement or other lowering of the flood defence level (such as damage to flood parapets) was recorded against each of the flood walls inspected.

2.3.2 As-built drawings - as-built drawings for several assets were provided. These have been reviewed as part of this commission to verify the form of construction where possible. However, the information which could be obtained from the drawings was limited owing to their low quality and resolution, and the as-built flood level could not be verified.

2.3.3 The outline option sketches presented in Appendix D are subject to the following limitations:

1) The structural form presented for each form of river wall is indicative only and is based largely on on-site observations.
2) Further intrusive and exploratory works would be required in order to confirm the condition of each of the surveyed walls and to assess whether the presented options are viable.
3) No numerical analyses have been undertaken during the preparation of the options presented. Typical analyses required to verify the suitability of any of the options at a later stage would include, but is not limited to: back-analyses of the existing

structures, stability calculations, and seepage and ground condition assessments.

4) There may be unknown local issues or restrictions which would render the options presented unacceptable to either the riparian owner(s) of the existing structures or the Environment Agency.

5) The list of raising options presented for each structural form is non-exhaustive and there may be additional options which are feasible.

3. SURVEY METHODOLOGY

3.1 Scope of Surveys

3.1.1 The surveys performed under this commission comprised a series of visual inspections. No intrusive or exploratory works were undertaken.

3.2 Access

3.2.1 Access to each of the sites was arranged via a land agent prior to the surveys being undertaken. Landside inspections were completed on foot by two Atkins engineers on 16th June, 18th June and 2nd July 2015. These were used to assess the condition and construction of the crest of the flood wall, as well as identify indications of settlement or movement. The landside surveys were also used to establish a chainage system (see Section 3 below).

3.2.2 Between 18th and 19th June, waterside surveys were performed by boat to view the condition of the flood wall structures from water level. Access was timed to coincide with low tides in order to view as much of the flood walls as possible. Additional passes close to the walls were performed as the tide level increased in order to allow the survey team to closely observe the upper sections of each flood wall. Foot access along the foreshore was not undertaken owing to silt levels and the risk of entrapment.

3.3 Reference system

3.3.1 For each flood wall asset (where an asset is defined as the length of wall with a single EA asset reference number) a chainage system was established to allow the approximate location of defects to be determined. In all cases, chainage 0m was taken as the upstream extent of the asset.

3.4 Recording Techniques

3.4.1 The following records were taken during the surveys:

- Video footage with commentary;
- Photos;
- Written notes;
- Tape measurements, where appropriate.

3.5 Condition Grading System

3.5.1 The river walls covered by this commission were assessed using the Environment Agency's (EA) "Condition Assessment Manual" (document reference 166_03_SD01). Table 2.1 of the document cites the following hierarchy of condition grading

Grade	Description of Condition	Extent of deterioration/defects in existing structure
1	Very Good	Cosmetic defects that will have no effect on performance.
2	Good	Minor defects that will not reduce overall performance of asset.
3	Fair	Defects that could reduce the performance of asset.
4	Poor	Defects that would significantly reduce performance of asset.
5	Very Poor	Severe defects resulting in complete performance failure.

3.5.2 The EA condition grade assigned to each river wall is generally taken to apply to the whole length of the asset. However, in some instances it is appropriate to assign a second score which takes account of a localised section of the frontage which is in worse / better condition that the rest of the asset. Throughout this report, this "sub-score" is expressed as the number in parenthesis. Where walls are composed of more than one construction type of varying condition grade, the condition is expressed thus: "X / Y" where X and Y are condition grades of the different construction forms.

4. SURVEY FINDINGS

4.1 ASD Metalworks Ltd / Crossrail

4.1.1 EA Asset ID 06304TH000303L03

Wall Construction	Upstream extent of the frontage is a blockwork wall with a rock armour revetment as toe protection. A sheet pile cut off has been installed in front of the revetment and a concrete bag work section situated in the corner of the flood wall. The remainder of the frontage is steel sheet piling (SSP) with a concrete capping beam which appears to have been raised to afford a greater standard of flood protection. A steel frame supporting rails for a spoil transfer hopper has been constructed in front of the flood wall. The frame is protected by large diameter steel tubular piles with rubber fenders. Horizontal bracing members have been installed between the spoil support frame and the sheet pile wall, presumably to provide lateral support to the frame.
Structural Condition	Concrete bag work appears to be in good condition with no signs of missing or damaged bags. However, a close inspection was not possible [Figure 5]. Sheet pile cut off has been installed at approximately 10m chainage for approx 10m; it has likely been installed to either retain the toe of the rock armour revetment and concrete bag work section or to protect the structures from impact damage. Alternate piles are “left high”[Figure 7]. The cut-off is in good condition with only minor superficial corrosion and no sign of vessel impact. The blockwork wall is generally in good condition and appears stable along the majority of the frontage. Some erosion and scour of the toe is evident at the eastern extent where it meets the bag work [Figure 6]. The alignment of the steel sheet piling appeared to be good with no indication of leaning. The piles themselves appeared to be in good condition with limited levels of corrosion. There are no visible waling bolts or anchor bolts in the steel sheet pile section. There are 2 flap valves which are missing from the sheet pile section. One has a large void behind which might indicate loss of fill material [Figure 4]. A topside survey could not be carried out on the upstream extent of the steel sheet piling and concrete bagwork sections due to the presence of a temporary structure covering the ground over this asset [Figure 8 and Figure 9]. No settlement behind the wall was observed along the sections which could be accessed.

Land Use	Land is owned by ASD Metalworks Ltd and is understood to be leased by Crossrail for spoil transfer operations, although these now appear to have ceased.
Condition Grade	Concrete bag work section – 3 Steel sheet piling – 2

Figure 1 - Steel sheet pile wall with large diameter fender piles and rails for spoil transfer system

Figure 2 - Steel sheet pile wall with concrete capping beam and parapet

Figure 3 - Intersection between steel sheet pile capping beam and spoil transfer structure

Figure 4 - Broken flap valve on sheet pile wall

Figure 5 - Concrete bagwork section with steel frame for spoil transfer hopper in foreground

Figure 6 - Blockwork wall frontage with localised erosion at toe of wall

Figure 7 - Steel sheet pile toe protection to block wall

Figure 8 - Temporary structure covering ground at upstream extent of the frontage

Figure 9 - Intersection between temporary structure and existing river wall

Flood defence levels	Level from 2013 topographic survey	5.08m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.1m
	Raising required to meet future flood defence level (+6.2m AOD)	1.12m
	Potential for Raising River Wall Level: Possible - see Sketches STWTN-ATK-SRW-XXXX-DR-C-0002 and STWTN-ATK-SRW-XXXX-DR-C-0006 in Appendix D for possible options for raising the river wall level.	

4.1.2 EA Asset ID 06304TH000303L02

Wall Construction	Masonry mass gravity wall with raised concrete parapet, three no. ground anchors at approximately 5m centres. The wall line is advanced, compared to the adjacent asset 06304TH000303L03. A steel frame supporting rails for a spoil transfer hopper has been constructed in front of the flood wall. The frame is protected by large diameter steel tubular piles with rubber fenders. Horizontal bracing members have been installed between the spoil support frame and the masonry wall, presumably to provide lateral support to the frame.
Structural Condition	The wall is in poor condition. There is a section of older masonry at the downstream extent of the frontage with loss of pointing; timber fenders have been attached to the wall at this section, possibly to protect the unstable section of wall from further impact damage [Figure 11]. There is a 5m (w) x 3m (h) section of heavily cracked masonry at the top of the wall adjacent to asset 06304TH000303L03 (upstream). This section appears unstable. The masonry units immediately below have suffered considerable erosion and loss of pointing [Figure 10]. The frontage as a whole appears to be misaligned and there is evidence of bulging. There is a horizontal crack which runs along a mortar joint across the entire length of the frontage. The crack is approximately mid-height between bed level and the elevation of the restraint anchors [Figure 12 and Figure 13]. There is some voiding behind the ground anchor plates. There are several missing bricks at high level below the line of the horizontal bracing for the spoil transfer hopper rails [Figure 11]. There does not appear to be any settlement behind the frontage.
Land Use	Land is owned by ASD Metalworks Ltd and is understood to be leased by Crossrail for spoil transfer operations, although these now appear to have ceased.
Condition Grade	4

Figure 10 - Section of heavily cracked and unstable masonry at upstream end

Figure 11 - View of older masonry and timber fenders at downstream end

Figure 12 - View of misalignment and bulging in wall

Figure 13 - View of horizontal crack in bed joints mid-height between bed level and anchor height

Figure 14 - Crack in concrete parapet with crack monitoring plates

Flood defence levels	Level from 2013 topographic survey	5.05m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.13m
	Raising required to meet future flood defence level (+6.2m AOD)	1.15m
	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0003 in Appendix D for possible options for raising the river wall level.	

4.1.3 EA Asset ID 06304TH000303L01

Wall Construction	Anchored steel sheet pile wall with a concrete capping beam. The concrete capping beam has been retrospectively raised by approximately 500mm.There are anchors at 8 pile centres and waling bolts in every in-pan at approximately 2/3 of retained height. A steel frame supporting rails for a spoil transfer hopper has been constructed in front of the flood wall. The frame is protected by large diameter steel tubular piles with rubber fenders. Horizontal bracing members have been installed between the spoil support frame and the piles, presumably to provide lateral support to the frame.
Structural Condition	The piles are generally in good condition. Accelerated corrosion to the sheet piles around the welded connections to the bracing structure is evident [Figure 18]. There is one possible instance of accelerated low water corrosion approximately 20m from the downstream end [Figure 17] There is minor cracking to the raised parapet at isolated locations. The wall alignment appeared to be good with no signs of leaning. No full-depth-thickness corrosion was observed. There does not appear to be any signs of settlement behind the frontage. There are high levels of vegetation growth directly behind the concrete river wall, including buddleia which can cause structural damage [Figure 19].
Land Use	Land is owned by ASD Metalworks Ltd and is understood to be leased by Crossrail for spoil transfer operations, although these now appear to have ceased.
Condition Grade	2 (3 – sections of concrete parapet)

Figure 15 - Steel sheet pile with steel brace and concrete parapet

Figure 16 - Steel sheet pile with large diameter fender piles (left) and frame supporting rails for spoil hopper (behind)

Figure 17 - Localised corrosion, possible Accelerated Low Water Corrosion

Figure 18 - Welded connection to brace hopper support frame. Elevated corrosion of piles around connection evident

Figure 19 - Vegetation growth behind the raised flood wall

Flood defence levels	Level from 2013 topographic survey	5.06m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.12m
	Raising required to meet future flood defence level (+6.2m AOD)	1.14m
	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0002 in Appendix D for possible options for raising the river wall level.	

4.2 ASD Metalworks Ltd

4.2.1 EA Asset ID 06304TH000302L39

Wall Construction	Masonry mass gravity wall with timber cladding and sections of concrete repair.
Structural Condition	This frontage is in poor condition. Where exposed, the masonry is badly eroded and there is a large vertical crack in the eastern curved section where the wall returns to meet the adjacent frontage [Figure 21 and Figure 22]. Attempts have been made to patch either damaged or missing masonry with mass concrete or a repair grout. These repairs are up to 3m2 in area. Some of these repaired sections appear unintegrated with some separation lines evident [Figure 22]. There is no visible cracking on the parapet. The upstream section of the wall is clad in timber and thus it was not possible to view the structure behind. The timber cladding is severely rotted. There is a steel channel section approximately 1-2m below the top of the wall which is severely corroded and whose connections to the wall have become loose. It is not clear whether this channel is intended to provide restraint to the wall or only the cladding [Figure 20 and Figure 21].
Land Use	Land is owned by ASD Metalworks Ltd and is understood to be leased by Crossrail for spoil transfer operations, although these now appear to have ceased.
Condition Grade	4

Figure 20 - Corroded steel restraint channel which is separating from the wall

Figure 21 - Interface between exposed masonry sections and timber clad section. Masonry is badly eroded or missing. Large repairs using (sprayed) concrete

Figure 22 - Large vertical crack in masonry section

Figure 23 - Loss of pointing in masonry section, together with rotten timber cladding

Flood defence levels	Level from 2013 topographic survey	5.1m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.08m
	Raising required to meet future flood defence level (+6.2m AOD)	1.1m

	Potential for Raising River Wall Level: Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0003 in Appendix D for possible options for raising the river wall level.

4.2.2 EA Asset ID 06304TH000302L38

Wall Construction	Concrete apron with masonry wing walls and a concrete upstand as a flood defence parapet, which has been raised retrospectively. The apron itself also appears to have been a retrospective addition to the frontage, potentially as a means of stabilising the original frontage behind.
Structural Condition	This frontage is in poor condition. There is significant voiding of the apron [Figure 24 and Figure 25]. There are visible sections where voids have been repaired with concrete multiple times [Figure 25]. The surfacing to the remainder of the apron is cracked and unstable, particularly around the area surrounding the void at the eastern extent [Figure 24 and Figure 25]. There is potential settlement of the ground behind the frontage [Figure 26]. The raised section of the upstand is cracked and some sections (up to 3m) are missing. At some locations, this appears to be the result of damage caused by vehicular impact, causing damage to the parapet and handrails [Figure 26 and Figure 28]. There is slight misalignment of the capping beam which could potentially be due to settlement. The masonry wing walls either side of the apron have eroded and there is loss of pointing. The walls have been repaired with new bricks in some areas but repairs do not appear fully embedded or integral [Figure 27].
Land Use	The area directly behind the frontage is used for heavy goods vehicles (HGV) access and parking.
Condition Grade	4 (5)

Figure 24 - Concrete apron and masonry abutments

Figure 25 - Void in concrete apron

Figure 26 - Impact damage to concrete parapet and possible settlement behind the frontage

Figure 27 - Repaired section of masonry wall

Figure 28 - Missing section of raised concrete parapet

Flood defence levels	Level from 2013 topographic survey	5.01m AOD
	Evidence of crest settlement	Yes
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.17m
	Raising required to meet future flood defence level (+6.2m AOD)	1.19m
	<u>Potential for Raising River Wall Level:</u> Possible – see Sketch STWTN-ATK-SRW-XXXX-DR-C-0003 in Appendix D for possible options for raising the river wall level.	

4.2.3 EA Asset ID 06304TH000302L37

Wall Construction	Masonry mass gravity wall with remnants of timber fenders.
Structural Condition	This frontage is in poor condition. There is heavy erosion to the masonry units with loss of pointing [Figure 30 and Figure 31]. Large sections of missing masonry have been replaced with newer brickwork [Figure 29]. There are remnants of an anchored horizontal steel waling beam approximately 1.5-2m below crest level. This steel section is now missing although the ties are still visible [Figure 30]. Voiding of the masonry was observed behind the remnants of a timber fender at high level [Figure 31]. Algal growth precluded a more thorough assessment of the condition of the masonry [Figure 32]. There is no evidence of settlement behind the structure.
Land Use	The land immediately behind the frontage is occupied by the site office for ASD Metalworks Ltd.
Condition Grade	4

Figure 29 - Interface between masonry wall and masonry abutment. View of large sections of replacement masonry

Figure 30 – View of eroded masonry wall with concrete parapet and remnants of steel waling beam.

Figure 31 - Voided masonry behind remains of timber fender

Figure 32 – View of algal growth and remains of timber fenders at downstream extent of asset

Flood defence levels	Level from 2013 topographic survey	5.08m AOD
	Evidence of crest settlement	No

	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.1m
	Raising required to meet future flood defence level (+6.2m AOD)	1.12m
	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0003 in Appendix D for possible options for raising the river wall level.	

4.2.4 EA Asset ID 06304TH000302L36

Wall Construction	Sheet pile construction with a set-back concrete flood defence parapet which has been raised after construction. It is believed the piles are anchored.
Structural Condition	This wall is in fair condition. Sheet piles appear to have been installed in front of the existing frontage. The upper reaches of the sheet piles were observed to have been backfilled with concrete at eastern extent of the frontage. Aside from superficial corrosion, the piles are generally in good condition. Some full-thickness corrosion of the piling was observed at the downstream extent of the frontage [Figure 36]. The interface between this asset and the adjoining masonry structure is in the form of a concrete transition or “plug” which is likely unreinforced. Several horizontal cracks were noted in the concrete mass [Figure 34]. There is a section of flood parapet missing (at 33m - 47m chainage). The capping beam has cracked and rotated at the eastern extent of the frontage. There is no sign of settlement behind the structure.
Land Use	The land behind the frontage is occupied by the site office for ASD Metalworks Ltd and employee parking.
Condition Grade	3 (4 – for sections of piling which exhibit full-thickness corrosion and missing flood parapet)

Figure 33 - Waling bolt on sheet pile wall

Figure 34 – Damage to concrete interface between sheet pile wall and downstream adjacent masonry wall

Figure 35 – View of steel sheet pile wall and concrete interface

Figure 36 – Full-thickness corrosion at the downstream extent of the frontage

Figure 37 - Concrete backfill behind sheet piles and concrete parapet

Flood defence levels	Level from 2013 topographic survey	5.3m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	NONE
	Raising required to meet future flood defence level (+6.2m AOD)	0.9m
	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0001 in Appendix D for possible options for raising the river wall level.	

4.2.5 EA Asset ID 06304TH000302L35

Wall Construction	Masonry mass gravity wall	
Structural Condition	The wall is in poor condition. The masonry wall is badly eroded and cracked, with several surface voids [Figure 38 and Figure 39]. There is a large crack and hole at the base of the wall at the eastern extent of the frontage. The alignment of the wall appeared to be fair with no sign of bulging. There is no sign of crest settlement behind the frontage.	
Land Use	Car park for ASD Metalworks Ltd	
Condition Grade	4	
 Figure 38 - Masonry wall with car park behind the frontage	 Figure 39 – Cracking in masonry wall	
Flood defence levels	Level from 2013 topographic survey	5.1m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.08m
	Raising required to meet future flood defence level (+6.2m AOD)	1.1m

	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0003 in Appendix D for possible options for raising the river wall level.

4.3 Keltbray Ltd / European Metal Recycling Ltd

4.3.1 EA Asset ID 06304TH000302L34

Wall Construction	Steel sheet pile wall with ground anchors at 8 pile centres and a mid-height waling beam with bolts at every in-pan. There is an additional waling beam at approximately 1/3 retained height at the western extent of the frontage. The type of steel sheet pile section changes at approximately 53m chainage.
Structural Condition	The sheet piles are generally in poor condition. At the downstream extent, the toes of the piles appear to be “kicking out” which might indicate toe bearing failure of the wall. There appears to be forward leaning of the piles at the location of a mooring bollard used to secure barges associated with spoil transfer. The piles exhibit superficial corrosion. There are isolated areas of more extensive and concentrated corrosion to full thickness [Figure 43]. There is consistent damage and crumpling to the tops of the piles across the whole of the frontage [Figure 40]. Impact damage to the sheet piles was observed at 60m chainage [Figure 42].
Land Use	The land behind the frontage is used for spoil transfer and disposal. There is regular HGV traffic and excavators traversing the area immediately behind the frontage.
Condition Grade	4 (pending further investigation of the cause for the piles’ non-verticality)

Figure 40 - Steel sheet pile wall with crumple damage to the top of the piles

Figure 41 - Waling and anchor bolts

Figure 42 - Impact damage to steel sheet piles

Figure 43 - Localised full-thickness corrosion to sheet piles

Flood defence levels	Level from 2013 topographic survey	5.03m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.15m
	Raising required to meet future flood defence level (+6.2m AOD)	1.17m
	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0001 in Appendix D for possible options for raising the river wall level.	

4.3.2 EA Asset ID 06304TH000302L33

Wall Construction	Sheet pile wall with alternating ground anchors and waling bolts at 4 pile centres. Frontage appears to have been piled in front of existing defence. A review of available as-built drawings confirms that the sheet piles comprising this frontage were driven in front of the existing flood wall, and that the piles are anchored back to a dead man wall. The drawings reviewed are of insufficient quality to discern the date of construction or additional details.
Structural Condition	The frontage is in poor condition. The piles lean backwards along this frontage. This could be the manner in which they were driven, or it could indicate instability of the wall whereby the toe of the wall is “kicking-out”. The piles exhibit primarily superficial corrosion. There is consistent damage and warping to the tops of the piles across the whole of the frontage. The tops of the sheet piles have been backfilled using mass concrete [Figure 48]. The sheet piles are slightly misaligned and lean slightly to the right when viewed from in front; this is likely to be the result of poor driving. Near the downstream extent of the frontage there is a missing flap valve [Figure 44].
Land Use	The land behind the frontage is used for spoil transfer and disposal. There is regular HGV traffic and excavators traversing the area immediately behind the frontage.
Condition Grade	4 (pending further investigation of the cause for the piles’ non-verticality)

Figure 44 – Pile non-verticality

Figure 45 – View of upstream end of asset, showing how the piles have been driven in front of existing frontage

Figure 46 - Hole in sheet piling indicating missing flap valve

Figure 47 - Steel sheet pile wall

Figure 48 - Concrete back filling behind piles

Flood defence levels	Level from 2013 topographic survey	5.03m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.15m
	Raising required to meet future flood defence level (+6.2m AOD)	1.17m
	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0001 in Appendix D for possible options for raising the river wall level.	

4.4 Quintain Ltd

4.4.1 EA Asset ID 06304TH000302L32

Wall Construction	Steel sheet piling capped with a steel plate and in-situ mass concrete coping. There is a Thames Water outfall structure at 47.5m chainage.
Structural Condition	This frontage is generally in good condition. There are no signs of settlement to the land behind the frontage. There are some minor cracks in the capping beam at 16m chainage. There is also heavy damage to the coping adjacent to the mooring bollards [Figure 51]. There is some minor pitting corrosion of the sheet piles. Otherwise, the piles appear in good condition. The alignment of the piles appeared to be good with no sign of leaning. The mooring of barges along this frontage appears common and the absence of fenders means that both the piling and the coping receive impact damage. It should be noted that a large proportion of the frontage was obscured from view due to the presence of moored vessels.
Land Use	General storage of plant, equipment and scrap.
Condition Grade	Steel sheet pile wall – 2 Concrete capping beam – 3 (4)

Figure 49 - Steel sheet pile wall and concrete Thames Water outfall

Figure 50 - Steel sheet pile wall adjacent to Thames Water outfall

Figure 51 – Damage to coping adjacent to mooring bollard

Flood defence levels	Level from 2013 topographic survey	5.1m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.08m
	Raising required to meet future flood defence level (+6.2m AOD)	1.1m
	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0001 in Appendix D for possible options for raising the river wall level.	

4.4.2 EA Asset ID 06304TH000302L31

Wall Construction	The asset is comprised of the old steel lock gates to the Royal Victoria Dock, together with concrete abutment walls. Downstream of the east abutment, the asset construction changes to a steel sheet pile wall section. The abutments are of concrete construction with vertical in-cast steel rails used presumably as a means of reinforcement. The steel gates are clad with close centred timber planking. The steel sheet pile wall has ground anchors at 8 pile centres and waling bolts at every in-pan. The piles are capped using an in-situ concrete coping. There is no discernible flood parapet across the frontage.
Structural Condition	The lock gates appear to be in fair condition, although the timber cladding precluded a more rigorous visual assessment. It is not known whether sufficient modifications were made to the gate structure and supports to allow it to function as an earth-retaining structure [Figure 54 and Figure 55]. The abutments appeared to be in good condition with no signs of cracking or other structural distress. The steel sheet piling appeared to be in generally good condition with only low levels of corrosion evident. However, at least one waling bolt was observed to have completely perished [Figure 56]. The pile alignment appeared to be good with no sign of leaning. The coping to the sheet piles is in generally fair condition – some impact damage and erosion is evident. There was no sign of ground settlement at any location behind the whole frontage. A linkspan has been positioned near to the western extent of the lock gates which is used to provide access to a floating barge. The use of the linkspan has caused some localised damage to the ground used to provide access to a floating barge.
Land Use	General storage of plant, equipment and scrap.
Condition Grade	Steel lock gates – 3 Concrete abutment walls – 2 Steel sheet piling – 3 (4 – missing waling bolts)

Figure 52 - Steel sheet pile wall with waling, anchor bolts and concrete coping

Figure 53 - Concrete abutments with steel railing reinforcement

Figure 54 - Steel lock gates with close centred timber cladding

Figure 55 - Steel lock gates with close centred timber cladding

Figure 56 - Perished waling bolts

Flood defence levels	Level from 2013 topographic survey	5.43m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	NONE
	Raising required to meet future flood defence level (+6.2m AOD)	0.77m
	<u>Potential for Raising River Wall Level:</u> Possible – see Sketch STWTN-ATK-SRW-XXXX-DR-C-0003 in Appendix D for possible options for raising the height of the concrete abutments. See Sketch STWTN-ATK-SRW-XXXX-DR-C-0002 in Appendix D for possible options for raising the height of the concrete coping along the piled wall. See Sketch STWTN-ATK-SRW-XXXX-DR-C-0004 in Appendix D for possible options for raising the defence height at the old dock gates.	

4.4.3 EA Asset ID 06304TH000302L30

Wall Construction	Steel sheet pile wall with concrete capping beam and concrete flood wall which has been raised retrospectively to afford a higher standard of flood protection. There are ground anchors at 8 pile centres directly below the capping beam. There are no visible waling bolts along the frontage. As-built drawings verify that the piled wall is anchored to “dead men” and that the flood parapet was raised in or around 1971. According to the dates of the drawings, the wall was originally constructed in or around 1966. The quality of the drawings is insufficient to allow more detailed information to be obtained.
Structural Condition	This frontage is in good-to-fair condition. The wall alignment is good with no sign of leaning. The soffit of the capping beam is eroded along the whole frontage with some areas of exposed and corroded steel reinforcement. There are also areas of spalling which could either be the result of vessel impact or corrosion of the reinforcement brought on by insufficient concrete cover. There is a significant section of exposed steel reinforcement at 60m chainage [Figure 60]. Large cracks visible from riverside at 10m and 55m chainage. There is resurfacing on the landside at 55m chainage adjacent to the vertical crack in the flood wall [Figure 61]. There are small vertical cracks in the flood wall at 70m chainage. The piles at 0m chainage have been formed by splicing shorter sections together using welds. There are no indications that these piles are under any form of distress and no misalignment or leaning is evident [Figure 62]. There is a break in the piling at 50m chainage where there is a concrete “plug” in place of a pile. There is no evidence to suggest a pile has been lost [Figure 58]. There are accelerated levels of corrosion at welded connections formally used to secure fenders [Figure 59].
Land Use	Construction traffic and construction material storage Warehouse storage
Condition Grade	Steel sheet piling – 2(3) Concrete capping beam – 3

Figure 57 – Splash zone corrosion and erosion of soffit of the concrete capping beam

Figure 58 – View of break in construction – joint in capping beam and concrete “plug” in place of pile below joint

Figure 59 - Accelerated corrosion of steel sheet piles at welded connections

Figure 60 - Spalling to soffit of concrete capping beam with exposed corroded steel reinforcement

Figure 61 - Crack in river wall with resurfacing on the land directly behind the frontage

Figure 62 - Section of sheet piles which have been horizontally spliced

Flood defence levels	Level from 2013 topographic survey	5.05m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.13m
	Raising required to meet future flood defence level (+6.2m AOD)	1.15m
	<u>Potential for Raising River Wall Level:</u> Possible – see Sketch STWTN-ATK-SRW-XXXX-DR-C-0002 in Appendix D for possible options for raising the river wall level.	

4.4.4 EA Asset ID 06304TH000302L29

Wall Construction	Steel sheet pile wall with external waling beam and grouted ground anchors at 12 pile centres. The top sections behind the piles have been backfilled with concrete. Between 0m and 12m chainage, the river wall has been raised by approx. 400mm The frontage is connected to the upstream asset (06304TH000302L30) with a concrete plug, likely unreinforced.
Structural Condition	This frontage is in poor condition. The concrete connection between assets has a large horizontal crack at around mid-height [Figure 63]. The piles lean backwards – this could be the result of the manner in which they were driven, or could be the result of toe bearing failure causing the toes of the piles to “kick out”. There is vegetation growing out of the wall at 17m chainage. There are multiple large corrosion holes above the waling beam with voids behind indicating fill has been lost [Figure 64]. There is impact damage to the waling beam at approximately 22m chainage [Figure 66]. There is impact damage to the top of the piles at various locations across the frontage. The movement joints observed did not appear to have sealant present [Figure 67]. The ground surfacing behind the frontage is cracked and uneven indicating possible movement [Figure 68].
Land Use	The land behind the frontage is used by The Old Basket Company for storage
Condition Grade	4

Figure 63 - Interface between steel sheet pile wall and adjacent upstream asset

Figure 64 - Full depth corrosion of steel sheet piles with voids in the concrete back fill

Figure 65 - Steel sheet pile wall with external waling beam. Piles leaning backwards

Figure 66 - Impact damage to waling beam

Figure 67 - Movement joint with no sealant present

Figure 68 - Cracked and uneven surfacing behind the frontage

Flood defence levels	Level from 2013 topographic survey	5.14m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	0.04m
	Raising required to meet future flood defence level (+6.2m AOD)	1.06m
	<u>Potential for Raising River Wall Level:</u> Possible – see Sketch STWTN-ATK-SRW-XXXX-DR-C-0002 in Appendix D for possible options for raising the river wall level.	

4.5 Nuplex Resin Limited

4.5.1 EA Asset ID 06304TH000302L28

Wall Construction	Frontage is an old dock of steel sheet pile construction with ground anchors generally at 6 pile centres, and waling bolts at every other in-pan. There are timber fenders mounted on the piles at the entrance. There is a set-back concrete parapet which runs around the perimeter of the dock embayment. At the Western extent of the dock there is a section of timber wall which appears to have been backfilled with mass concrete. There is a steel section which appears to be acting as a restraint to the timber.
Structural Condition	The sheet piles appeared to be in good condition with low levels of corrosion. Given their sheltered location, very little in the way of impact damage was noted [Figure 69]. The alignment of the sheet piles appeared to be good with no signs of leaning. There are no signs of settlement in the land behind the frontage. Elevated levels of corrosion to the anchor and waling bolts were noted [Figure 72]. The timber wall section of the frontage is in poor condition. Large sections of timber are missing and the concrete behind has multiple voids [Figure 75]. The steel section, which is assumed to be a wall restraint, is corroded but there is no sign of full depth corrosion.
Land Use	The land directly behind the frontage is owned by Nuplex Ltd but appears largely unused.
Condition Grade	Steel sheet piling – 2 Timber wall – 4

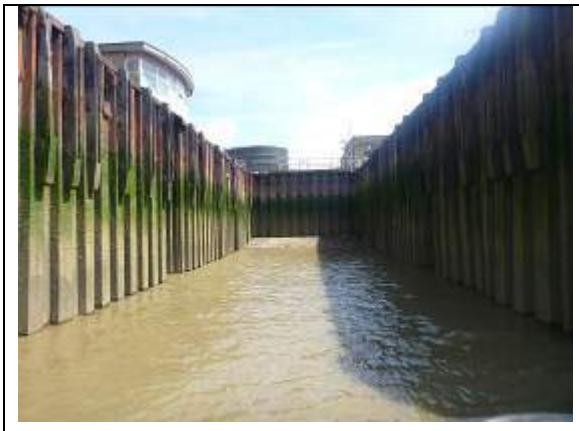


Figure 69 - Steel sheet pile dock

Figure 70 - Timber fenders on entrance to the dock

Figure 71 - Steel sheet pile walls with waling and anchor bolts

Figure 72 - Corroded waling and anchor bolts

Figure 73 - Timber wall section at upstream extent of asset

Figure 74 - Timber wall with concrete fill behind

Figure 75 - Timber wall and voids in concrete at intersection with steel sheet piling

Flood defence levels	Level from 2013 topographic survey	5.3m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	NONE
	Raising required to meet future flood defence level (+6.2m AOD)	0.9m
	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0005 in Appendix D for possible options for raising the river wall level around the old dock structure. See Sketch STWTN-ATK-SRW-XXXX-DR-C-0003 in Appendix D for possible options for raising the river wall level around the timber wall.	

4.6 South Bank

Wall Construction	The flood defence is of multi-tiered construction. The riverside toe of the defence is a mixture of gabion baskets and steel sheet piling, which support a vegetated inter-tidal terrace. Behind the terrace is a cantilevered L-shaped concrete wall, which supports a 3m wide Thames Path. Behind the path there are 4 No (120mm high, 1000mm wide) paved steps up to the flood defence level. The above construction details are verified in the available as-built drawings.
Structural Condition	The concrete wall appears to be in good condition, although, visibility of the frontage from the riverside was impaired due to vegetation cover [Figure 76]. The crest level of gabion baskets appeared to undulate although the baskets themselves appeared to be in reasonably good condition with no signs of tears or loss of ballast [Figure 76]. The finish level of the sheet piling likewise appeared to undulate although the condition of the capping beam would seem to indicate that these undulations have existed since construction. The condition of the piles could not be viewed due to tidal and foreshore conditions. The alignment of the piles appeared to be generally good [Figure 77]. The paving and handrails along the path and crest are in good condition [Figure 78 and Figure 79].
Condition Rating	2

Figure 76 - Concrete wall is obstructed by reeds but gabion baskets at the toe are visible

Figure 77 - Section of the river wall with sheet piled toe

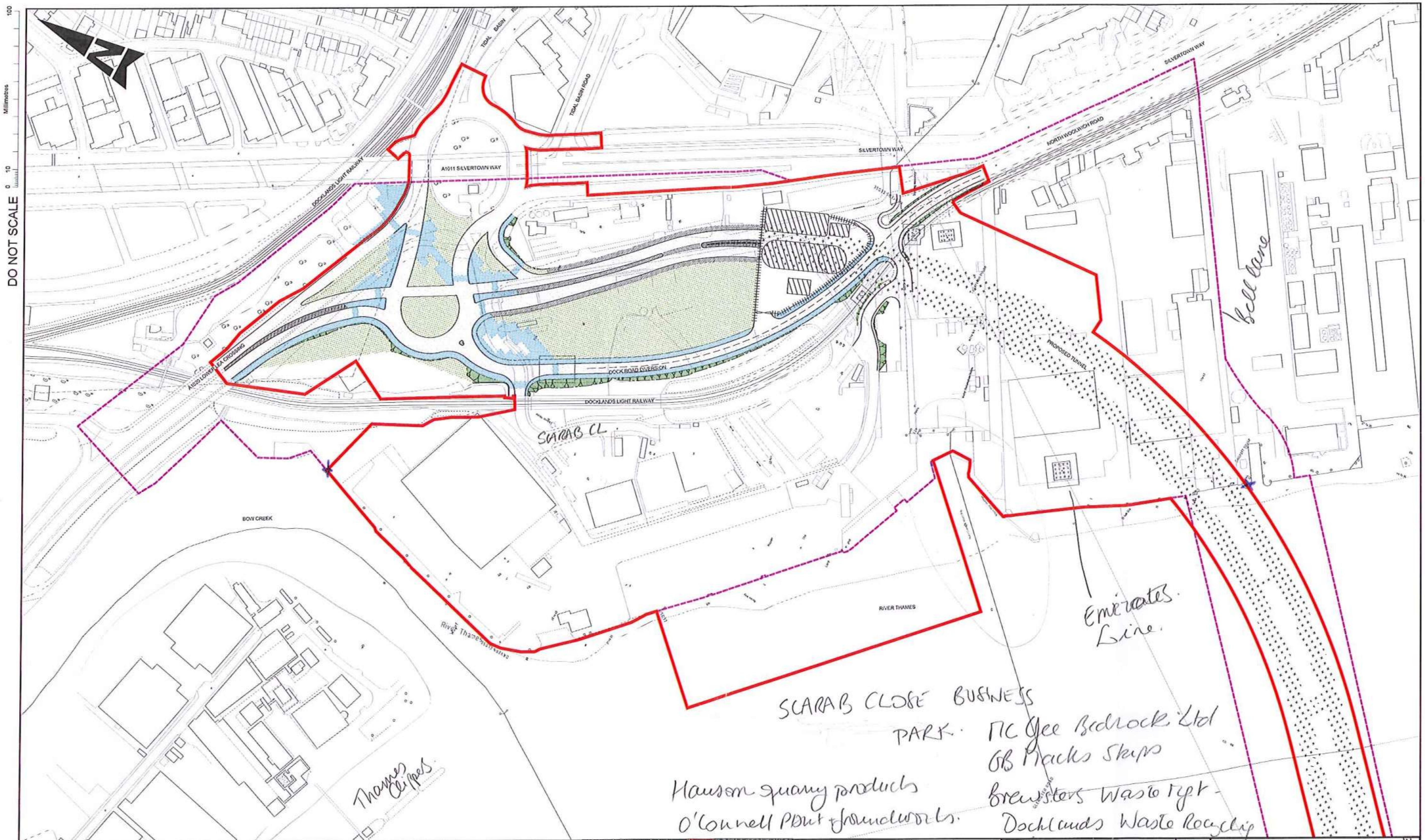
Figure 78 - Lower Thames Path directly behind the frontage

Figure 79 - Concrete steps up to second Thames Path - this is the flood defence level

Flood defence levels	Level from 2013 topographic survey	5.57m AOD
	Evidence of crest settlement	No
	Raising required to meet current statutory flood defence level (+5.18m AOD)	NONE
	Raising required to meet 2100 statutory flood defence level (+6.2m AOD)	0.63m
	<u>Potential for Raising River Wall Level:</u> Possible - see Sketch STWTN-ATK-SRW-XXXX-DR-C-0003 in Appendix D for possible options for raising the river wall level.	

APPENDIX A: TUNNEL WORKS RED LINE BOUNDARY PLAN

Adobe Acrobat Document



KEY:

- SCHEME FOOTPRINT
- PERMANENT WORKS ON EXISTING HIGHWAY FOOTPRINT (1.5 Ha)
- PERMANENT LAND TAKE - SURFACE (2.6 Ha)
- PERMANENT LAND TAKE - SUB SURFACE
- TEMPORARY LAND TAKE FOR TEMPORARY WORKS OR SITE COMPOUNDS (7.3 Ha)

NOTES:

1. THIS DRG HAS BEEN PREPARED USING INFORMATION TAKEN FROM:
   1.1. MOTT MACDONALD EXTENT OF WORKS DRGS MD-298348-Z-DR-00-ZZ-1001 TO 1003;
   1.2. MOUCHEL LANDOWNERSHIP PLANS SHEETS 1 TO 4, DATED 30/10/13.
2. THE INFORMATION SHOWN ON THIS DRAWINGS IS TO BE CONFIRMED THROUGH THE REFERENCE DESIGN DEVELOPMENT AND CONFIRMATION OF LAND OWNERSHIP DETAILS.

Scale 1:2500
50m 0m 50m 100m 150m

LOCATION PLAN

Rev	Drawn / Des	Checked	Approved	Date
P01	DB	MK	MM	15/05/15
FOR REVIEW				

Description

Drawing Status: WORK IN PROGRESS
Suitability: S0

ATKINS

Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
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Client

Project Title

Drawing Title: LAND REGISTRARY PLANS

SHEET 1 of 3

Draft - For Discussion Purposes Only

Scale	Designed	Drawn	Checked	Authorised
1:1250				
Original Size A1	Date 00/00/00	Date 00/00/00	Date 00/00/00	Date 00/00/00

Drawing Number: STWTNDCO - ATK - VGN - ZZ - DR - D - 000015
(Project / Originator / Volume / Location / Type / Role / Number)

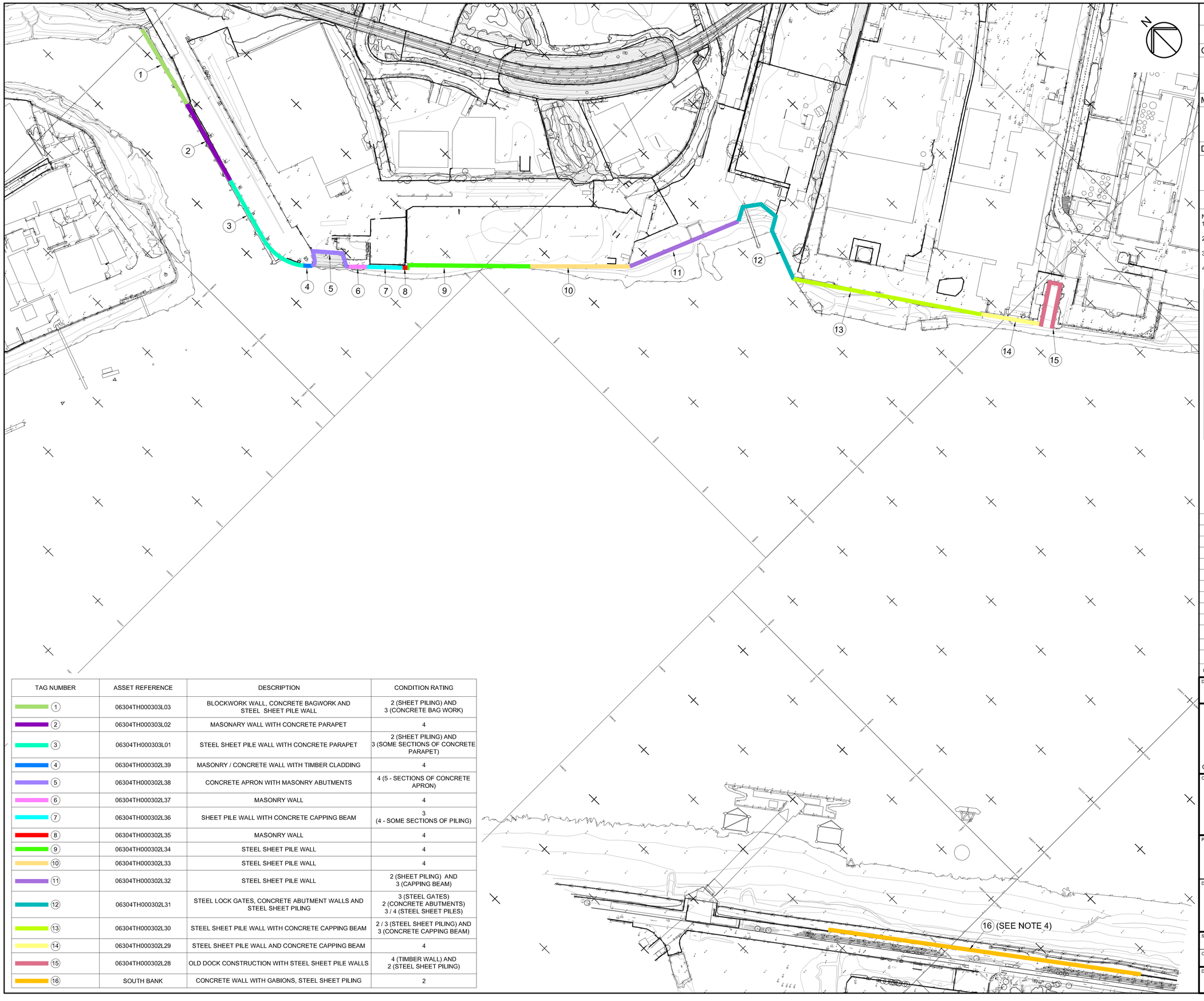
Project Ref No: 5123288

Revision: P01

\\wsatkins.com\Project\GBEMB\HandT\Tso\AR\Projects\5123288 - Silvertown Tunnel - ROBS3186\20_CAD\SILVERTOWN TUNNEL DEVELOPMENT CONSTWTNDCO-ATK-VGN-ZZ-DR-D-000015_000017.dwg Plotted by: bowe7306 Date: May 15, 2015 - 4:38pm

APPENDIX B: SURVEY EXTENTS

Adobe Acrobat Document



TAG NUMBER	ASSET REFERENCE	DESCRIPTION	CONDITION RATING
1	06304TH000303L03	BLOCKWORK WALL, CONCRETE BAGWORK AND STEEL SHEET PILE WALL	2 (SHEET PILING) AND 3 (CONCRETE BAG WORK)
2	06304TH000303L02	MASONARY WALL WITH CONCRETE PARAPET	4
3	06304TH000303L01	STEEL SHEET PILE WALL WITH CONCRETE PARAPET	2 (SHEET PILING) AND 3 (SOME SECTIONS OF CONCRETE PARAPET)
4	06304TH000302L39	MASONRY / CONCRETE WALL WITH TIMBER CLADDING	4
5	06304TH000302L38	CONCRETE APRON WITH MASONRY ABUTMENTS	4 (5 - SECTIONS OF CONCRETE APRON)
6	06304TH000302L37	MASONRY WALL	4
7	06304TH000302L36	SHEET PILE WALL WITH CONCRETE CAPPING BEAM	3 (4 - SOME SECTIONS OF PILING)
8	06304TH000302L35	MASONRY WALL	4
9	06304TH000302L34	STEEL SHEET PILE WALL	4
10	06304TH000302L33	STEEL SHEET PILE WALL	4
11	06304TH000302L32	STEEL SHEET PILE WALL	2 (SHEET PILING) AND 3 (CAPPING BEAM)
12	06304TH000302L31	STEEL LOCK GATES, CONCRETE ABUTMENT WALLS AND STEEL SHEET PILING	3 (STEEL GATES) 2 (CONCRETE ABUTMENTS) 3 / 4 (STEEL SHEET PILES)
13	06304TH000302L30	STEEL SHEET PILE WALL WITH CONCRETE CAPPING BEAM	2 / 3 (STEEL SHEET PILING) AND 3 (CONCRETE CAPPING BEAM)
14	06304TH000302L29	STEEL SHEET PILE WALL AND CONCRETE CAPPING BEAM	4
15	06304TH000302L28	OLD DOCK CONSTRUCTION WITH STEEL SHEET PILE WALLS	4 (TIMBER WALL) AND 2 (STEEL SHEET PILING)
16	SOUTH BANK	CONCRETE WALL WITH GABIONS, STEEL SHEET PILING	2

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

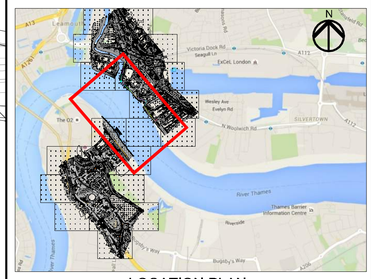
CONSTRUCTION

MAINTENANCE/CLEANING

DECOMMISSIONING/DEMOLITION

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES TO ORDNANCE SURVEY DATUM (NEWLYN).
3. HIGHLIGHTED WALLS WERE SURVEYED BETWEEN 16/06/2015 AND 02/07/2015.
4. SOUTH BANK WAS SURVEYED FROM EASTERN EXTENT OF QUANTUM SCULPTURE FOR APPROXIMATELY 225m.



LOCATION PLAN

SCALE 1 : 1250

10 m 0 100 m

Rev.	Date	Description	By	Chk'd	App'd
P1	01/07/2015	FOR INFORMATION	MT	PV	-

Drawing Status: FOR INFORMATION

Suitability: S1

ATKINS
Woodcote Grove
Ashley Road
Epsom
Surrey
KT18 5BW
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

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Client: TRANSPORT FOR LONDON

Project Title: SILVERTOWN TUNNEL RIVER WALL SURVEY

Drawing Title: ASSET CONDITION SURVEY PLAN

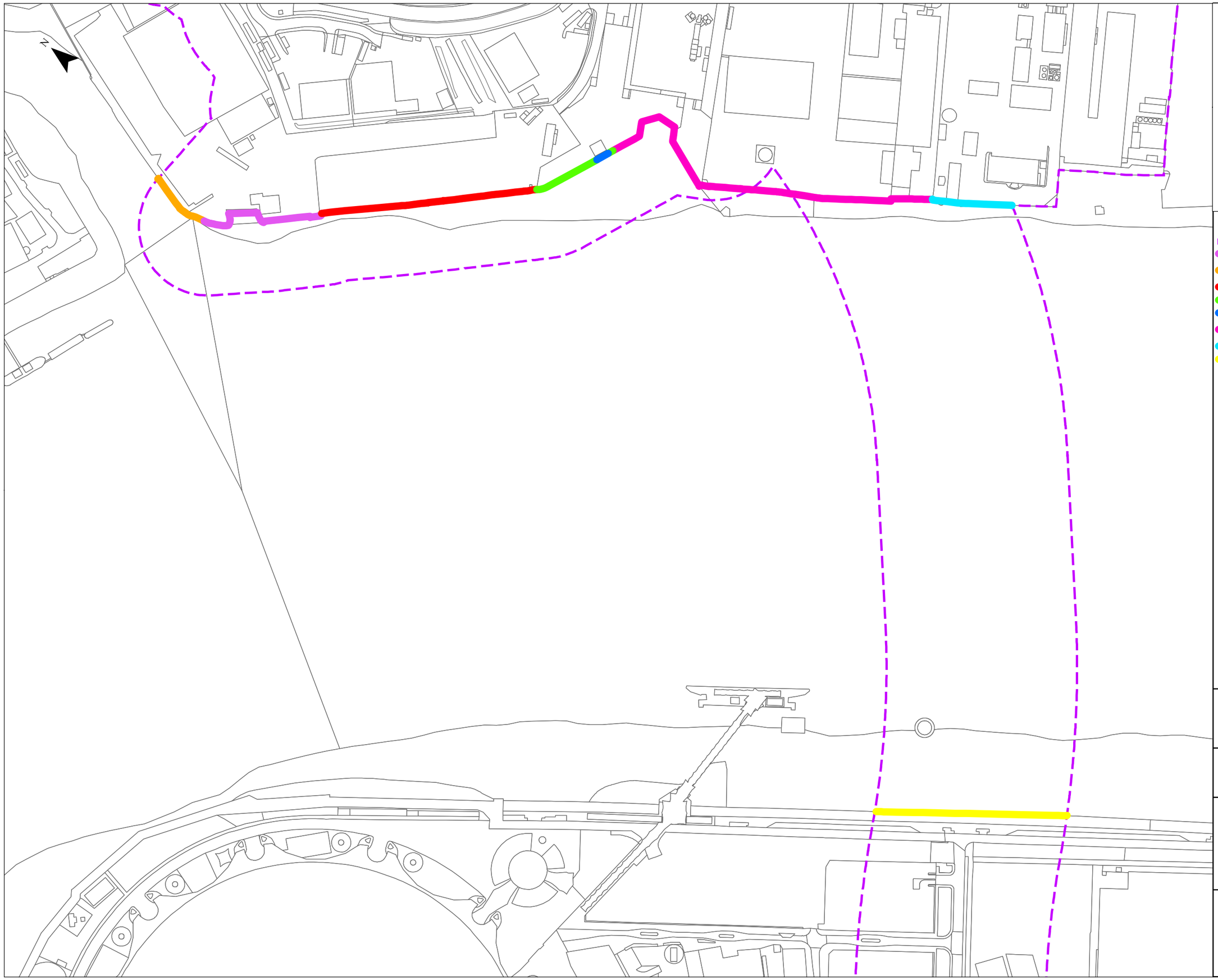
Scale	Designed	Drawn	Checked	Authorised
1:1250	PV	MT	PV	-
Original Size	**Date**	**Date**	**Date**	**Date**
A1	29.06.15	29.06.15	01.07.15	-

Drawing Number: 5123288-ATK-ZZ-922-DR-C-0001

Revision: P1

APPENDIX C: SURVEY AREA BY LAND INTEREST

Adobe Acrobat Document



Key

- Scheme Limits 2014-08-11
- ASD Limited
- Greater London Authority (Freehold) & ASD Limited (Leasehold)
- European Metal Recycling Limited
- Quintain (No.8) Limited
- Thames Water Utilities Limited
- Greater London Authority & Quintain (No.8) Limited
- Silvertown Land Holding Limited
- Greater London Authority

0 10 20 40 60 80
Metres

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Date : 2015/03/10
Projection : ..... British National Grid

Transport for London

mouchel
building great relationships

Title:

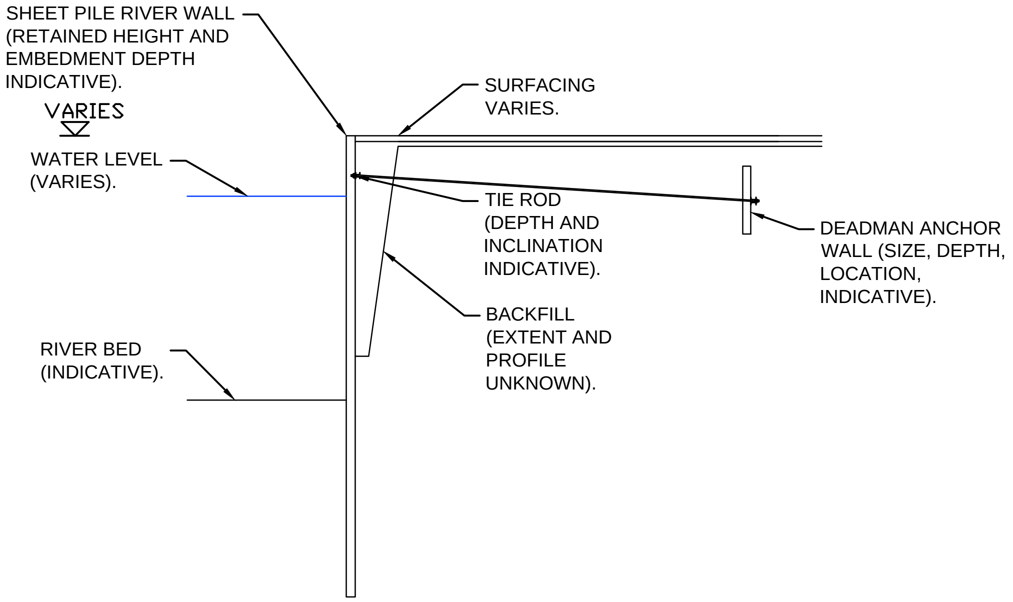
Silvertown Tunnel
Water Front Land Interest
Sheet Number 1 of 1

APPENDIX D: OUTLINE DESIGN SKETCHES

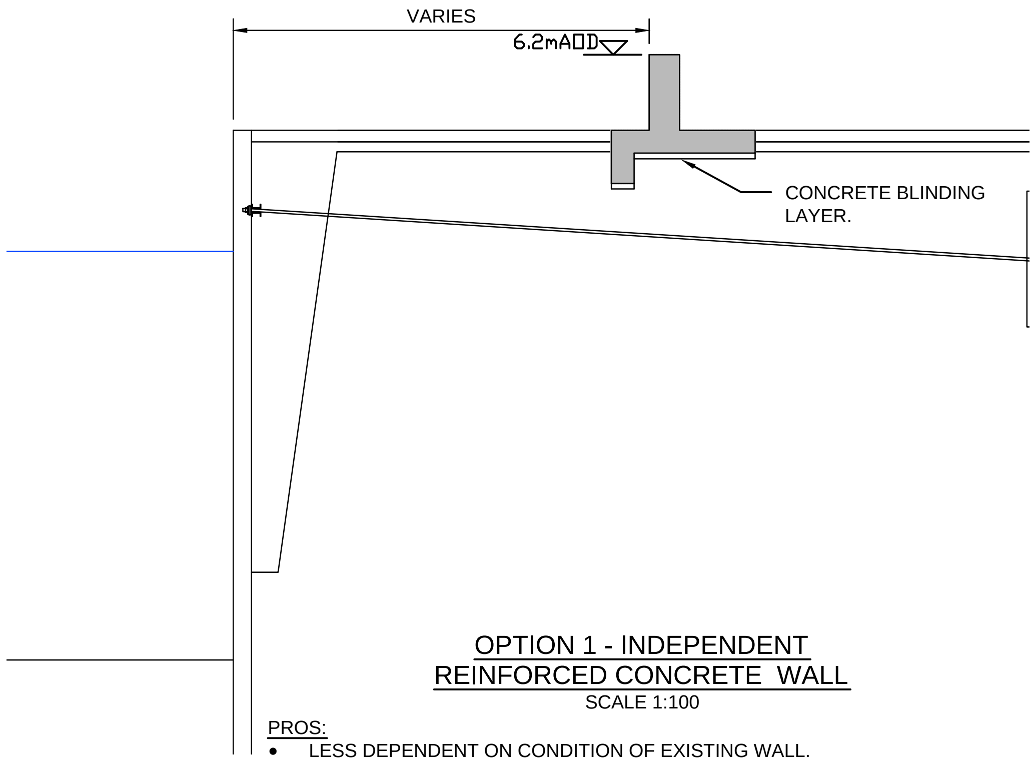
Sketch No.	Sketch Title
STWTN-ATK-SRW-XXXX-DR-C-0001	Sheet Piled River Wall Without Existing Capping Beam or Flood Parapet 
STWTN-ATK-SRW-XXXX-DR-C-0002	Sheet Piled River Wall With Existing Capping Beam or Flood Parapet 
STWTN-ATK-SRW-XXXX-DR-C-0003	Masonry / Concrete Gravity Wall or Sloping Revetment With or Without Existing Flood Parapet 
STWTN-ATK-SRW-XXXX-DR-C-0004	Backfilled Dock Gates 
STWTN-ATK-SRW-XXXX-DR-C-0005	Existing Dock Structure 
STWTN-ATK-SRW-XXXX-DR-C-0006	Stone Revetment With Existing Masonry Flood Wall 

Millimetres 100 10 0

DO NOT SCALE



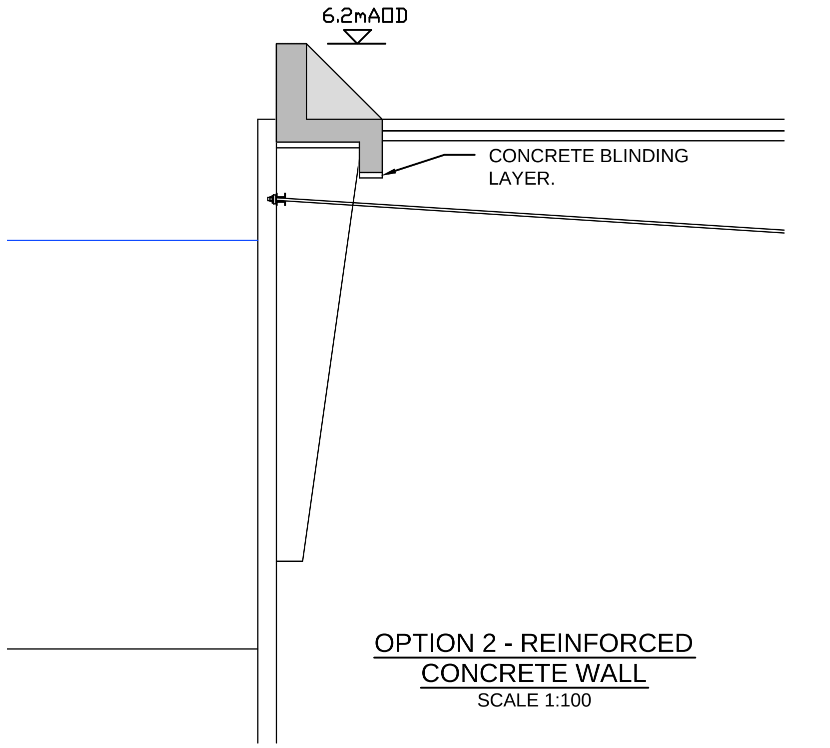
EXISTING STRUCTURAL FORM
SCALE 1:200



OPTION 1 - INDEPENDENT REINFORCED CONCRETE WALL
SCALE 1:100

PROS:
- LESS DEPENDENT ON CONDITION OF EXISTING WALL.
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

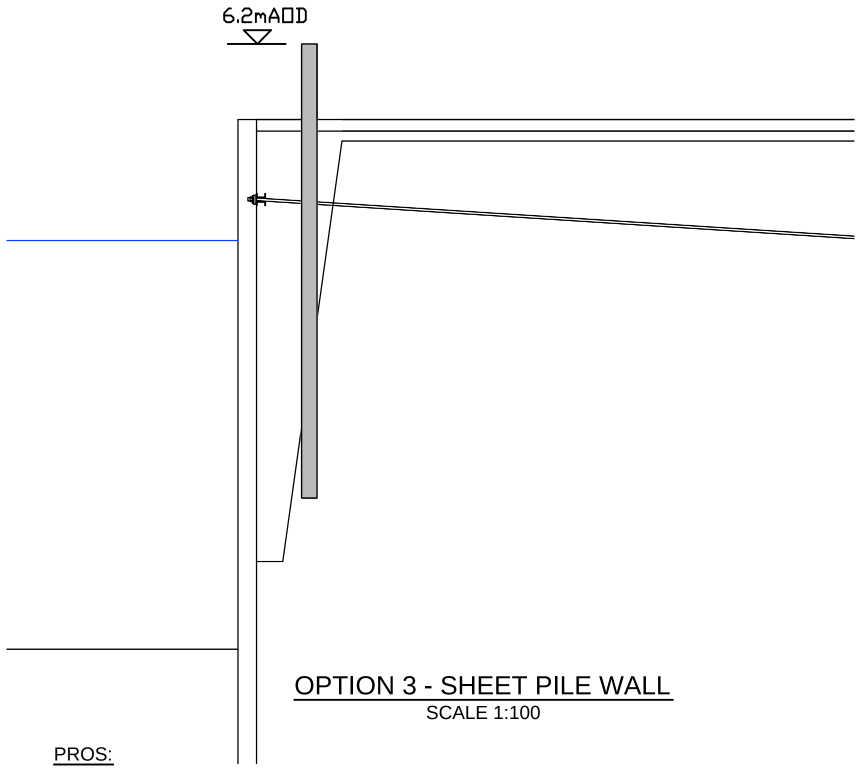
CONS:
- INCREASES LAND TAKE AND REDUCES USABLE AREA ON WHARF.
- POTENTIAL PONDING ON RIVER SIDE OF NEW DEFENCE.



OPTION 2 - REINFORCED CONCRETE WALL
SCALE 1:100

PROS:
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

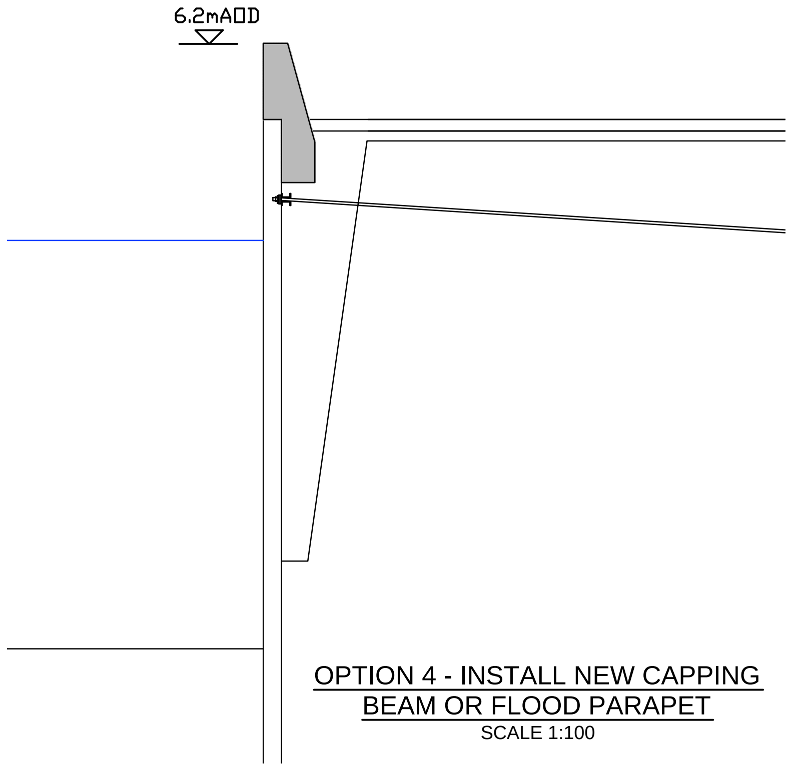
CONS:
- RELIANT ON CONDITION OF EXISTING WALL AND BACKFILL.



OPTION 3 - SHEET PILE WALL
SCALE 1:100

PROS:
- REDUCED INSTALLATION PROGRAMME ASSUMING GOOD ACCESS AND NO OBSTRUCTION TO PILING.

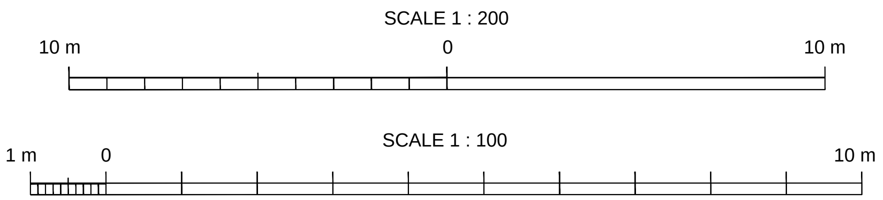
CONS:
- RELIANT ON CONDITION OF EXISTING WALL.
- RELIANT ON THERE BEING GROUND CONDITIONS WHICH PERMIT PILING.
- MAY NEED TO MOVE INLAND TO AVOID POTENTIAL BACKFILL OBSTRUCTIONS.



OPTION 4 - INSTALL NEW CAPPING BEAM OR FLOOD PARAPET
SCALE 1:100

PROS:
- MINIMAL LOSS OF FOOTPRINT OF WHARF.

CONS:
- RELIANT ON CONDITION OF EXISTING WALL.



NOTES

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3. NEW FLOOD DEFENCE LEVEL (FDL) AT +6.2mAOD.
4. STRUCTURAL FORM IS INDICATIVE ONLY AND BASED LARGELY ON ON-SITE OBSERVATIONS. AS-BUILT DRAWINGS ARE GENERALLY UNAVAILABLE AND THOSE PROVIDED ARE NOT OF SUFFICIENT QUALITY TO PROVIDE ADDITIONAL INFORMATION.
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8. DRAINAGE OR GROUND RE-PROFILING BETWEEN THE EXISTING AND NEW DEFENCES MAY BE REQUIRED TO PREVENT LOCAL PONDING.
9. ADDITIONAL DRAINAGE TO THE LAND SIDE OF THE NEW DEFENCES MAY BE REQUIRED.
10. THE PRESENCE OF BURIED SERVICES AND RISK OF ENCOUNTERING UXO IS UNKNOWN AND WILL NEED TO BE ASSESSED VIA DESK STUDY PRIOR TO CONSTRUCTION.

Rev	Drawn / Des	Checked	Approved	Date
P01	MT	MH	CA	14/12/15
First Issue				

Description

Drawing Status	Suitability
WORK IN PROGRESS	S0

SILVERTOWN TUNNEL

Transport for London

ATKINS

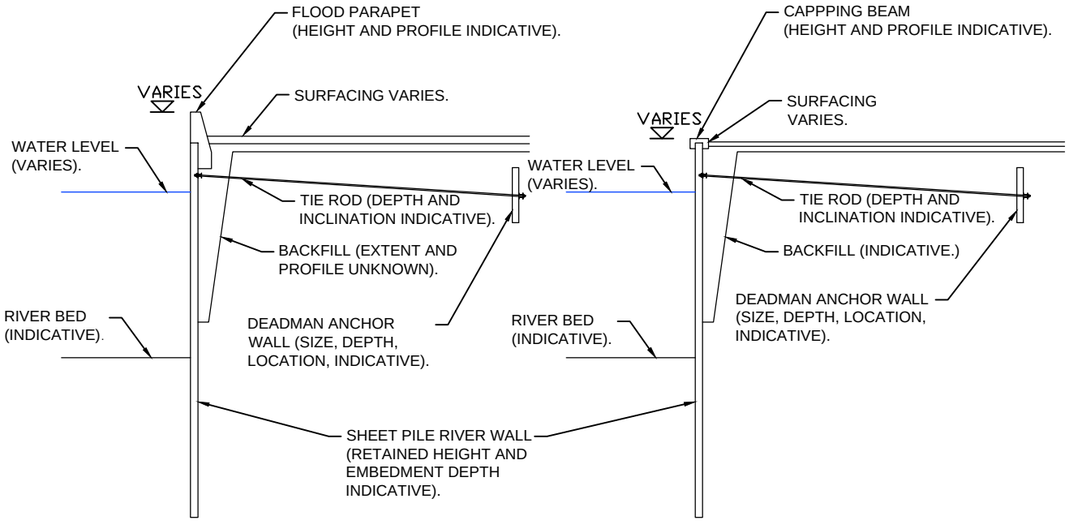
Project Title: SILVERTOWN TUNNEL

Drawing Title: SHEET PILED RIVER WALL WITHOUT EXISTING CAPPING BEAM OR FLOOD PARAPET

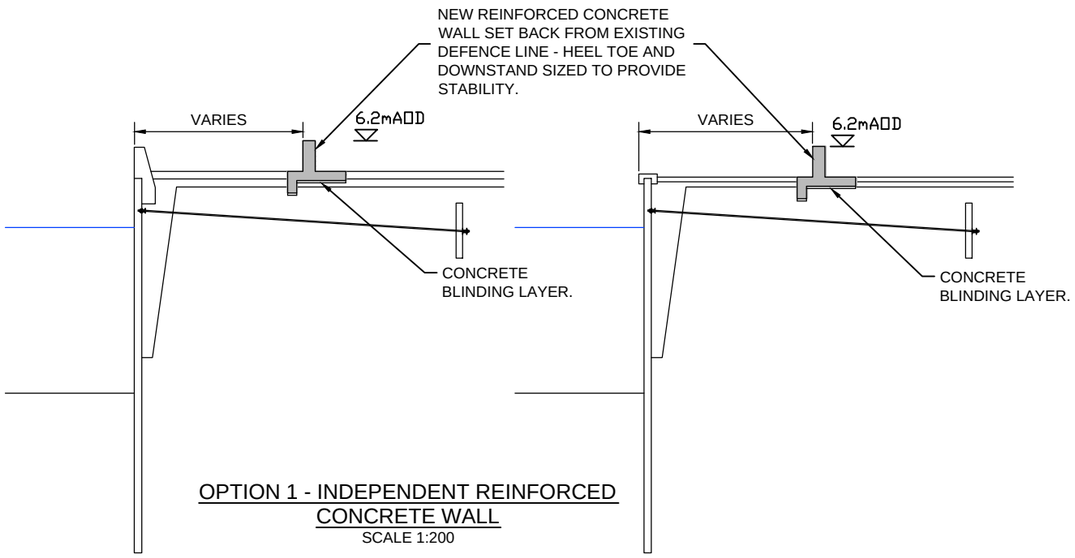
Scale	Designed / Drawn	Checked	Approved	Authorised
AS SHOWN	MT	MH	CA	
Original Size: A3	Date: 14/12/15	Date: 14/12/15	Date: 14/12/15	Date: ---

Drawing Number	Revision
STWTN-ATK-SRW-XXXX-SK-C-0001	P01

Plotted: Dec 17, 2015 - 8:04am by: BROW3184



EXISTING STRUCTURAL FORMS
SCALE 1:200

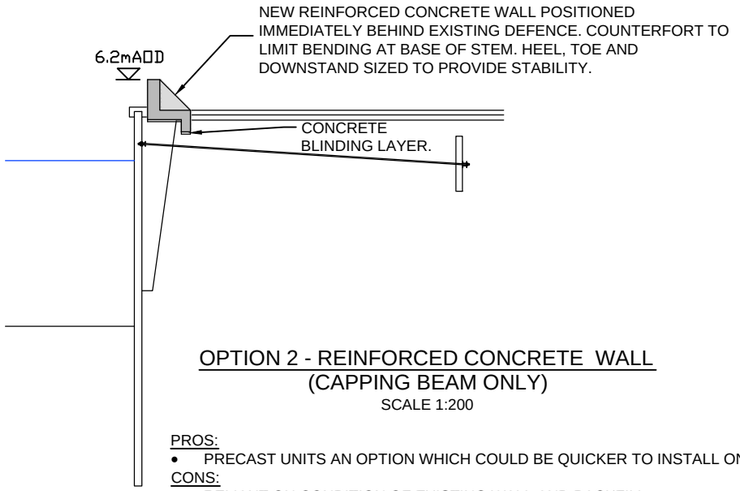


OPTION 1 - INDEPENDENT REINFORCED CONCRETE WALL
SCALE 1:200

PROS:
- LESS DEPENDENT ON CONDITION OF EXISTING WALL.
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

CONS:
- INCREASES LAND TAKE AND REDUCES USABLE AREA ON WHARF.
- POTENTIAL PONDING ON RIVER SIDE OF NEW DEFENCE.

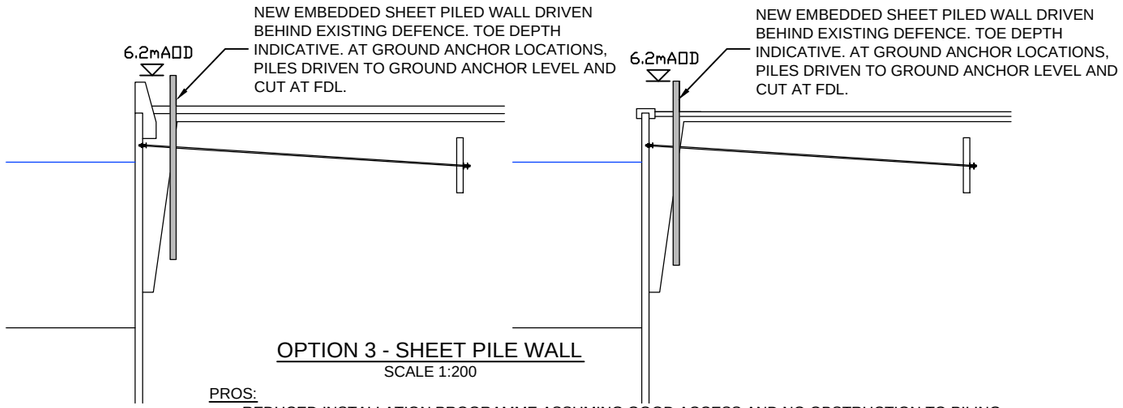
10 m 0 10 m



OPTION 2 - REINFORCED CONCRETE WALL (CAPPING BEAM ONLY)
SCALE 1:200

PROS:
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

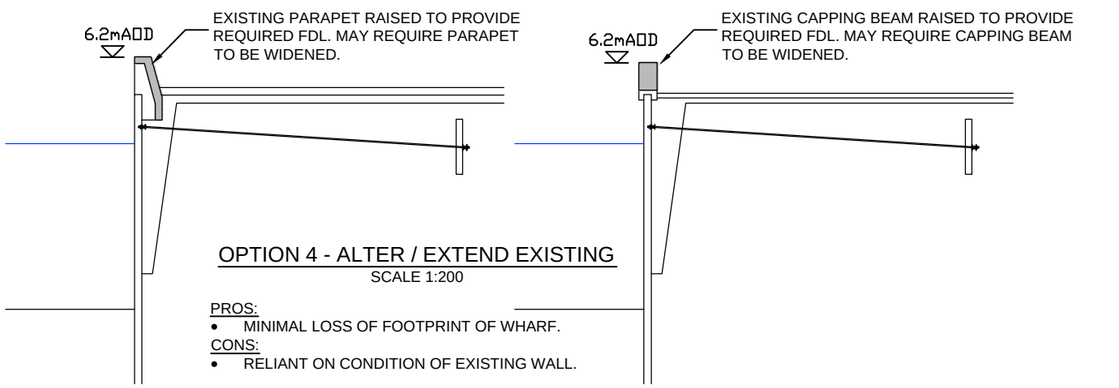
CONS:
- RELIANT ON CONDITION OF EXISTING WALL AND BACKFILL.



OPTION 3 - SHEET PILE WALL
SCALE 1:200

PROS:
- REDUCED INSTALLATION PROGRAMME ASSUMING GOOD ACCESS AND NO OBSTRUCTION TO PILING.

CONS:
- RELIANT ON CONDITION OF EXISTING WALL.
- RELIANT ON THERE BEING GROUND CONDITIONS WHICH PERMIT PILING.
- MAY NEED TO MOVE INLAND TO AVOID POTENTIAL BACKFILL OBSTRUCTIONS.



OPTION 4 - ALTER / EXTEND EXISTING
SCALE 1:200

PROS:
- MINIMAL LOSS OF FOOTPRINT OF WHARF.

CONS:
- RELIANT ON CONDITION OF EXISTING WALL.

NOTES

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2. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
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9. ADDITIONAL DRAINAGE TO THE LAND SIDE OF THE NEW DEFENCES MAY BE REQUIRED.
10. THE PRESENCE OF BURIED SERVICES AND RISK OF ENCOUNTERING UXO IS UNKNOWN AND WILL NEED TO BE ASSESSED VIA DESK STUDY PRIOR TO CONSTRUCTION.

Rev	Drawn / Des	Checked	Approved	Date
P01	MT	MH	CA	14/12/15

First Issue

Description

Drawing Status: WORK IN PROGRESS
Suitability: S0

Transport for London ATKINS

Project Title: SILVERTOWN TUNNEL

Drawing Title: SHEET PILED RIVER WALL WITH EXISTING CAPPING BEAM OR FLOOD PARAPET

Scale	Designed / Drawn	Checked	Approved	Authorised
AS SHOWN	MT	MH	CA	---
Original Size	Date	Date	Date	Date
A3	14/12/15	14/12/15	14/12/15	---

Drawing Number: STWTN-ATK-SRW-XXXX-SK-C-0002
Revision: P01

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DO NOT SCALE
Plotted: Dec 17, 2015 - 8:03am by: BROW3184

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Millimetres
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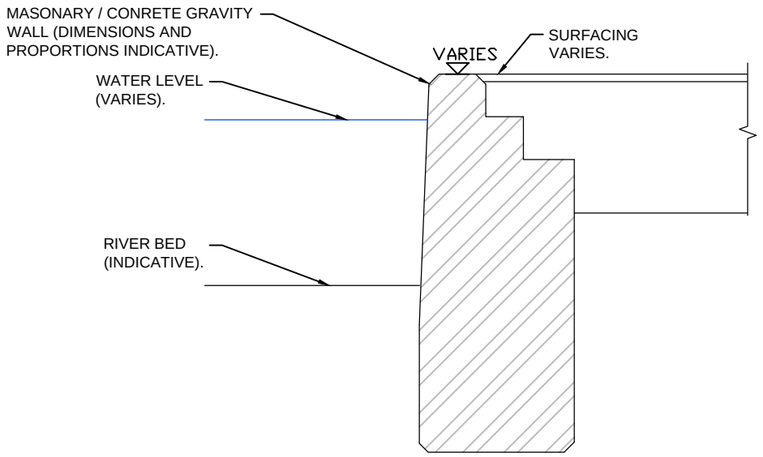
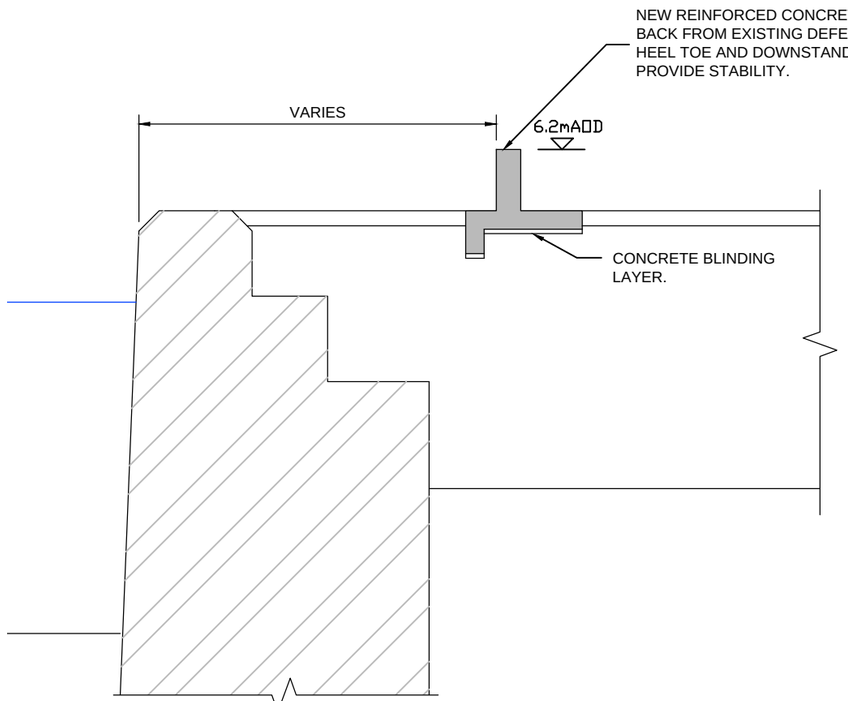
DO NOT SCALE



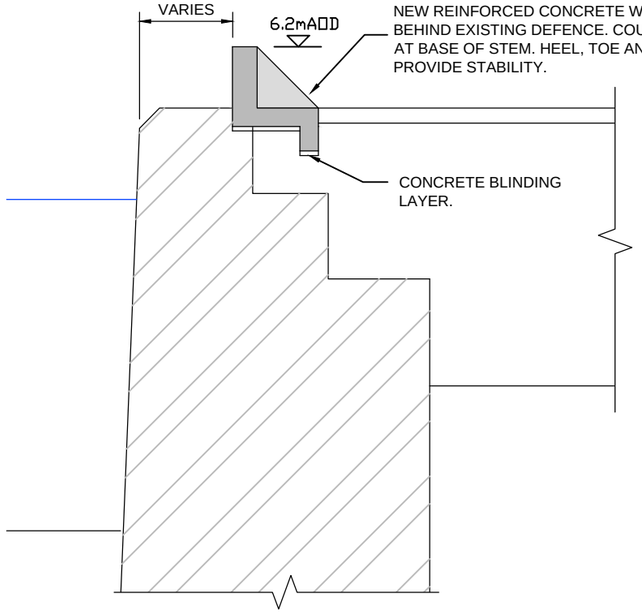
EXISTING STRUCTURAL FORM
SCALE 1:200



OPTION 1 - INDEPENDENT REINFORCED CONCRETE WALL
SCALE 1:100

PROS:
- LESS DEPENDENT ON CONDITION OF EXISTING WALL.
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

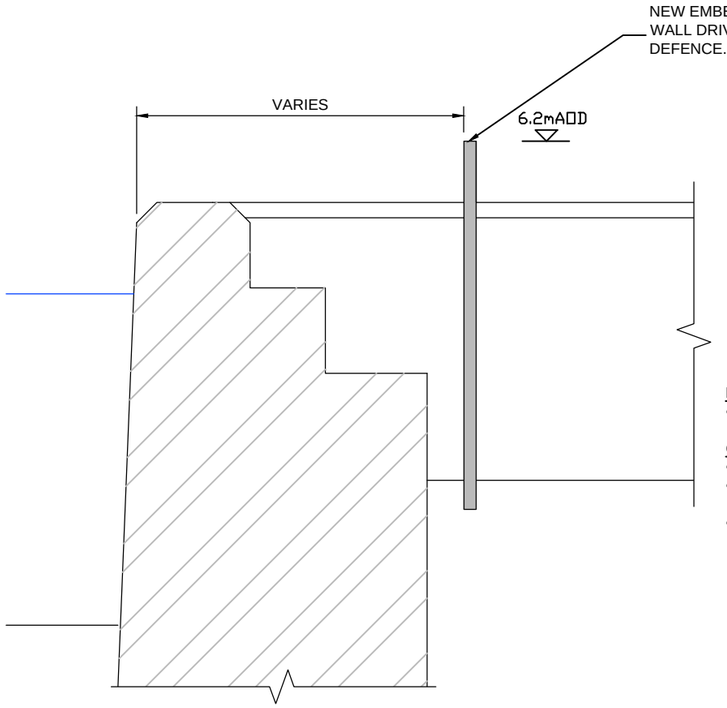
CONS:
- INCREASES LAND TAKE AND REDUCES USABLE AREA ON WHARF.
- POTENTIAL PONDING ON RIVER SIDE OF NEW DEFENCE.



OPTION 2 - REINFORCED CONCRETE WALL
SCALE 1:100

PROS:
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

CONS:
- RELIANT ON CONDITION OF EXISTING WALL AND BACKFILL.



OPTION 3 - SHEET PILE WALL
SCALE 1:100

PROS:
- REDUCED INSTALLATION PROGRAMME ASSUMING GOOD ACCESS AND NO OBSTRUCTION TO PILING.

CONS:
- RELIANT ON CONDITION OF EXISTING WALL.
- RELIANT ON THERE BEING GROUND CONDITIONS WHICH PERMIT PILING.
- MAY NEED TO MOVE INLAND TO AVOID POTENTIAL BACKFILL OBSTRUCTIONS.

SCALE 1 : 100

1 m 0 10 m

SCALE 1 : 200

10 m 0 10 m

NOTES

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10. THE PRESENCE OF BURIED SERVICES AND RISK OF ENCOUNTERING UXO IS UNKNOWN AND WILL NEED TO BE ASSESSED VIA DESK STUDY PRIOR TO CONSTRUCTION.

Rev	Drawn / Des	Checked	Approved	Date
P01	MT	MH	CA	14/12/15

First Issue

Description

Drawing Status: WORK IN PROGRESS
Suitability: S0

SILVERTOWN TUNNEL

Transport for London ATKINS

Project Title: SILVERTOWN TUNNEL

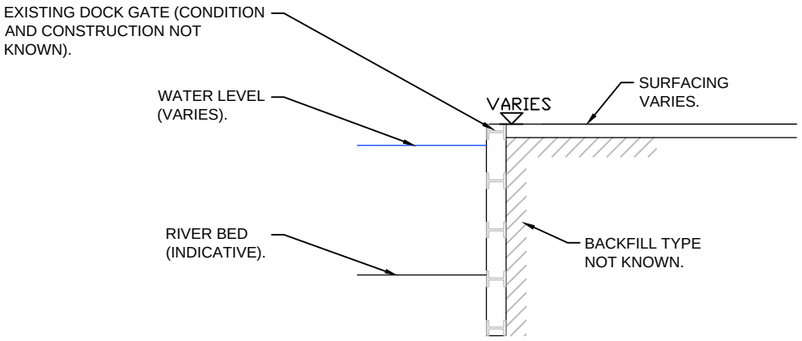
Drawing Title: MASONARY / CONCRETE GRAVITY WALL OR SLOPING REVETMENT WITH OR WITHOUT EXISTING FLOOD PARAPET

Scale	Designed / Drawn	Checked	Approved	Authorised
AS SHOWN	MT	MH	CA	---
Original Size	Date	Date	Date	Date
A3	14/12/15	14/12/15	14/12/15	---

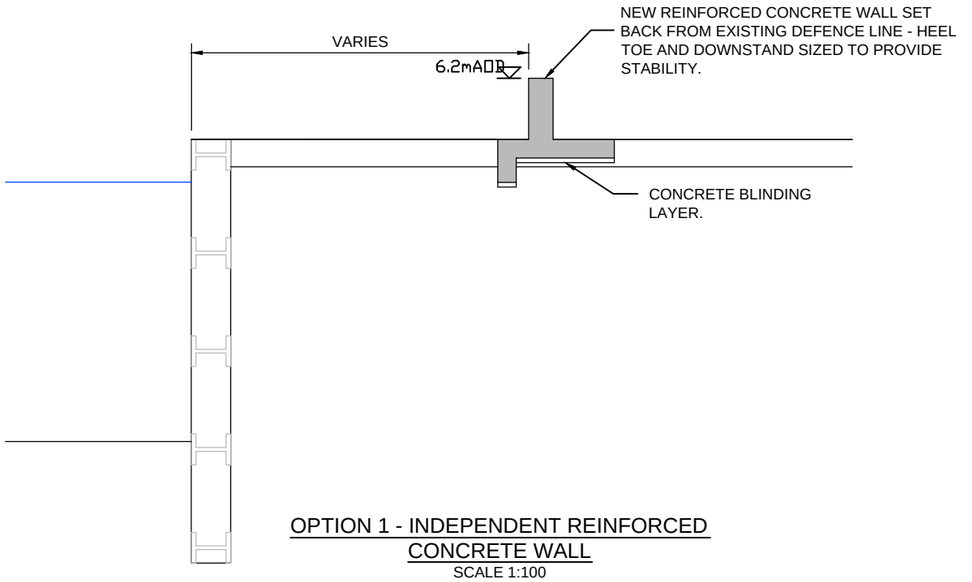
Drawing Number: STWTN-ATK-SRW-XXXX-SK-C-0003
Revision: P01

Plotted: Dec 17, 2015 - 8:05am by: BROW3184

Millimetres 100 10 0
DO NOT SCALE



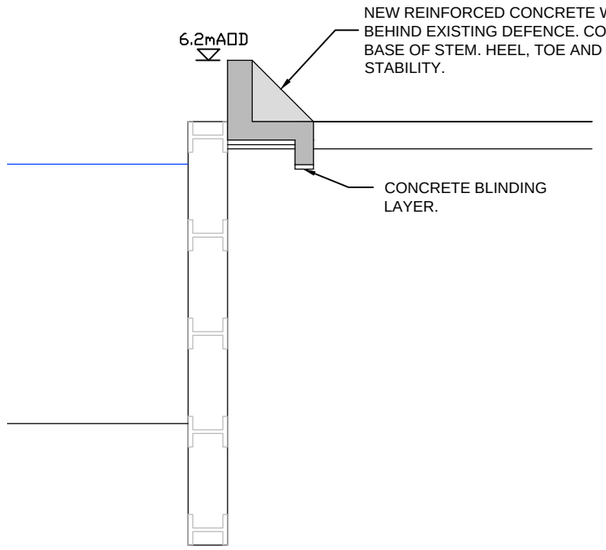
EXISTING STRUCTURAL FORM
SCALE 1:200



OPTION 1 - INDEPENDENT REINFORCED CONCRETE WALL
SCALE 1:100

PROS:
- LESS DEPENDENT ON CONDITION OF EXISTING GATES.
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

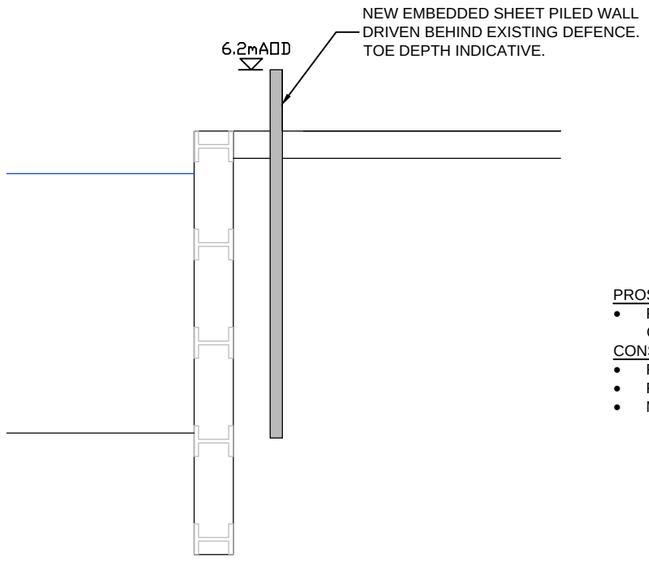
CONS:
- INCREASES LAND TAKE AND REDUCES USABLE AREA ON WHARF.
- POTENTIAL PONDING ON RIVER SIDE OF NEW DEFENCE.



OPTION 2 - REINFORCED CONCRETE WALL
SCALE 1:100

PROS:
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

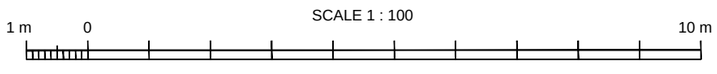
CONS:
- RELIANT ON CONDITION AND MAKE-UP OF EXISTING GATES.

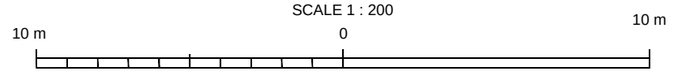


OPTION 3 - SHEET PILE WALL
SCALE 1:100

PROS:
- REDUCED INSTALLATION PROGRAMME ASSUMING GOOD ACCESS AND NO OBSTRUCTION TO PILING.

CONS:
- RELIANT ON CONDITION AND MAKE-UP OF EXISTING GATES.
- RELIANT ON THERE BEING GROUND CONDITIONS WHICH PERMIT PILING.
- MAY NEED TO MOVE INLAND TO AVOID POTENTIAL BACKFILL OBSTRUCTIONS.





NOTES

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10. THE PRESENCE OF BURIED SERVICES AND RISK OF ENCOUNTERING UXO IS UNKNOWN AND WILL NEED TO BE ASSESSED VIA DESK STUDY PRIOR TO CONSTRUCTION.

Rev	Drawn / Des	Checked	Approved	Date
P01	MT	MH	CA	14/12/15

First Issue

Description

Drawing Status	WORK IN PROGRESS
Suitability	S0
Project Title	SILVERTOWN TUNNEL
Drawing Title	BACKFILLED DOCK GATES

Scale	Designed / Drawn	Checked	Approved	Authorised
AS SHOWN	MT	MH	CA	---
Original Size	**Date**	**Date**	**Date**	**Date**
A3	14/12/15	14/12/15	14/12/15	---

Drawing Number	Revision
STWTN-ATK-SRW-XXXX-SK-C-0004	P01

Transport for London ATKINS

Plotted: Dec 17, 2015 - 8:07am by: BROW3184

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Millimetres
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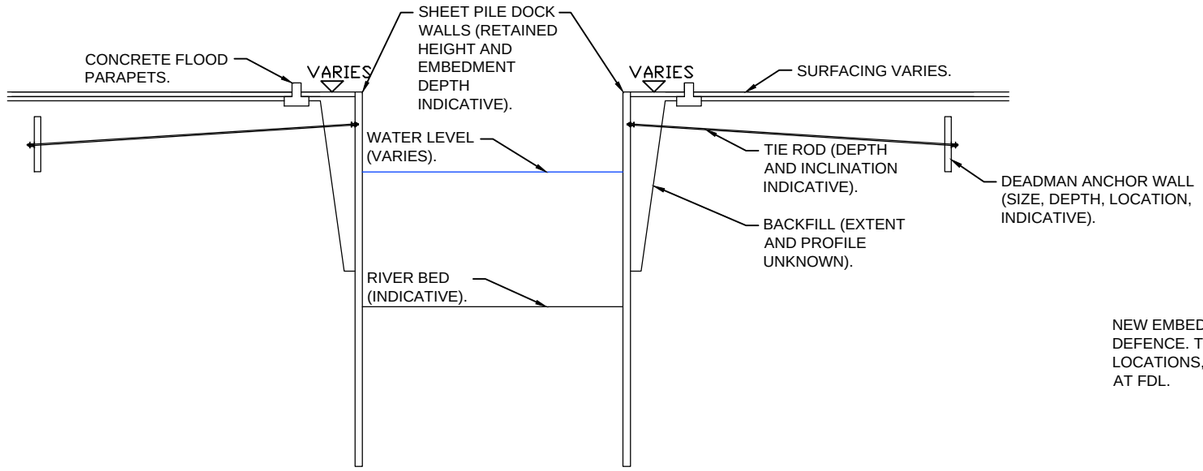
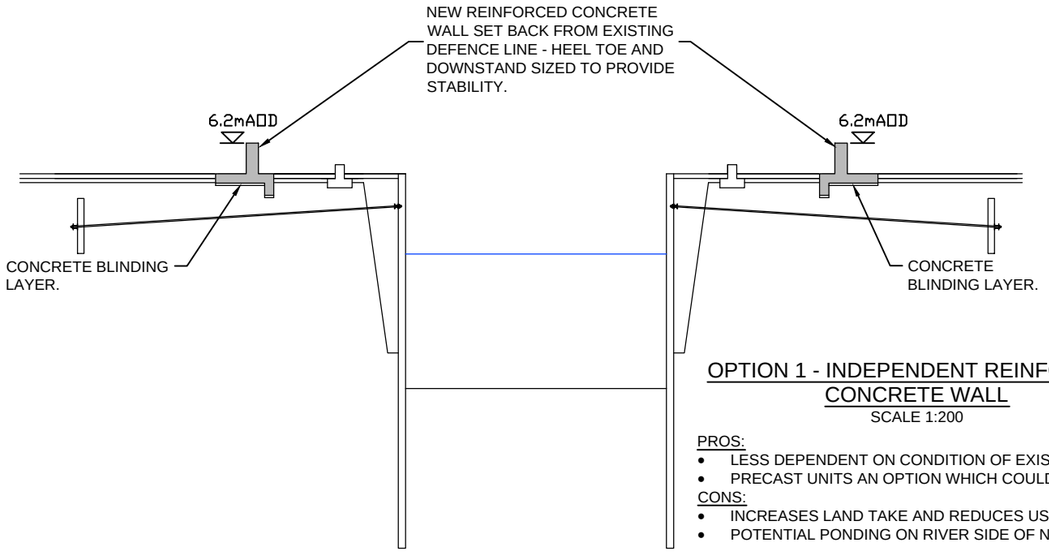
DO NOT SCALE



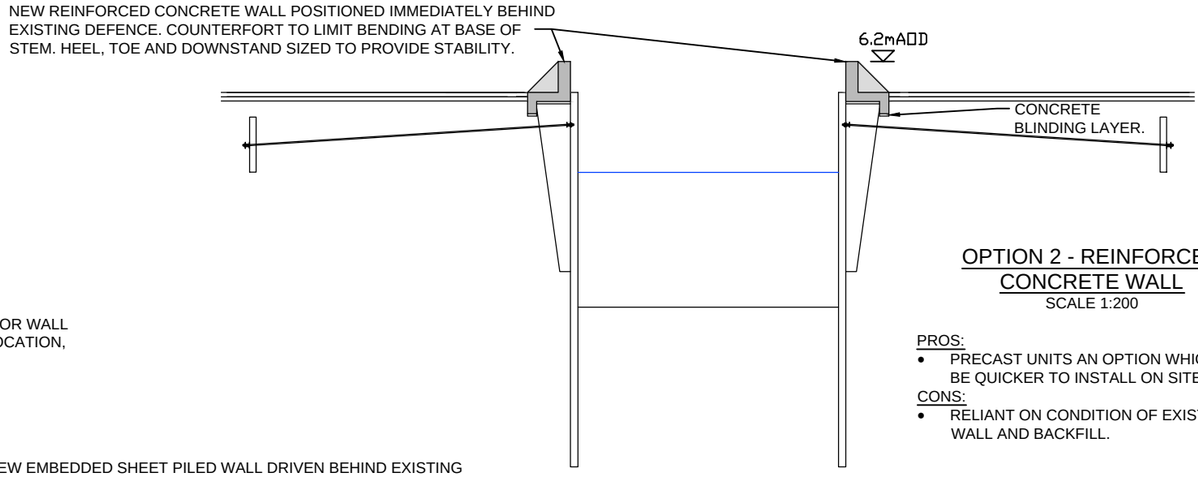
EXISTING STRUCTURAL FORM
SCALE 1:200



OPTION 1 - INDEPENDENT REINFORCED CONCRETE WALL
SCALE 1:200

PROS:
- LESS DEPENDENT ON CONDITION OF EXISTING WALL.
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

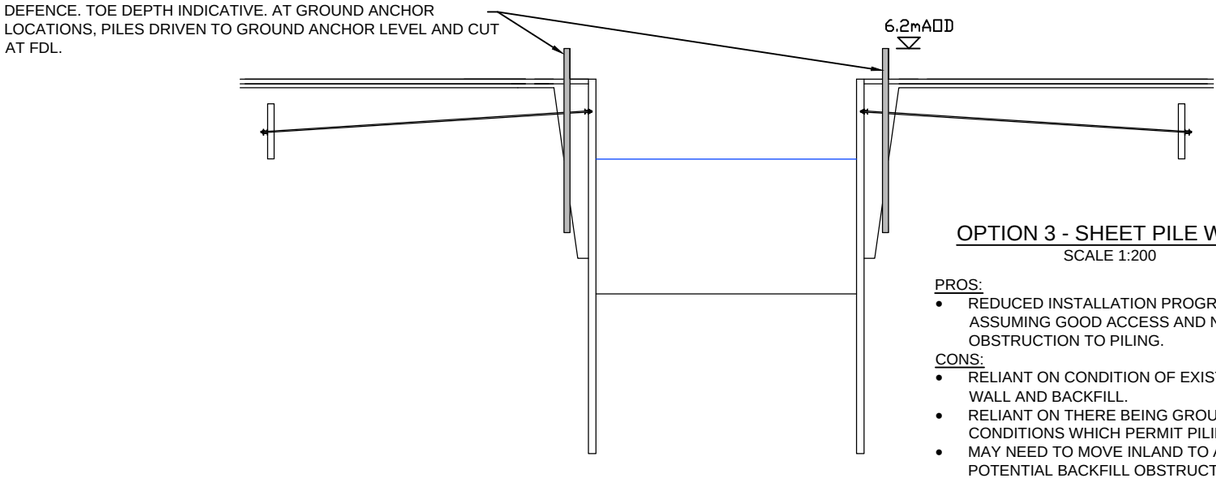
CONS:
- INCREASES LAND TAKE AND REDUCES USABLE AREA ON WHARF.
- POTENTIAL PONDING ON RIVER SIDE OF NEW DEFENCE.



OPTION 2 - REINFORCED CONCRETE WALL
SCALE 1:200

PROS:
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

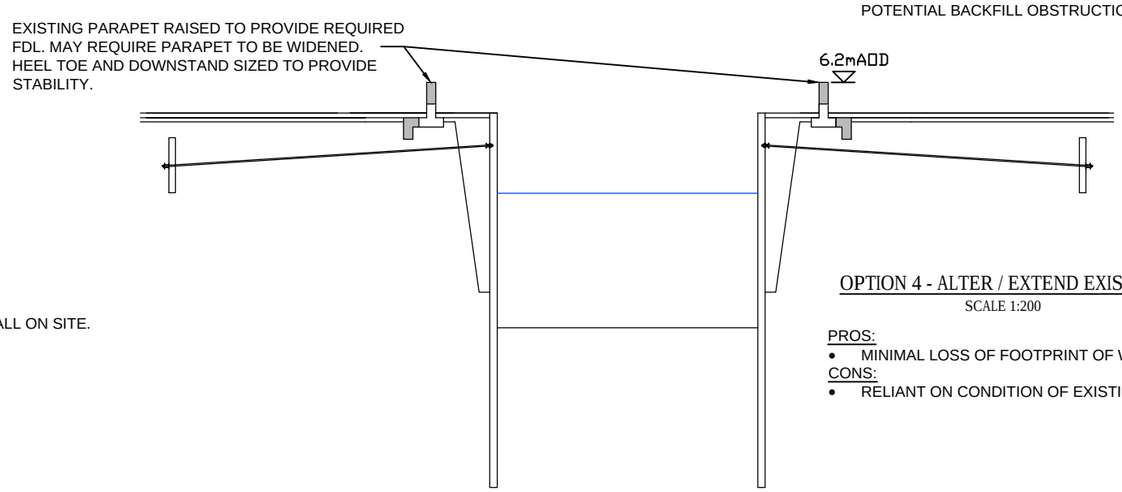
CONS:
- RELIANT ON CONDITION OF EXISTING WALL AND BACKFILL.



OPTION 3 - SHEET PILE WALL
SCALE 1:200

PROS:
- REDUCED INSTALLATION PROGRAMME ASSUMING GOOD ACCESS AND NO OBSTRUCTION TO PILING.

CONS:
- RELIANT ON CONDITION OF EXISTING WALL AND BACKFILL.
- RELIANT ON THERE BEING GROUND CONDITIONS WHICH PERMIT PILING.
- MAY NEED TO MOVE INLAND TO AVOID POTENTIAL BACKFILL OBSTRUCTIONS.



OPTION 4 - ALTER / EXTEND EXISTING
SCALE 1:200

PROS:
- MINIMAL LOSS OF FOOTPRINT OF WHARF.

CONS:
- RELIANT ON CONDITION OF EXISTING WALL.

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
3. NEW FLOOD DEFENCE LEVEL (FDL) AT +6.2mAOD.
4. STRUCTURAL FORM IS INDICATIVE ONLY AND BASED LARGELY ON ON-SITE OBSERVATIONS. AS-BUILT DRAWINGS ARE GENERALLY UNAVAILABLE AND THOSE PROVIDED ARE NOT OF SUFFICIENT QUALITY TO PROVIDE ADDITIONAL INFORMATION.
5. FURTHER INTRUSIVE AND EXPLORATORY WORKS WOULD BE REQUIRED IN ORDER TO CONFIRM WALL CONDITION AND TO ASSESS WHETHER OPTIONS ARE VIABLE.
6. NO NUMERICAL ANALYSIS HAS BEEN UNDERTAKEN. ASSESSMENT REQUIRED TO VERIFY OPTIONS WOULD INCLUDE BACK-ANALYSIS OF THE EXISTING STRUCTURES, STABILITY CALCULATIONS, SEEPAGE AND GROUND CONDITION ASSESSMENTS.
7. UNKNOWN LOCAL ISSUES OR RESTRICTIONS MAY MEAN THAT OPTIONS WOULD NOT BE ACCEPTED BY EITHER THE RIPARIAN OWNER OR ENVIRONMENT AGENCY.
8. DRAINAGE OR GROUND RE-PROFILING BETWEEN THE EXISTING AND NEW DEFENCES MAY BE REQUIRED TO PREVENT LOCAL PONDING.
9. ADDITIONAL DRAINAGE TO THE LAND SIDE OF THE NEW DEFENCES MAY BE REQUIRED.
10. THE PRESENCE OF BURIED SERVICES AND RISK OF ENCOUNTERING UXO IS UNKNOWN AND WILL NEED TO BE ASSESSED VIA DESK STUDY PRIOR TO CONSTRUCTION.

Rev	Drawn / Des	Checked	Approved	Date
P01	MT	MH	CA	14/12/15

First Issue

Description

Drawing Status: WORK IN PROGRESS
Suitability: S0

Transport for London ATKINS

Project Title: SILVERTOWN TUNNEL

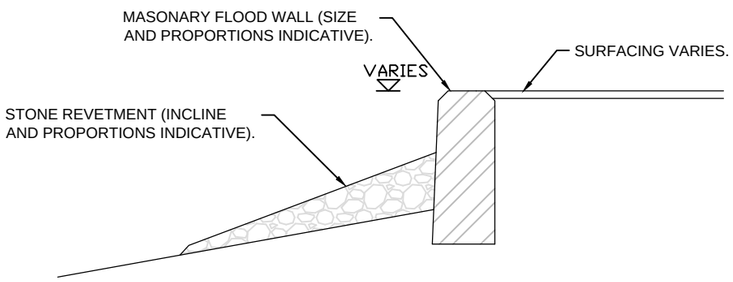
Drawing Title: EXISTING DOCK STRUCTURE

Scale	Designed / Drawn	Checked	Approved	Authorised
AS SHOWN	MT	MH	CA	---
Original Size	Date	Date	Date	Date
A3	14/12/15	14/12/15	14/12/15	---

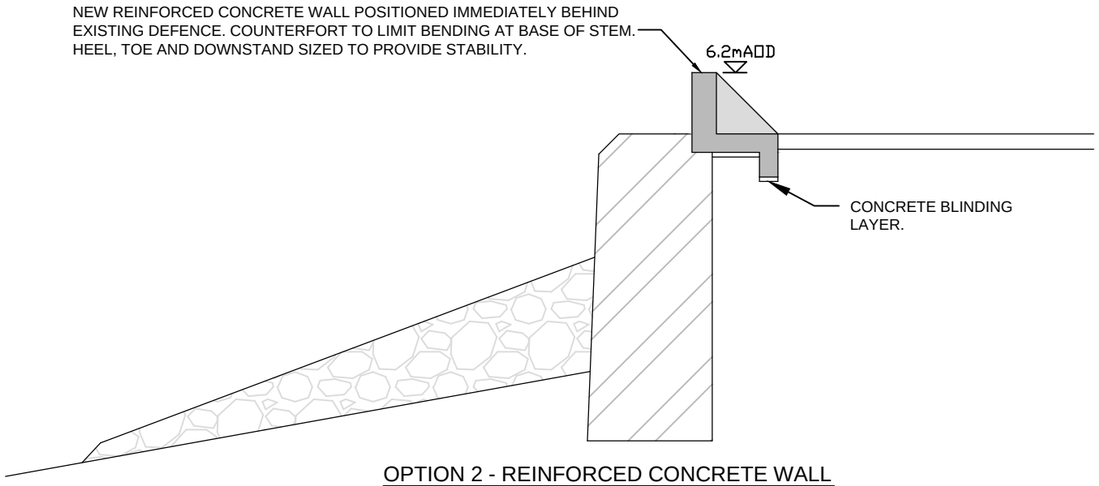
Drawing Number: STWTN-ATK-SRW-XXXX-SK-C-0005
Revision: P01

Plotted: Dec 17, 2015 - 8:07am by: BROW3184

100
Millimetres
10
0
DO NOT SCALE



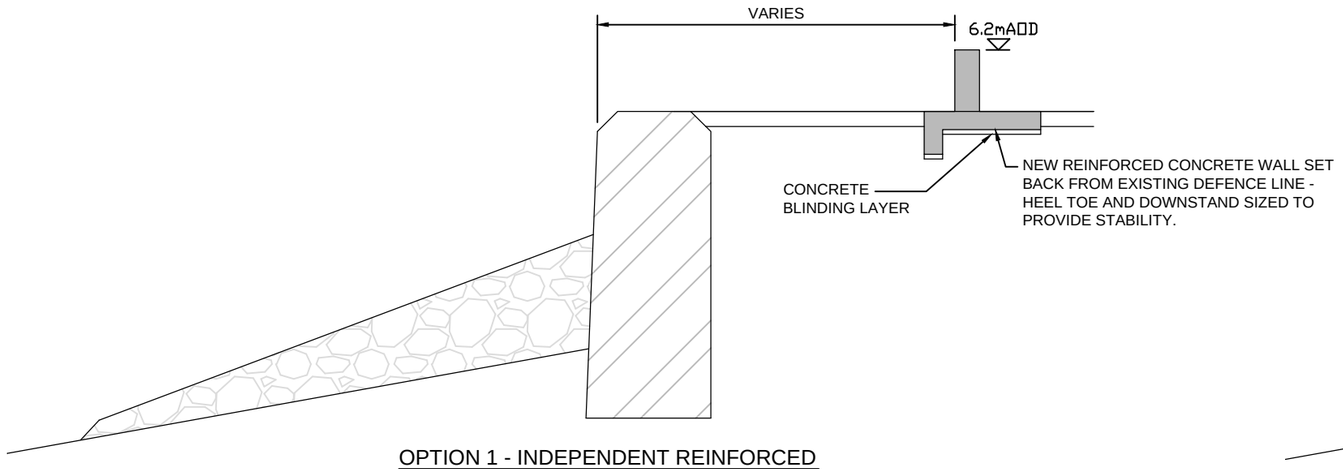
EXISTING STRUCTURAL FORM
SCALE 1:200



OPTION 2 - REINFORCED CONCRETE WALL
SCALE 1:100

PROS:
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

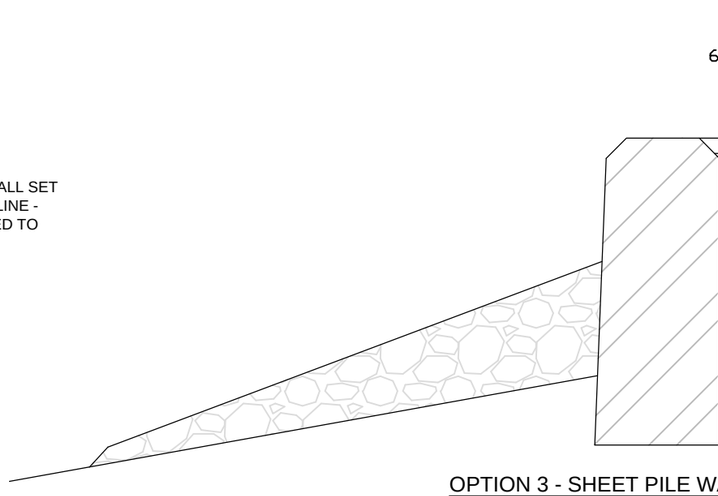
CONS:
- RELIANT ON CONDITION OF EXISTING WALL AND BACKFILL.



OPTION 1 - INDEPENDENT REINFORCED CONCRETE WALL
SCALE 1:100

PROS:
- LESS DEPENDENT ON CONDITION OF EXISTING WALL.
- PRECAST UNITS AN OPTION WHICH COULD BE QUICKER TO INSTALL ON SITE.

CONS:
- INCREASES LAND TAKE AND REDUCES USABLE AREA ON WHARF.
- POTENTIAL PONDING ON RIVER SIDE OF NEW DEFENCE.



OPTION 3 - SHEET PILE WALL
SCALE 1:100

PROS:
- REDUCED INSTALLATION PROGRAMME ASSUMING GOOD ACCESS AND NO OBSTRUCTION TO PILING.

CONS:
- RELIANT ON CONDITION OF EXISTING WALL.
- RELIANT ON THERE BEING GROUND CONDITIONS WHICH PERMIT PILING.
- MAY NEED TO MOVE INLAND TO AVOID POTENTIAL BACKFILL OBSTRUCTIONS.

SCALE 1 : 100

1 m 0 10 m

SCALE 1 : 200

10 m 0 10 m

NOTES

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Rev	Drawn / Des	Checked	Approved	Date
P01	MT	MH	CA	14/12/15

First Issue

Description

Drawing Status: WORK IN PROGRESS
Suitability: S0

SILVERTOWN TUNNEL

Transport for London ATKINS

Project Title: SILVERTOWN TUNNEL

Drawing Title: STONE REVETMENT WITH EXISTING MASONARY FLOOD WALL

Scale	Designed / Drawn	Checked	Approved	Authorised
AS SHOWN	MT	MH	CA	---
Original Size	Date	Date	Date	Date
A3	14/12/15	14/12/15	14/12/15	---

Drawing Number: STWTN-ATK-SRW-XXXX-SK-C-0006
Revision: P01

Plotted: Dec 17, 2015 - 8:08am by: BROW3184

Appendix B BuroHappold Dohm Wharf Surveys

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BUROHAPPOLD ENGINEERING

Technical Note

Project	Thames Side West
Subject	Dohm Wharf River Wall Quarterly Inspection – December 2017
Project no	035668
Date	8 January 2018

Revision	Description	Issued by	Date	Approved (signature)
00	For issue	JF	08.01.18	

1 Introduction

Dohm Wharf Wall is a section of river wall on the north bank of the River Thames. The wall is 32m long, and comprises steel sheet piles, waling beams and ground anchors. The retained area behind the wall is occupied by hard standing and a warehouse.

Following the completion of a series of repairs to the steel sheet pile sections in September 2017, it was agreed with the Environment Agency (EA) that quarterly inspections of the river shall be carried out. The principle aim of these inspections is to ensure that the river wall remains in suitable condition to act as a flood defence, until the wall is fully replaced as part of the Thames Side West Operational Development works. The purpose of these visual inspections is twofold:

- To monitor the overall structural stability of river wall; and
- To monitor the repairs previously carried out to the steel sheet pile wall to confirm that the repairs remain in place and that no further degradation of the condition of the steel has taken place.

The first quarterly inspection was carried out on the 19th December 2017. Present at the inspection were Christine Cambrook and Jack Foster, of BuroHappold Engineering. The inspection was carried out from the land side of the river wall only.

This Technical Note provides a summary of the observations during the 19th December 2017 inspection and should be read in conjunction with the following reports from previous inspections and site visits carried out by BuroHappold:

- Dohm Wharf River Wall Inspection, 23rd February 2017
- Dohm Wharf Repairs Summary Report, 27th September 2017

2 Overall Structural Stability

A visual inspection of the river wall was carried out from the land side, with access gained via the following two areas shown in Figure 2-1 which are separated by timber hoarding and a fire escape from the adjacent building.

- Concrete hardstanding (purple)
- The Old Basket Supply (TOBS) terrace area, both at ground and first floor level (orange)

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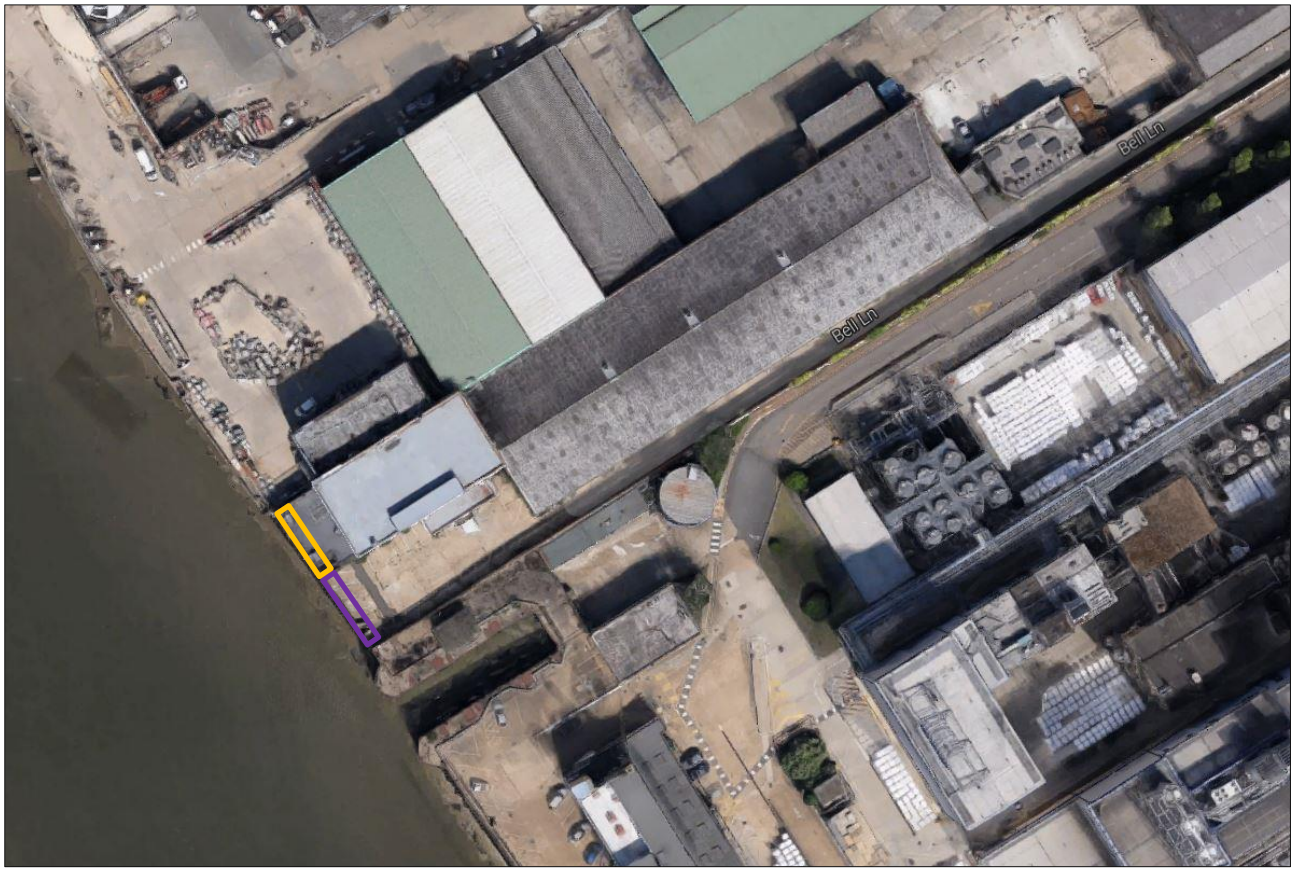

Figure 2-1: Aerial view of Dohm Wharf showing inspection areas

The purpose of the visual inspection was to monitor the overall structural stability of the river wall by identifying any evidence of movement such as new cracks in the concrete parapet wall, capping beam, hardstanding or adjacent perpendicular brick walls.

Record photos were taken from a series of standard locations to allow repeat photos to be taken to enable direct visual comparison to determine if any degradation occurs between subsequent quarterly inspections. These record photos and locations are given in the Appendix, along with observation notes.

No evidence of movement or settlement of the existing river wall was observed.

3 Steel Sheet Pile Repairs

During the 23rd February 2017 inspection, corrosion to the steel sheet pile sections of the river wall was observed. This was most significant in the splash zone above high water where voids were present behind perforations in the steel.

Following the inspection, it was recommended that short-term remedial works were carried out to preserve the structural integrity of the wall and the associated flood defence. These remedial works to the corroded areas of the steel sheet piling were carried out in August and September 2017, in the form of plates welded over the perforations.

As part of this quarterly monitoring, a visual inspection of the remedial works was carried out from the land side of the river wall to confirm that the repairs remain in place and that no further degradation of the steel has taken place.

3.1 Upper Level

The repairs to the upper part of the sheet pile wall above the upper waling beam were visible from the land side. A camera was suspended over the river wall from the land side in order to take a video of the river wall at the level of the waling beams. The video was later reviewed to inspect the condition of the repairs.

All plate repairs appear to remain securely welded to the existing sheet pile sections and there is no evidence of further degradation of the condition of the remaining steel. Figure 3-1 shows a typical photograph of the upper level of the southern half of the river wall, showing the steel plate repairs securely welded to the sheet piling.

Figure 3-1: Typical photograph of upper level of river wall, showing steel plate repairs to sheet piling

There is one location where a perforation has not had a patch repair installed. This is between the two waling beams immediately north of the southern most ground anchor, shown in Figure 3-2. This was not observed at completion of the repair works, but it is likely to have been missed due to access issues to this section of the river wall during the remedial works, and proximity to the waling beam. It is considered that this single perforation would not pose a risk of structural failure of the river wall. Additional repair works are therefore not proposed, however this area will be closely monitored as part of the ongoing quarterly inspection programme to identify whether any further significant corrosion occurs.

Figure 3-2: Location where patch repair to perforation in steel sheet piling has been missed

3.2 Low Level

Access to the foreshore was not possible during the inspection. A detailed inspection of the condition of the repairs was therefore not possible. However, from observations from the land side of the top of the river wall, no patch repairs appeared to be missing.

It is therefore recommended that during the next quarterly inspection a detailed inspection of the low level patch repairs to the steel sheet piling is carried out. This would preferably be by foot access to the foreshore at low tide via boat, so that the welds can be checked in detail. Alternatively a video and photographic survey could be carried out using a drone.

4 Summary and Conclusion

The visual inspection did not identify any evidence of further movement or settlement within the concrete hardstanding, concrete capping beam and parapet wall or adjoining brick walls since the previous inspection.

Of the steel sheet pile repairs that were visible, the welds appear to remain sound and the plates securely fixed. One location was identified at the south end of the river wall between the waling beams where a perforation had not had a patch repair installed, which was not observed at the time of remedial works. It is not considered that this omission would pose a risk of structural failure of the river wall.

The repairs carried out at the foot of the river wall were not visible due to access restrictions. It is recommended that the next inspection is carried out by boat at low tide so that foot access to the river bed can be gained to allow a detailed inspection of the low level repairs.

The next quarterly inspection is due to be carried out in March 2018.

Appendix

Location 1

Hard standing area – overview of parapet wall

Notes:

- Hard standing generally in good condition.
- Existing cracks in hard standing previously observed during 23rd February inspection.
- No new cracks observed in concrete parapet wall or concrete hard standing.
- No obvious indications of movement or settlement of parapet wall or hard standing.
- Vegetation present within cracks in hard standing, with increased growth since 23rd February 2017 inspection.

Location 2

Hard standing area – south corner

Notes:

- Brick wall perpendicular to river wall, at south boundary of Dohm Wharf river wall.
- Existing crack in brick wall unchanged since last inspection. See location 3 for detail.
- No new cracks observed in concrete parapet wall, adjoining red brick wall or concrete hardstanding.

Location 3

Hard standing area – south corner brick wall crack detail

Notes:

- Brick wall perpendicular to river wall, at south boundary of Dohm Wharf river wall.
- Existing crack in brick wall at approximate level of crest of concrete parapet wall.
- Extent of crack remains unchanged since 23rd February 2017 inspection.
- Crack does not appear to have widened since 23rd February 2017 inspection.
- No obvious indications of movement or settlement.

Location 4

Hard standing area – north corner

Notes:

- No new cracks observed in concrete parapet wall or concrete hard standing.
- No evidence of movement at interface between timber hoarding, concrete parapet wall and concrete hard standing.
- No obvious indications of movement or settlement of parapet wall or hard standing.