DESIGN PACKAGE C122
BORED TUNNELS

ADDENDUM TO WSI: CONNAUGHT TUNNEL WATCHING BREIF

Document Number: C122-OVE-T1-RGN-CR146-50002

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☐	Code 3.	Not Accepted. Revise and resubmit. Work may not proceed
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Reviewed/Accepted by:(signature) [redacted]

Print Name: [redacted] Date: 27/3/12

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		Name	Suzanna Pembroke	Rebecca Casey	Peter Chamley
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		Name	Suzanna Pembroke	Rebecca Casey	Peter Chamley
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		Signature			
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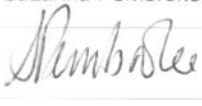
		Signature			

Issue Document Verification with Document ✓

Contents

1 Introduction

This document provides details of the archaeological watching brief required to mitigate impacts of construction activities on the Connaught Tunnel. It sets out the location and recording activities required following cofferdam installation and reduction of dock bed to expose and remove the tunnel crown. It also sets out requirements for C263 to provide advice ahead of the dismantling, storage and reconstruction of the Pump Head House.

The Principal Contractor proposes to remove the twin tunnel section by breaking out the tunnel crown, central section and invert. In the Dock Passage section this will require dewatering of the dock passage to remove the crown (see figure 1). During exposure and demolition of the tunnel crown, the *Archaeological Contractor* C263 shall provide a watching brief to record this non listed built heritage feature.

The Principal Contractor will undertake to dismantle, and remove the Pump Head House (see figure 1). This will be removed and re-erected adjacent to the SS Robin's mooring at the western end of Royal Victoria Dock. The *Archaeological Contractor C263* shall undertake a watching brief and provide advice where necessary on the procedure.

This document is an addendum to the Written Scheme of Investigation for Connaught Tunnel and Surface Rail (*C122-OVE-T1-GMS-CR146_WS158-00002*) and should be read in conjunction with that document. In particular the Historic Fabric Survey, Appendix 1, of the WSI records previous works where the tunnel crown was exposed and should be reviewed ahead of site works.

This document outlines the requirements of the *Main Contractor* (Section 3) and the requirements of the *Archaeological Contractor* (Section 4).

2 Scope of Works

2.1 Aims of the Watching Brief

The overall aim of the archaeological works is to document the nature of the exposed tunnel crown prior to demolition and the pump head house during dismantling as part of the overall non-listed built heritage recording of the Connaught Tunnel.

Figure 1 below shows the relationship of the dock passage with the tunnel alignment beneath it. The area of works is shown as the dock segment overlying the Connaught Tunnel. This will be drained using coffer dams and excavated to expose the top of the tunnel crown. The crown will then be removed. An archaeologist will be present to monitor the excavation, exposure and removal of the tunnel crown to a built heritage level 3 standard.

This work should further aim to understand the nature of the relationship of the tunnel with the dock.

Figure 1 also shows the location of the Pump Head House. The archaeologist shall monitor the dismantling of the structure and provide historic building advice to the contractor as required.

2.2 Site Specific Aims

The following site-specific research aims can be outlined for the proposed investigations at the Connaught Tunnel dock bed site:

- What is the relationship of the Connaught Tunnel, with the construction of the Royal Albert and Victoria Dock;
- What evidence is there for modifications to the Connaught Tunnel over time?

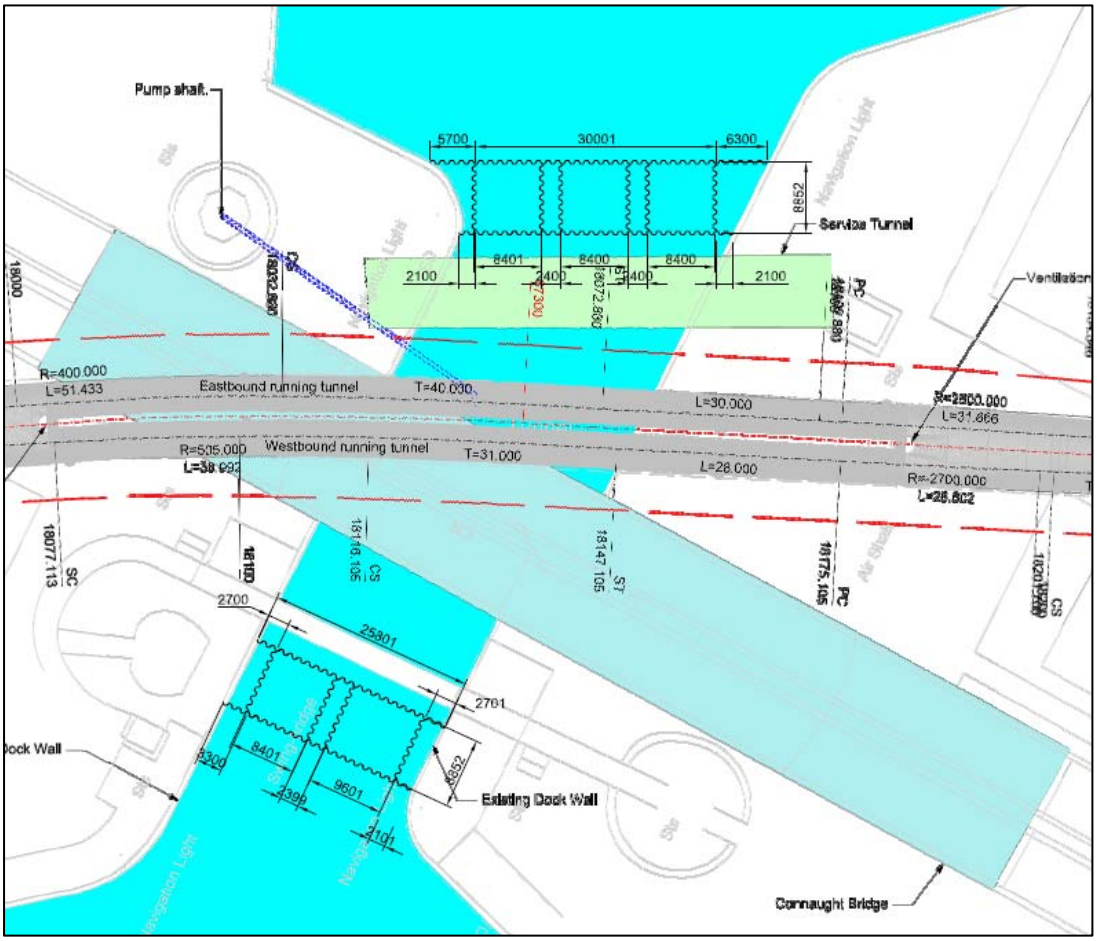


Figure 1. Site Plan

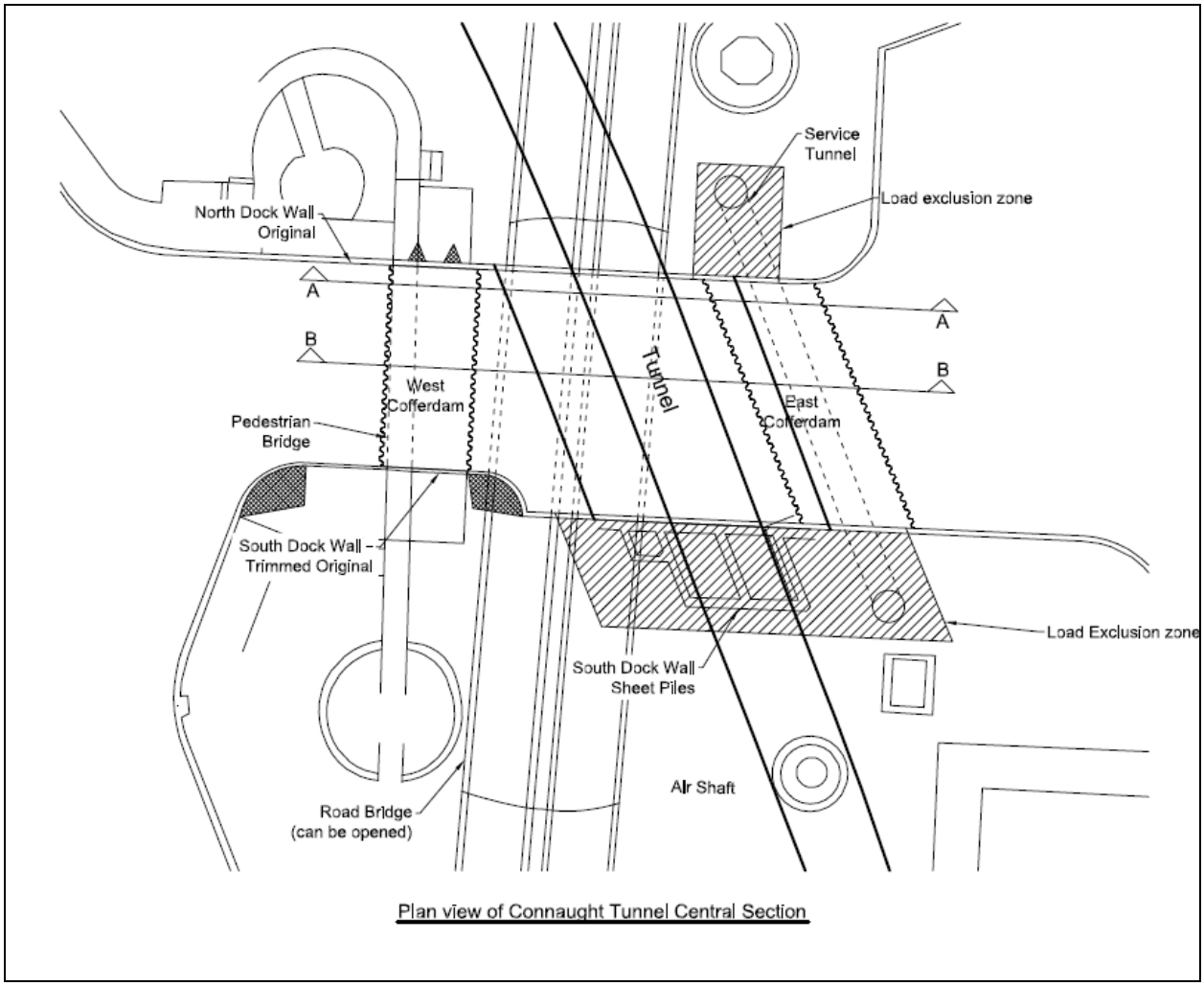


Figure 2. Cofferdam Plan

3 Specific Requirements for the Main Principal Contractor (C315)

3.1 Archaeological Watching Brief – Connaught Tunnel

Refer to the Generic WSI (CR-PN-LWS-EN-SY-00001) for the definition of General Watching Brief. The *Main Contractor* (C315) shall undertake to allow the Archaeological Contractor access to the site for the purpose of monitoring the exposure and removal of the tunnel crown and to record the tunnel feature.

A clear operating area will be defined for use by the *Archaeological Contractor* (C263), safe from any adjacent construction activity. The *Main Contractor* shall allow the *Archaeological Contractor* safe access to record the tunnel crown as it is exposed.

If significant archaeological remains are uncovered, the archaeological contractor will notify the Principal Contractor and Project Archaeologist.

3.2 Archaeological Watching Brief – Pump Head House

The *Main Contractor* (C315) shall undertake to allow the Archaeological Contractor access to the site for the purpose of monitoring the dismantling and removal of the Pump Head House.

3.2.1 Watching Brief Procedure

The *Main Contractor* shall:

- Ensure no live underground services/UXO's exist in the area identified for investigation;
- Allow suitable access from ground level to excavated area for archaeologists to work;
- Allow safe access for archaeological operatives into the site;
- Allow for up to 2 archaeologists to be on site at any one time; and
- Provide further technical advice to the *Archaeological Contractor* as maybe required to safely complete the works.

3.3 Site Accommodation and Facilities

The *Main Contractor* shall provide the following site accommodation facilities for the use of archaeological operatives, inclusive of any hardstanding and services required

- Toilets, with drying and washing facilities;
- First Aid;
- Temporary office for the use of archaeologists complete with furniture; and,
- Secure storage facilities for tools, finds etc.

3.4 Healthy by Design

Additional considerations for provision of a safe working environment are given in Appendix B – Designer's Risk Control Log Summary, in accordance with the Crossrail Standards:

- *Healthy By Design: A guide for Crossrail Design Teams* (Document reference: CR-XRL-Z7-XCS-CR001-0001)

4 Instructions to C263 *Archaeological Contractor* and Specification

4.1 General Watching Brief Connaught Tunnel and Pump Head House

The archaeological watching brief will be carried out at Connaught Tunnel in two places. The Connaught Tunnel dock passage where the tunnel crown will be exposed and removed and the Pump Head House where this will be dismantled and removed. Further background information on the general scope of work and requirements on the *Archaeological Contractor* are to be found in the Site Specific Written Scheme of Investigation for Connaught Tunnel, document reference number: *C122-OVE-T1-RGN-CR146_WS158-00002*.

The *C263 Archaeological Contractor* shall provide suitably qualified archaeologists, experienced in building recording and the nature of archaeological deposits which are expected on this site. The scope and specification for undertaking this work is to level 3 and follows the requirements set out in the WSI. Please refer to that document for details.

It will be necessary to provide historic building advice on the appropriate method for dismantling the Pump Head House to the Principal Contractor. This will be provided by C263.

4.2 Deliverables

The required deliverables, including *Archaeological Contractor*'s Method Statement, Site Monitoring and Progress Reports, Site Archives, Interim Statement, Survey Report, Fieldwork Report, SMR Report, Summary Report and Post-Excavation Assessment are set out in Sections 8 and 9 of the Written Scheme of Investigation for Connaught Tunnel (*C122-OVE-T1-RGN-CR146_WS158-00002*) and in the C263 contract requirements.

C263 will be required to add details regarding the tunnel crown exposure and the Pump Head House dismantling to the existing NLBH report previously carried for Connaught Tunnel (document reference : C263-MLA-X-RGN-CRG07-50039).

5 Programme

5.1 Tunnel Crown

A start date for preceding activities required prior to targeted watching brief has been set for the 1st QTR 2013. This will require installation of the cofferdam and draining of the dock bed.

A start date for archaeological watching brief has yet to be agreed with the CRL and Vinci Site Manager but will likely be the 1st QTR 2013 and carried out for a six month period from January 2013 to July 2013.

The timetable involved in the archaeological watching brief is set out as:

- Archaeological and NLBH monitoring will be required of excavation of the dock bed to top of the tunnel crown and removal/demolition of crown (estimated to take 1 week);
- Recording of tunnel crown and its relationship to dock bed and remaining tunnel structure through drawing and photographic record by the *Archaeological Contractor*;
- Post excavation activities: This will involve interim reporting after seven days and post-excavation reporting and analysis as required.

5.2 Pump Head House

The proposed date for the dismantling of the Pump Head House is the 19th April 2012.

6 References

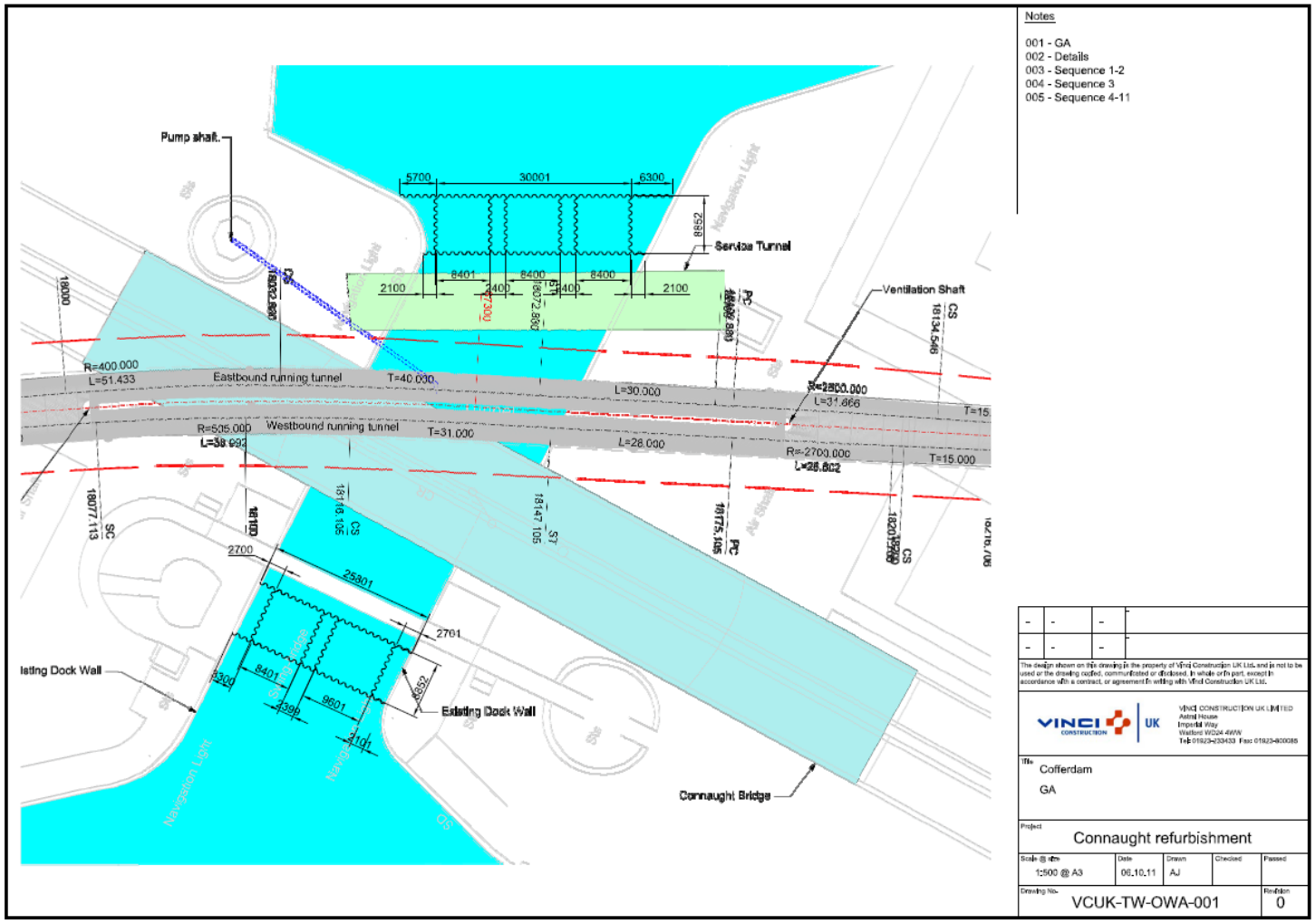
2011 C122 Connaught Tunnel and Surface Rail Site Specific Archaeological Written Scheme of Investigation, Document Number: *C122-OVE-T1-GMS-CR146_WS158-00002*

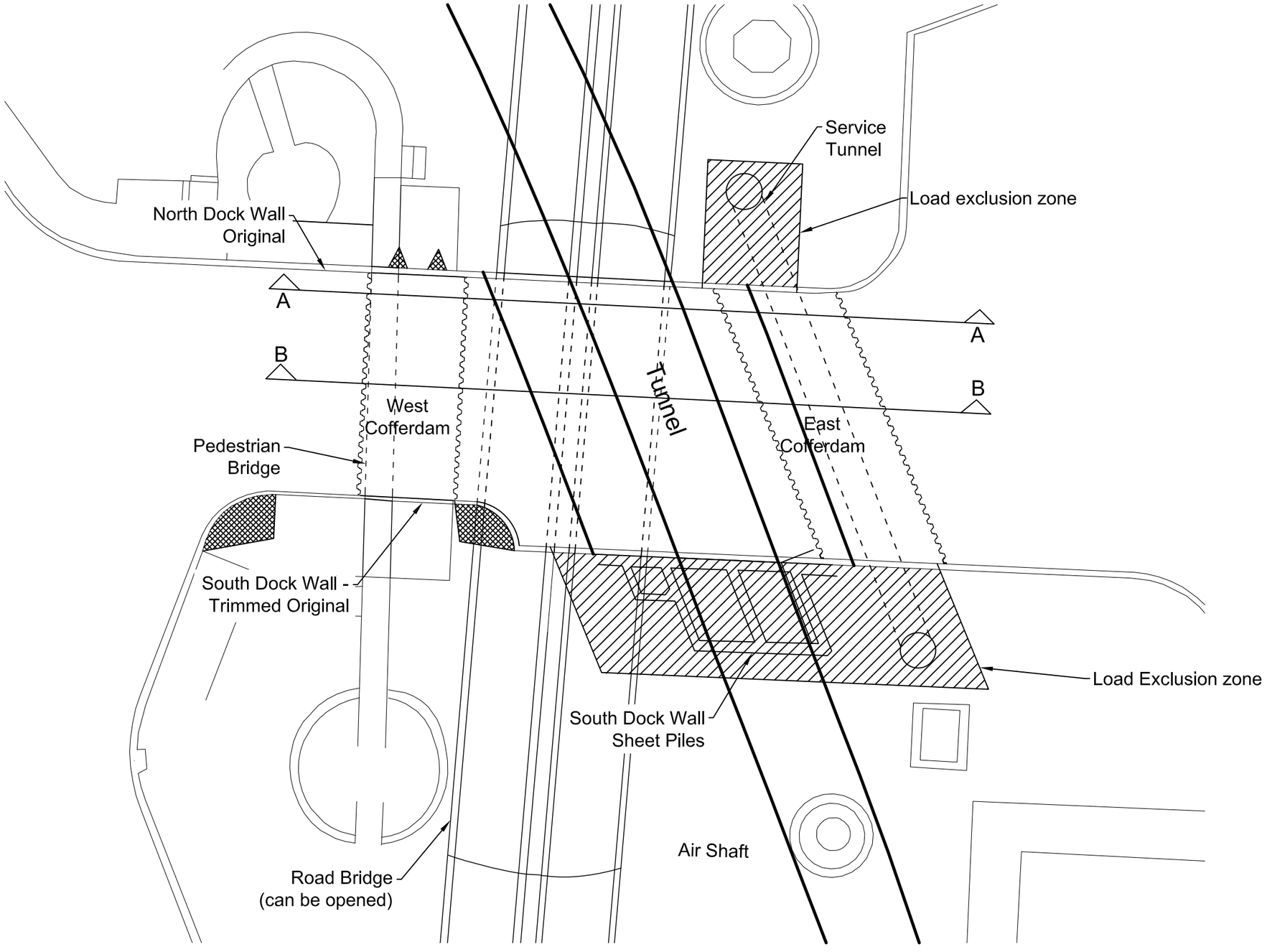
Appendix A – Archaeological Mapping Information

Drawing VCUK-TW-OWA-001 Site plan

C315-SK-030 Cofferdam Plan

C315-SK-031 Cofferdam profile





Plan view of Connaught Tunnel Central Section

Notes

1. West cofferdam dimensions:
   25m across passage
   11m along passage
   10.5m depth of fill
   Volume = 2890m3
2. East Cofferdam
   32.7m across passage
   14m along passage
   10.5m depth of fill
   Volume = 4810m3
3. Total Fill Required - 7700m3
4. Wall propping not yet shown but props will limit areas for lifting in equipment

WORK IN PROGRESS

-	-	-	-
-	-	-	-

VINCI CONSTRUCTION UK LIMITED
Astral House
Imperial Way
Watford WD24 4WW
Tel: 01923-233433 Fax: 01923-800085

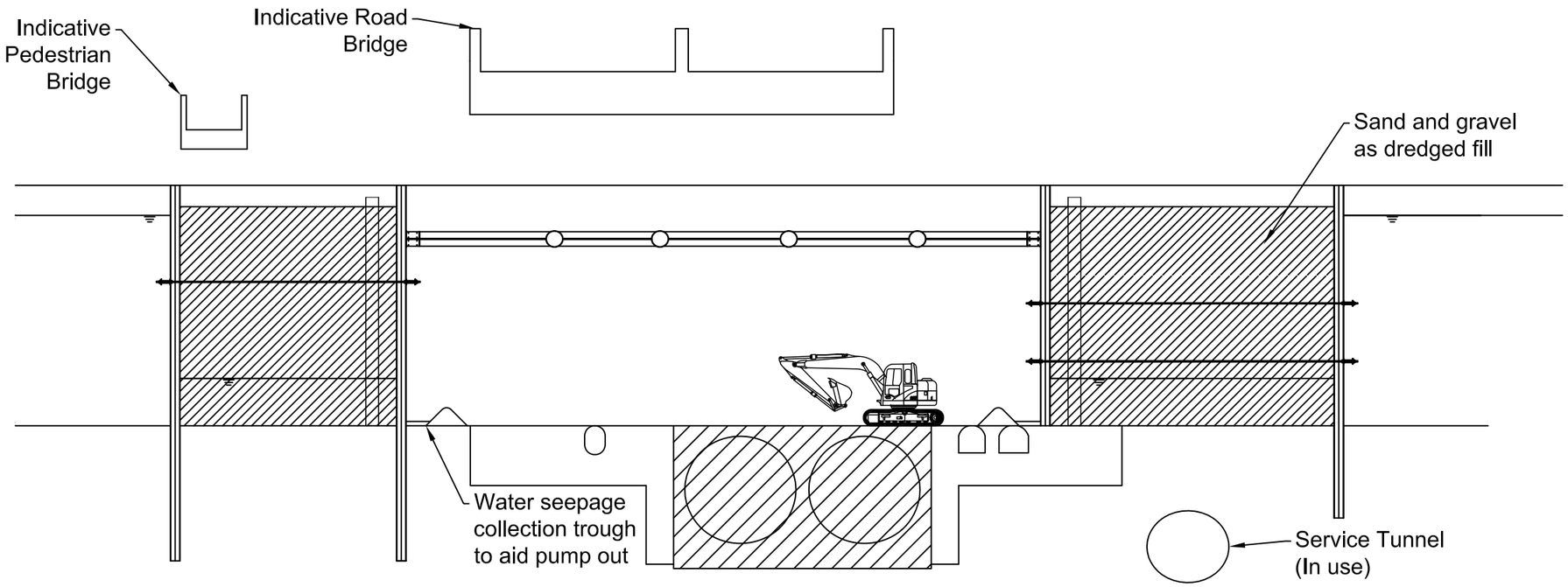
Title: Plan of Connaught Passage with Cofferdams

Project: Connaught Tunnel Refurbishment

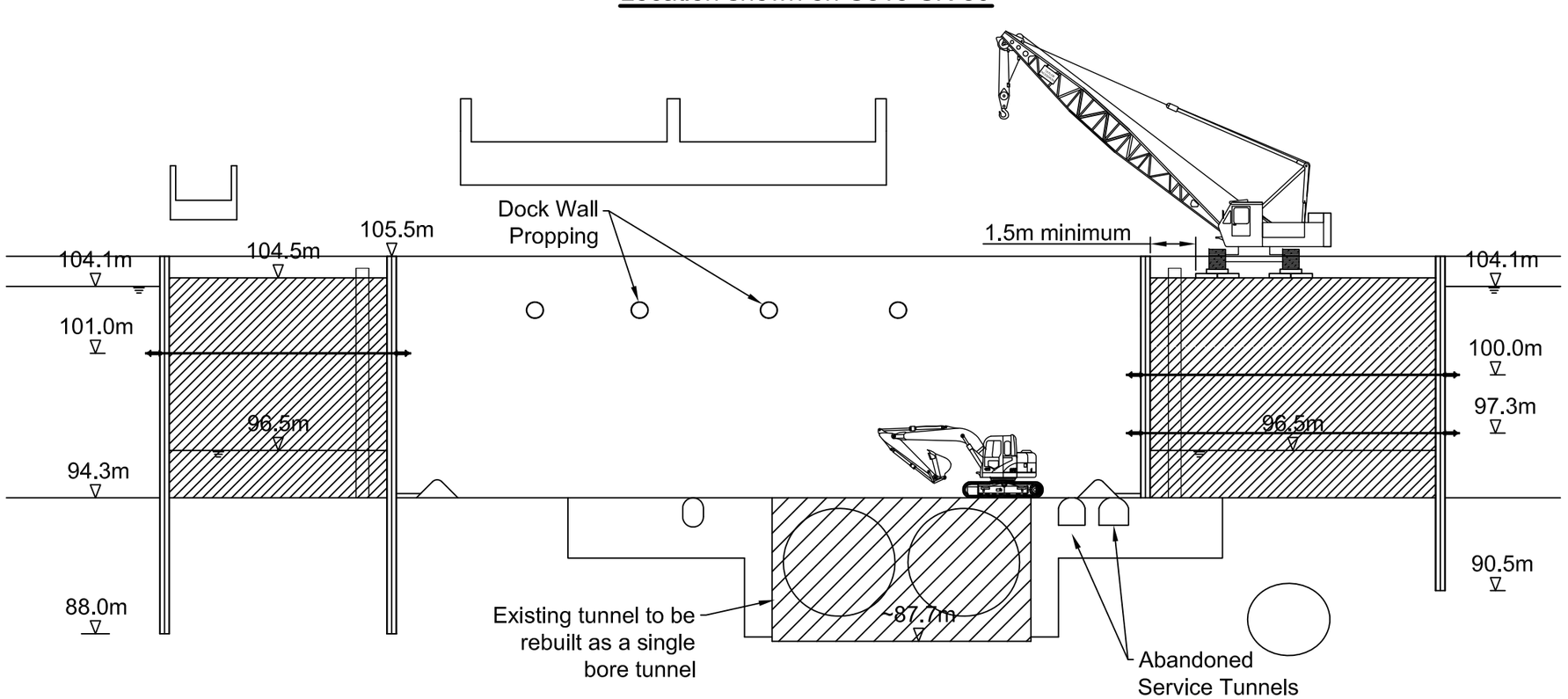
Scale @ size	Date	Drawn	Checked	Passed
1:500 @ A3	02.12.11	GS		

Drawing No. C315-SK-030

Revision P0



Section A - A along the centre of Connaught Passage
Location shown on C315-SK-30



Section B - B along the centre of Connaught Passage
Location shown on C315-SK-30

Notes

1. Do not scale from this drawing as dimensions of existing structures are approximate
2. All levels are meters Above Tunnel Datum (ATD) which is AOD plus 100m.
3. West cofferdam dimensions:
   25m across passage
   11m along passage
   10.2m depth of fill
   Volume = 2810m3
4. East Cofferdam
   33m across passage
   14m along passage
   10.2m depth of fill
   Volume = 4720m3
   Total Fill Required - 7530m3
5. Max permissible crane pressure 340kPa over a 1m strip, set min 1.5m back from inside of sheet. Crane loading to be agreed with Temporary Works Designer

WORK IN PROGRESS

-	-	-	-
-	-	-	-

VINCI CONSTRUCTION UK LIMITED
Astral House
Imperial Way
Watford WD24 4WW
Tel: 01923-233433 Fax: 01923-800085

Title
Long Section through Connaught Passage

Project
Connaught Tunnel Refurbishment

Scale @ size	Date	Drawn	Checked	Passed
1:250 @ A3	15.12.11	GS		

Drawing No.
C315-SK-031

Revision
P0

Appendix B – Designer's Risk Control Log Summary

Significant residual risks have been identified through *Designer's* risk assessment (Eliminate Reduce Isolate Control).

Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
General Site Working	All following	E	Site Specific Induction, toolbox talks etc.	*Main Contractor*
		R	Contractors' Method Statements and Risk Assessments to be approved in writing prior to working. All site staff to confirm that they have read and understood MS and RA	*Designer* *Main Contractor* *Archaeological Contractor*
		I	Zoning of site activities to prevent unnecessary overlap of working areas	*Designer* *Main Contractor* *Archaeological Contractor*
		C	Ensure all site staff are competent and aware of risks (e.g. CSCS cards)	*Main Contractor* *Archaeological Contractor*
	Contact with plant/machinery, trips, falls,	E	Zoning of site activities to prevent unnecessary overlap of working areas	*Designer* *Main Contractor* *Archaeological Contractor*
		R	Minimum PPE to be worn at all times to include Hi-Visibility clothing, Hard Hats, site safety boots, safety glasses, gloves.	*Main Contractor* *Archaeological Contractor*
		I	Zoning of site activities to prevent unnecessary overlap of working areas	*Designer* *Main Contractor* *Archaeological Contractor*
		C	Minimum PPE to be worn at all times to include Hi-Visibility clothing, Hard Hats, site safety boots, safety glasses, gloves.	*Main Contractor* *Archaeological Contractor*

Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
	Contaminated land/disease etc	E	Geotechnical reports indicate risk of contamination due to previous site use as railway.	*Main Contractor*
		R	Geotechnical reports indicate risk of contamination due to previous site use as railway. Appropriate PPE to be provided by *Archaeological Contractor* as required.	*Archaeological Contractor*
		I	Any areas of contamination identified during excavation are to be reported and remedial measures put in place prior to further excavation.	*Main Contractor* *Archaeological Contractor*
		C	Staff required to wash hands before ingestion of food/drink etc.	*Main Contractor* *Archaeological Contractor*
			Welfare for hygiene etc. is to be provided by Main contractor at Archaeologist site office, to include washing facilities	*Main Contractor*
Deep excavation Archaeological contractors will require access to deep excavations in dock bed	Falls from height, tripping etc. Objects falling from height.	E	n/a	
		R	Dedicated Egress – ramping with edge guard is preferred option. Edge Guards/Heras fencing to be specified to provide barrier to deep excavation and prevent falls from objects into open worksite.	*Main contractor*
		I	n/a	
		C	Deep excavation signs	
Plant and Machinery	Proposed Archaeological contractor's working	E	n/a	
		R	Appropriate PPE to be provided	*Archaeological Contractor*

Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
	route towards proposed location of plant. Risk of contact with excavating machine arm, crushing etc.	I	Ensure dedicated pedestrian routes away from arc of machine working	*Main Contractor*
		C	Employ banksman	*Main Contractor*
Site Traffic	Risk of injury or death from contact with moving vehicles	E	Proposed working and storage area for *Archaeological Contractor* to be located away from site traffic routes	*Designer* *Main Contractor* *Archaeological Contractor*
		R	n/a	
		I	Controlled crossing points and separation of pedestrian/site traffic routes	*Main Contractor*
		C	n/a	
Use of hand tools	Possible injury resulting from use of hand tools, e.g. mattocks, trowels, spades	E	n/a	
		R	Appropriate training and PPE to be provided	*Archaeological Contractor*
		I	n/a	
		C	n/a	
Adverse Weather	Changeable ground conditions leading to trips and falls etc.	E	n/a	*Archaeological Contractor*
		R	Use of Youngmans boards or similar is to be specified for the transportation of spoil where appropriate	*Main Contractor*
		I	Appropriate finishing to egress ramps (e.g. compacted hardcore/rubble to provide sufficient purchase, edge guard etc.)	*Main Contractor*
		C	Appropriate PPE to be provided for adverse weather working	*Archaeological Contractor*

Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
	Adverse weather conditions may require use of electrical equipment powered by generators (e.g. pumps, temporary lighting etc), with accompanying associated risks for electrocution etc.	E	n/a	
		R	Energy Supply methods and risk assessment to be detailed in Contractor's method statements	*Main Contractor*
		I	n/a	
		C	Only staff with appropriate training are to operate generators and other electrically operated equipment (for example pumps)	*Archaeological Contractor*
Buried utilities/services Existing utilities plan indicates main utilities corridors are routed primarily through road surfaces and are not present within area of proposed evaluation.	Hazardous contact with buried services e.g. electrical shock, gas leakage/explosion, contamination through contact with sewage etc.	E	This area is to be excluded from the archaeological design and identified on plan. *Main Contractor* to confirm that appropriate action has been taken to decommission services prior to archaeological investigation. *Main Contractor* to identify location of utilities/services in Method Statement and on plan.	*Designer* *Main Contractor*
		R	n/a	
		I	Surface sweep (e.g. CAT scan) to be undertaken prior to excavation by *Main Contractor*.	*Main Contractor*
		C	Banksman to be employed to watch for possible buried services/utilities	*Main Contractor*
			Appropriate PPE measures as outlined above for contamination	*Main Contractor* *Archaeological Contractor*

Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
Noxious gases	May be present in areas of buried sediment.	E	n/a	
		R	Avoid creating confined spaces where noxious gases could accumulate	*Main Contractor*
		I	Ensure gas monitors are provided, and training for use, where appropriate	*Main Contractor* *Archaeological Contractor*
		C	Appropriate PPE measures as outlined above for contamination	*Main Contractor* *Archaeological Contractor*
Unexploded ordinances (UXO)	Records show there is a low risk	E	*Main Contractor* to employ UXO specialist to undertake site survey and probe for UXO	*Main Contractor*
		R	Briefing by UXO specialist to site staff where appropriate.	*Main Contractor*
		I	Potential UXO to be reported immediately to site manager and isolated. Any works halted.	*Main Contractor*
		C	Following identification Authorities to be informed. Procedures for remediation as set out in Main Contractor's method statement to be enacted	*Main Contractor*
Contaminated sediment	The risk to archaeological contractors is considered to be **low** assuming mitigation measures are followed	E	Geotechnical reports indicate risk of contamination due to residues surviving in sediments.	*Main Contractor*
		R	Appropriate PPE to be provided by *Archaeological Contractor* as required.	*Archaeological Contractor*
		I	Remedial measures put in place prior to further excavation if water ingress becomes a risk	*Main Contractor* *Archaeological Contractor*

Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
		C	Staff required to wash hands before ingestion of food/drink etc.	*Main Contractor* *Archaeological Contractor*
Contaminated water - weils disease	The risk to archaeological contractors is considered to be **low** assuming mitigation measures are followed	E	Environment reports indicate risk of contamination due to previous site use as railway.	*Main Contractor*
		R	Protective equipment to be used at all times. Personal hygiene after inspection work Wearing of suitable glove and appropriate PPE to be maintained	*Archaeological Contractor*
		I	Remedial measures put in place prior to further excavation if water ingress becomes a risk	*Main Contractor* *Archaeological Contractor*
		C	Staff required to wash hands before ingestion of food/drink etc. - access to welfare facilities required.	*Main Contractor* *Archaeological Contractor*