



## C123 – Intermediate Shafts

# Addendum to SSWSI: Trial Trench Evaluation and Detailed Excavation – Limmo Peninsula Shaft

**Document Number: C123-JUL-T1-RGN-CR144\_SH011\_Z-00002**

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## 1 Introduction

This document provides details of the programme of archaeological investigation required to evaluate and mitigate the impact of the construction of the Limmo Peninsula Shaft on heritage assets, primarily archaeological remains. It sets out the location and recording activities required at the Limmo Shaft worksite prior to the main works phase.

Instone Wharf is not included in this document due to a lack of sufficiently detailed design information. The shaft adit is also not included in this phase due to a lack of sufficiently detailed design information. Both elements will be incorporated into a further addendum SSWSI when sufficiently detailed design information is available.

This document is an addendum to the Site Specific Written Scheme of Investigation (C123-JUL-T1-TPL-CR144\_SH011\_Z-00001 Revision 8) and should be read in conjunction with the document. This document outlines the roles of the *Main Contractor (C252)* and the *Archaeological Contractor (C261)*.

Site works are subject to CDM regulations. Contractors are required to consult the Main Works CDM register before beginning work on site.

## 2 Scope of works

### 2.1 Aims of the proposed investigations

The overall aim is to identify the extent and survival of archaeological remains that would be removed by the excavation of the shaft and to mitigate the impact of the construction works. Archaeological remains that have been identified within the site footprint include possible Pleistocene/Glacial Allerod channel deposits and the remains of structures that were part of the Thames ironworks and Ship Building Company Ltd. This will be achieved through a programme of archaeological evaluation by trial trenching.

### 2.2 Site Specific Aims and Objectives

The general aims of the investigations at Limmo Peninsula are:

1. To gain an understanding of the development of the landscape from Pleistocene to medieval periods.
2. To gain an understanding of the development of the site of the former Thames Ironworks and Ship Building Company Ltd.

The site-specific aims of the archaeological mitigation will be informed by the results of the trial trenching and geoarchaeological assessment.

The objectives of the archaeological investigations are set out below:

1. Trial trench evaluation will identify the presence or absence of structures forming part of the Thames Ironworks between ground level 4m OD (104 ATD) and 1m OD (101 ATD), which is the estimated base of the Thames Iron Works deposits. The results of this work will be used to determine if further mitigation is required. If further mitigation is required it would be an archaeological excavation covering the footprint of the shaft.
2. Geoarchaeological assessment - Window samples (or a similar type of sample) will be taken from the base of the Thames Iron Works levels (identified as a demolition layer in some areas); expected depths of the window samples are from 1m OD (101m ATD) to -

4 to -5m OD (96-95m ATD). These will be used to establish the presence of Pleistocene/Glacial Allerod deposits, and, if present, assess the potential for further analysis of the window samples.

3. Mitigation would be archaeological excavation and analysis of the window samples. There may be a requirement for a watching brief in the areas outside the proposed footprint of the tunnel shaft, however, this is dependant on the results of the above investigations.

### 2.3 Indicative ground model

The model below is based on the logs of four boreholes (CH85R, CH56R, CH61R and CH57R) undertaken as part of Package 19 Ground Investigation Works (Plate 1). The boreholes were archaeologically monitored and the results of the monitoring were presented in the report Archaeological Monitoring of Ground Investigations Limmo Peninsula and Victoria Dock Portal (Excel Car Park) April 2010.

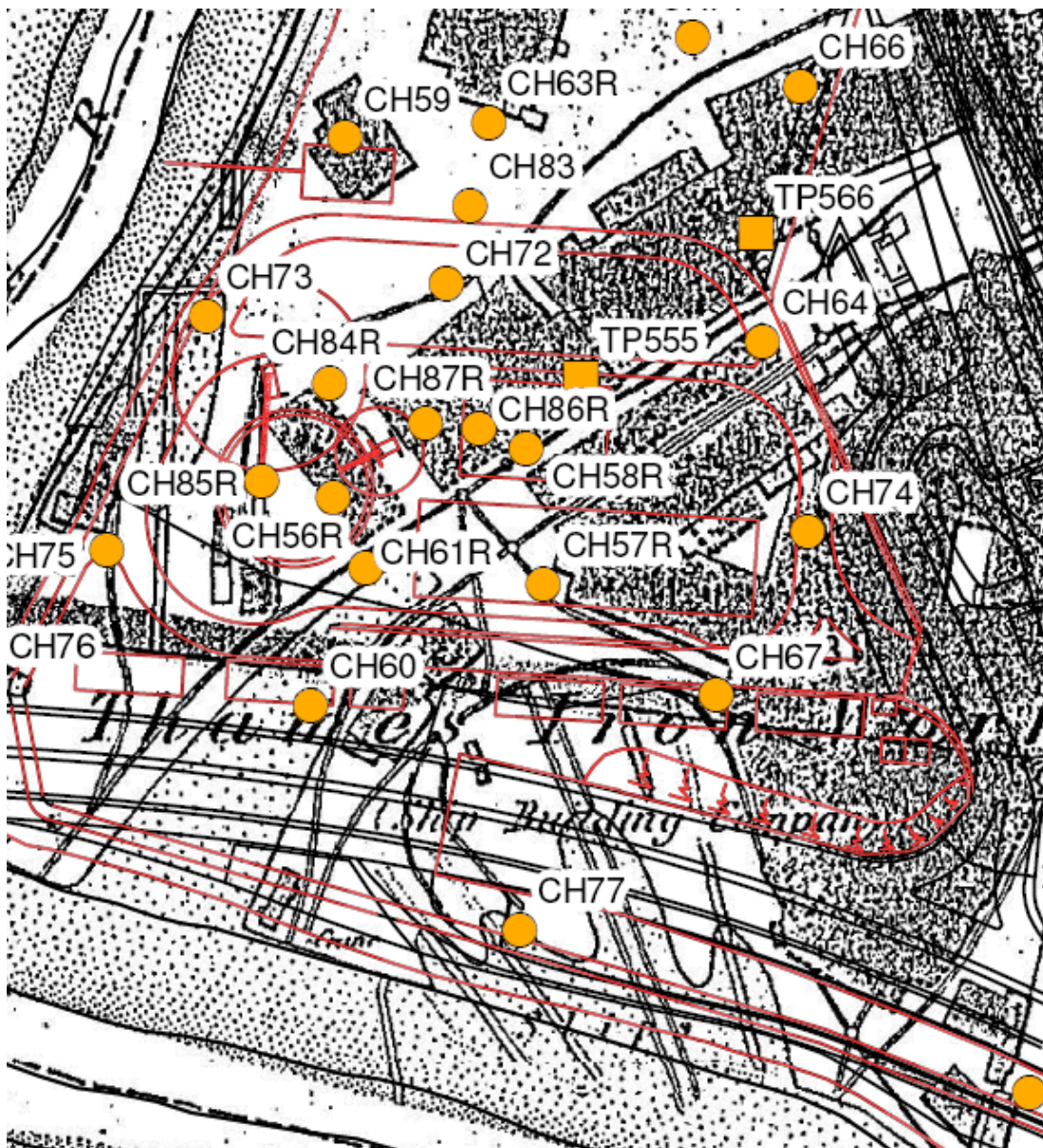


Plate 1 Location of boreholes overlain on 1916 Ordnance Survey drawing. Shaft footprint shown in red.

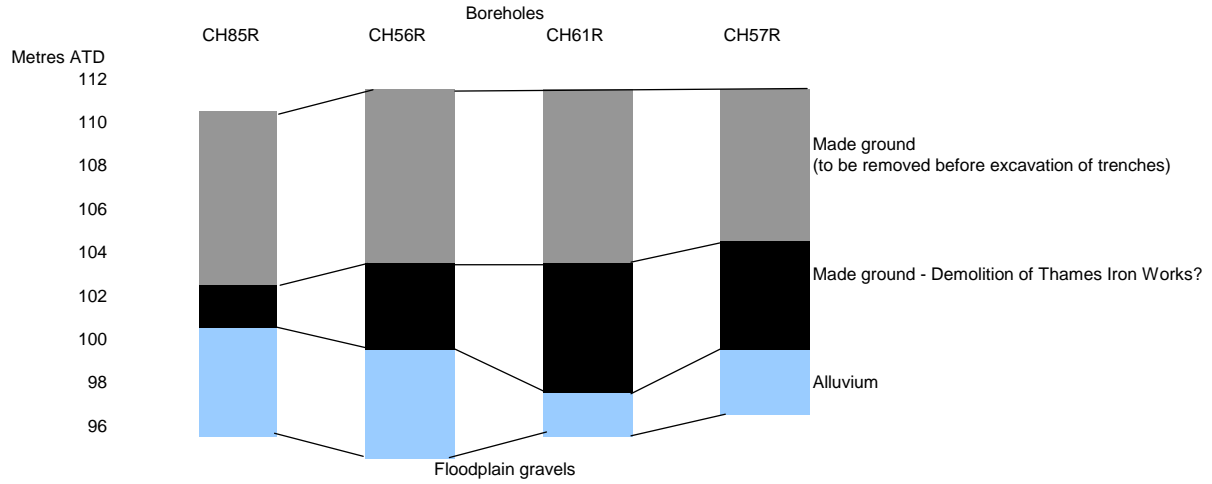


Plate 2 Indicative ground model (NB Included for indicative purposes only not to scale).

### 3 Specific Requirements for the Main Contractor (252)

#### 3.1 Archaeological Trial Trench Evaluation

Two trial trenches are required to evaluate the presence or absence of archaeological remains within the upper 6m of the Limmo Peninsula Shaft. It is proposed that the trenches measure 30m in length, 2 to 6m in width (dependant on the requirement to step the trenches) and 3 to 4m in depth; the trenches will be excavated after removal of made ground/overburden.

Trial trench evaluation is defined in the Generic WSI (CR-PN-LWS-EN-SY-00001) as ‘*targeted or sample-based mechanical or hand excavated trial trench based investigation used to record the character and/or extent of known or potential archaeological remains identified through desk based assessment.*’

The *Main Contractor (C252)* will undertake to remove the made ground/overburden material to create a safe working area as shown on Figure 1. The borehole data indicates that the made ground to be removed measures up to 6m in depth (110-104 ATD). The removal of the material is expected to stop at approximately 104m ATD (Plate 2). Based on the footprint of the shaft it is estimated that a 50m x 50m working area will be required and that 15,000m<sup>3</sup> of material would need to be removed. The initial removal will not require archaeological supervision, however, removal of the material close to the interface with the Thames Iron Works demolition layers will be done under supervision of the *Archaeological Contractor (C261)*.

Following removal of the made ground/overburden, the *Main Contractor (C252)* will excavate the two trial trenches using a mechanical excavator fitted with a toothless ditching bucket. If solid surfaces, e.g. tarmac or concrete, are identified they will be broken out using a pecker or similar suitable machine. The machine will be under constant archaeological supervision. The machine will remove material interpreted as demolition layers to identify the presence, or absence, of buildings shown on the 1<sup>st</sup> edition Ordnance Survey map (Figure 2).

Machine excavation at most locations will cease at a depth of approximately 4m (100m ATD where alluvial deposits have been identified (Plate 2)). If structures are identified mechanical excavation will cease and the structure will be hand cleaned and recorded. Structural elements will not be removed at this stage.

Please note that concentrations exceeding human screening values have been identified in the ash material; please see Contamination Assessment of the Gas Main Diversion at Limmo Peninsula Shaft (Document Number: C123-JUL-T1-RST-CR144\_SH011\_Z-00001). Groundwater has been identified at 104m ATD, however, this may be affected by tidal changes.

##### 3.1.1 Archaeological Trial Trench Procedure

The *Main Contractor (C252)* will ensure the following:

- That there are no live underground services within the trench footprint;
- That all excavated material is stored in spoil heaps at a safe distance from the trenches;
- Determine the requirement to step the trenches;
- Provide earthworks support if the sides of the trenches are considered to be unstable, or are deeper than 1.2m and are therefore unsafe and access to the trench is required;
- Provide suitable forms of access into the trenches;
- Provide Heras mesh fencing (or a similar product) around the trench, including toe-boards where necessary;



- Allow for localised machine excavation within the trial trenches to remove material after it has been recorded by C261. The estimated depth of the trench is 3 to 4m dependant on the archaeological remains identified within the trenches;
- All excavation using mechanical excavators or other types of plant will be undertaken in agreement and under the supervision of a C261 Archaeologist;
- Provision of the following services:
  - Welfare
  - Power
  - Lighting
  - Water
  - Plant
- Provision of safe access for archaeological personnel into the working area;
- Allow for two archaeologists per trench and one Senior Archaeologist to supervise the overall archaeological works;
- Allow for visits by photographer and up to two geomatics personnel;
- Provision of further technical advice to C261 as may be required to safely complete the works; and
- Temporary reinstatement of the trenches while the mitigation strategy is agreed; trenches are to be backfilled after instruction from PDP.

- **Trench data**

The following setting out details are for the proposed trial trenches:

Trench no.	East/north point	West/south point	Length	Depth
1	E:89765.687 N: 35521.478	E: 89730.733 N: 35523.148	35m	3-4m
2	E: 89765.687 N: 35506.078	E: 89730.734 N: 35507.748	35m	3-4m

### 3.2 Geoarchaeological Assessment

A programme of geoarchaeological assessment will be undertaken by *Archaeological Contractor (C261)*. The requirements of this work are presented in Section 4.1 below

### 3.3 Archaeological Excavation

Archaeological excavation is defined in the Generic WSI (CR-PN-LWS-EN-SY-00001). As *'the process of exposure, recording and recovery of archaeological remains. This may be targeted at specific locations or a sample range of locations (e.g. specific investigation trenches)'*.

An assessment of the results of the archaeological trial trenching will inform the requirement for archaeological excavations. If archaeological excavation is required it will be taken shortly after completion of the trial trenching with completion before the C305 construction work begins.

The *Main Contractor (C252)* will undertake mechanical excavation of the material within a 50m x 50m area (Figure 1). The 50m x 50m area allows for provision for a 10m access track between the edge of the made ground/overburden and the edge of the excavation.

The layer of material interpreted as demolition of the Thames Iron Works will be removed by mechanical excavator by the *Main Contractor (C252)*. The mechanical excavator will be fitted with a toothless ditching bucket. All excavation will be done under constant supervision by *Archaeological Contractor (C261)*. The excavation will remove demolition layers that may be sealing structural remains of the Thames Iron Works and Ship Building Company Ltd. Following removal of this material any identified archaeological deposits will be recorded and sampled by the *Archaeological Contractor (C261)*. On completion of this work sample excavations will be undertaken to establish if there are further buried archaeological remains within the shaft footprint. Excavation is expected to be limited to small machine dug sondages.

Archaeological excavation will be undertaken using hand tools.

### 3.4 Archaeological Watching Brief

As part of the overall site work to create the working area for the tunnel boring machine (TBM) further removal of the made ground/overburden is required. The interface between the made ground/overburden and Thames Iron Works levels is at approximately 104m ATD. A Targeted Watching Brief will be undertaken at the point where the material is reduced to 105m ATD.

Refer to generic WSI (CR-LWS-EN-SY-00001) for definitions of General and Targeted Watching Briefs.

#### 3.4.1 Archaeological Targeted Watching Brief Procedure

During the removal of the made ground/overburden the following procedure is to be incorporated into the *Main Contractor (C252)* methods of work:

- Remove made ground/overburden at approximately 104m ATD under archaeological supervision of the *Archaeological Contractor (C261)*;
- Allow for archaeological deposits to be excavated and recorded;
- Allow safe access to the working area;
- Make allowance for 2 to 3 archaeologists on site to monitor and record;
- Use of plant in the working area only to be undertaken with the agreement of, and under the constant supervision the *Archaeological Contractor (C261)*; and
- Provide technical advice to the *Archaeological Contractor (C261)* as may be required to safely complete the work.

#### 3.4.2 Site Accommodation and Facilities

The *Main Contractor (C252)* will provide the following site accommodation facilities for the use of archaeological personnel, inclusive of hardstanding and services required:

- Secure storage for tools and equipment for a team of three archaeologists;
- Toilets with washing and drying facilities;
- Temporary office facilities for use by *C261* (one Senior Archaeologist) complete with suitable furniture and provision of drying areas for work clothing; and
- First Aid facilities and fire stations.

## 4 Instructions to Archaeological Contractor (C261) and Specification

### 4.1 Archaeological Evaluation, Excavation and Watching Brief

It is proposed that a programme of archaeological investigation comprising evaluation by trial trenching, geoarchaeological assessment and potentially excavation be undertaken at the site of Limmo Peninsula Shaft. Further details on the requirements of the *Archaeological Contractor (C261)* are to be found in Limmo Peninsula Shaft Site Specific Written Scheme of Investigation (C123-JUL-T1-TPL-CR144\_SH011\_Z-00001 Revision 8).

The *Archaeological Contractor (C261)* shall:

- Provide a team of suitably qualified and experienced archaeologists to cover the range of archaeological investigation to be undertaken;
- Provide a method statement for carrying out the works;
- Provide a risk assessment and health and safety plan;
- Undertake excavation of two trial trenches measuring 30m in length, 2 to 6m in width and 3 to 4m in depth. The location of the trenches is provided in Figure 2. C123 will provide C261 with a geo-referenced drawing and the setting out details of the trenches prior to the onset of the excavation works scheduled for October 2010.
- During trial trenching, excavation and the watching brief all archaeological features will be hand cleaned and defined to allow determination of their plan form, type, function, phasing and relationship with any other archaeological features. Each feature will be recorded as defined in the Limmo Peninsula Shaft Site Specific Written Scheme of Investigation (C123-JUL-T1-TPL-CR144\_SH011\_Z-00001 Revision 8);
- Further excavation will be undertaken if any structures that formed part of the Thames Iron Works are identified. This excavation will be undertaken to understand the stratigraphic sequence in the upper levels of the alluvial deposits. It is not proposed that excavation is undertaken within the River Terrace deposits. The impact of the shaft will be mitigated by the geoarchaeological assessment (as described below) if suitable material is identified.

### 4.2 Geoarchaeological Assessment

The *Archaeological Contractor (C261)* will record any archaeological features identified within the trenches. On completion of the recording the *Archaeological Contractor (C261)* will take two to three window samples (a decision will be made on site as to whether a third window sample is required based on the results of the first two window samples).

The window samples will be taken using a terrier rig. The working area required for the machine is presented in table 4.1.1 below.

Table 4.1.1 Terrier rig dimensions and weight

Access width	0.9m
Access height	1.5m
Access length	2.4m
Operating width	1.3m



Operating height	3.2m
Operating length	2.7m
Working area	4m x 2m minimum
Weight	1.3 tonnes

The terrier rig will gain access to the trench via a machine cut access ramp. The window samples will be logged on site. On completion of the logging the window samples will be taken offsite to the office of the *Archaeological Contractor (C261)* and stored in suitable conditions for subsequent laboratory assessment and, if suitable material is identified, analysis.

### 4.3 Deliverables

Within seven (no.) calendar working days of completion of a fieldwork event the *Archaeological Contractor (C261)* will submit an Interim Statement to the Project Archaeologist.

Further deliverables with respect to trial trenching and excavation are presented in the Limmo Peninsula Shaft Site Specific Written Scheme of Investigation (C123-JUL-T1-TPL-CR144\_SH011\_Z-00001 Revision 8).

Geoarchaeological assessment will comprise processing samples and assessing the value of further analysis. A report will be produced within eight (no.) weeks of completion of fieldwork. The report will follow the Crossrail standard for fieldwork reporting a presented in Archaeology Specification for Evaluation and Mitigation (including Watching Brief) (CR-PN-LWS-EN-SP-00001).

### 4.4 Site Archives

The site archive shall be organised to be compatible with other archaeological archives in London as described in Section 8.2 in the Site Specific Written Scheme of Investigation (C123-JUL-T1-TPL-CR144\_SH011\_Z-00001 Revision 8).

### 4.5 Post-excavation

The requirements of the post-excavation programme are presented in CRL/Crossrail Archaeological Contract and Limmo Peninsula Shaft Site Specific Written Scheme of Investigation (C123-JUL-T1-TPL-CR144\_SH011\_Z-00001 Revision 8).

## 5 Provisional timetable

Activity	Responsibility	Construction Phase
Removal of made ground/overburden	C252	Enabling works – October 2010
Excavation of 2 (no.) trial trenches (estimated time period is 2 weeks)	C252 and C261	Enabling works – 25 <sup>th</sup> October to 5 <sup>th</sup> November 2010
Geoarchaeological assessment (x2 window samples – estimated time two days)	C252 and C261	Week end 29 <sup>th</sup> October 2010
Undertake excavation (allows 6 week window)	C252 and C261	22 <sup>nd</sup> November 2010 – 23 <sup>rd</sup> December 2010

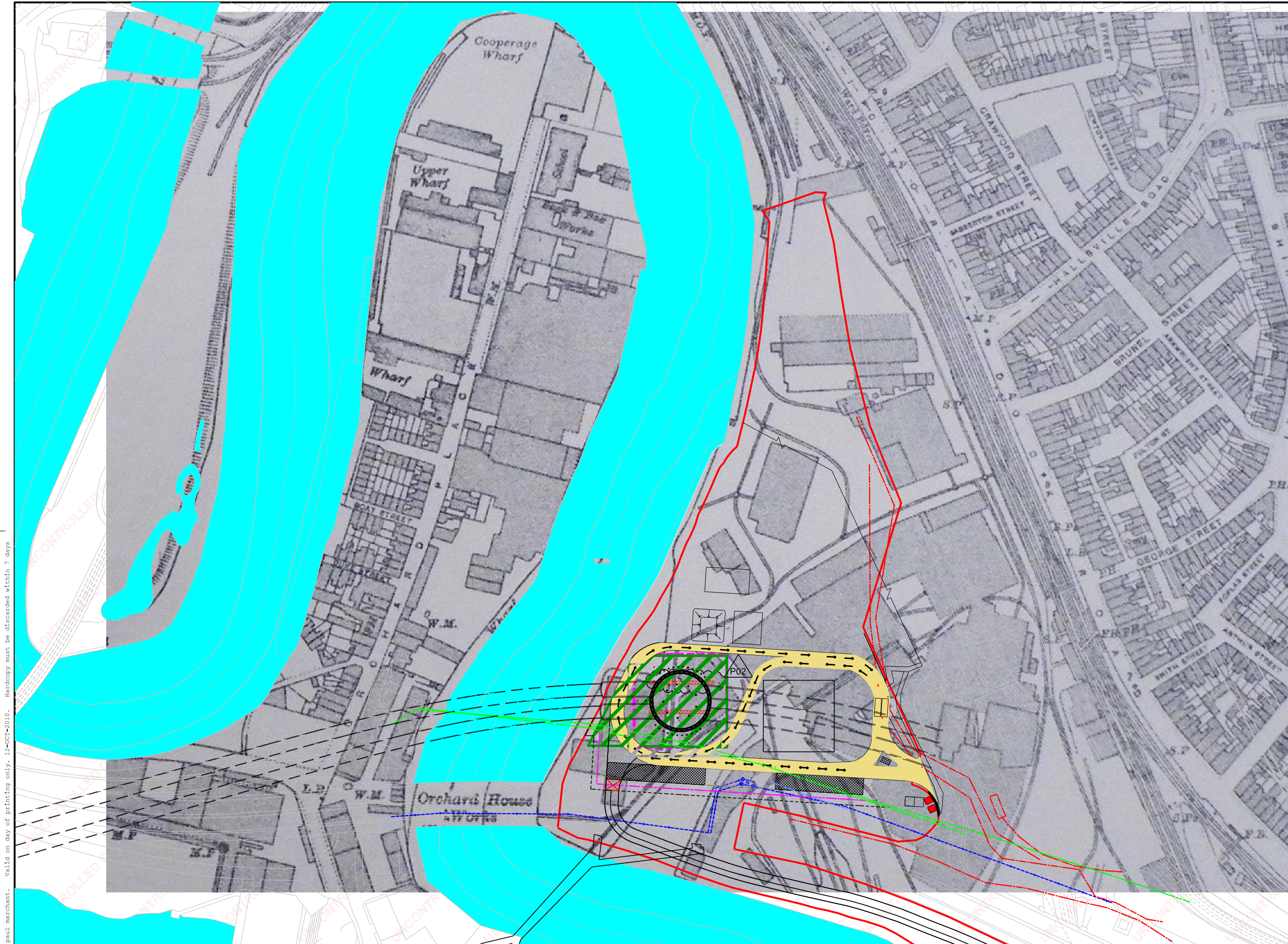




## Appendix A – Archaeological Mapping Information

Drawing title	Drawing number	Revision
Location of trenches and monitoring wells Figure 1	C123-JUL-T1-DDL-CR144_SH011-00060	P02
Location of archaeological investigations overlain on 1869 Ordnance Survey Figure 2	C123-JUL-T1-DDL-CR144_SH011-00063	P02
Trench and borehole locations Figure 3	C123-JUL-T1-DDL-CR144_SH011-00062	P01





**Safety, Health and Environmental Information**  
 Notes below are additional to hazards/risks normally associated with this type of work:

**Construction**  
 Ci. Provide earthworks support if the sides of the trenches are considered to be unstable or are deeper than 1.2m.  
 Cii. Identify and locate all buried services.  
 Ciii. Take precautions against health hazards from contaminated ground and dust.  
 Civ. Take precautions against risk of UXO in excavations.  
 Cv. Take precautions against risk of skin blisters from Hogweed at site boundaries.

**Operations**  
 Oi. Ensure site is tidy and hand tools are stored correctly to prevent trips and slips.

**Maintenance**  
 Mi. N/A

**Dismantling/Demolition (Future)**  
 Di. N/A

These notes are based on the use of experienced and competent contractors carrying out the work using an approved safe method of working.



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Rev.	Date	Description	By	Chk	App	Auth
P01	16/09/2010	Issued for inclusion in Document No. C123-JUL-T1-RGN-CR144_SH011_Z-00002	PM	RS	RS	
P02	11/10/2010	Trench Location Revised	PM	RS	RA	

**Notes**

- This drawing to be used in conjunction with information contained in the following report: Addendum to SWSI: Trial Trench Evaluation and Detailed Excavation Limmo Peninsula Shaft (Document Reference: C123-JUL-T1-RGN-CR144\_SH011\_Z-00002).
- See drawing No. C123-JUL-T1-DDL-CR144\_SH011-00060 for site details, trench sizes and setting out.
- Dimensions are in millimeters unless noted otherwise
- Dimensions should not be scaled from this drawing.
- The coordinate system relates to London Survey Grid.
- Instone Wharf and the shaft adit is not included due to a lack of sufficiently detailed design information at this stage.

**Key**

- Worksite Boundary. See Note 1
- DLR overburden to be removed
- Archaeological Trial Trench
- Potential Excavation Area

- EDF services
- Thames Water services
- Gas Main
- Gas Main diversion
- Construction access road

Scale: 1:1000 @ A1

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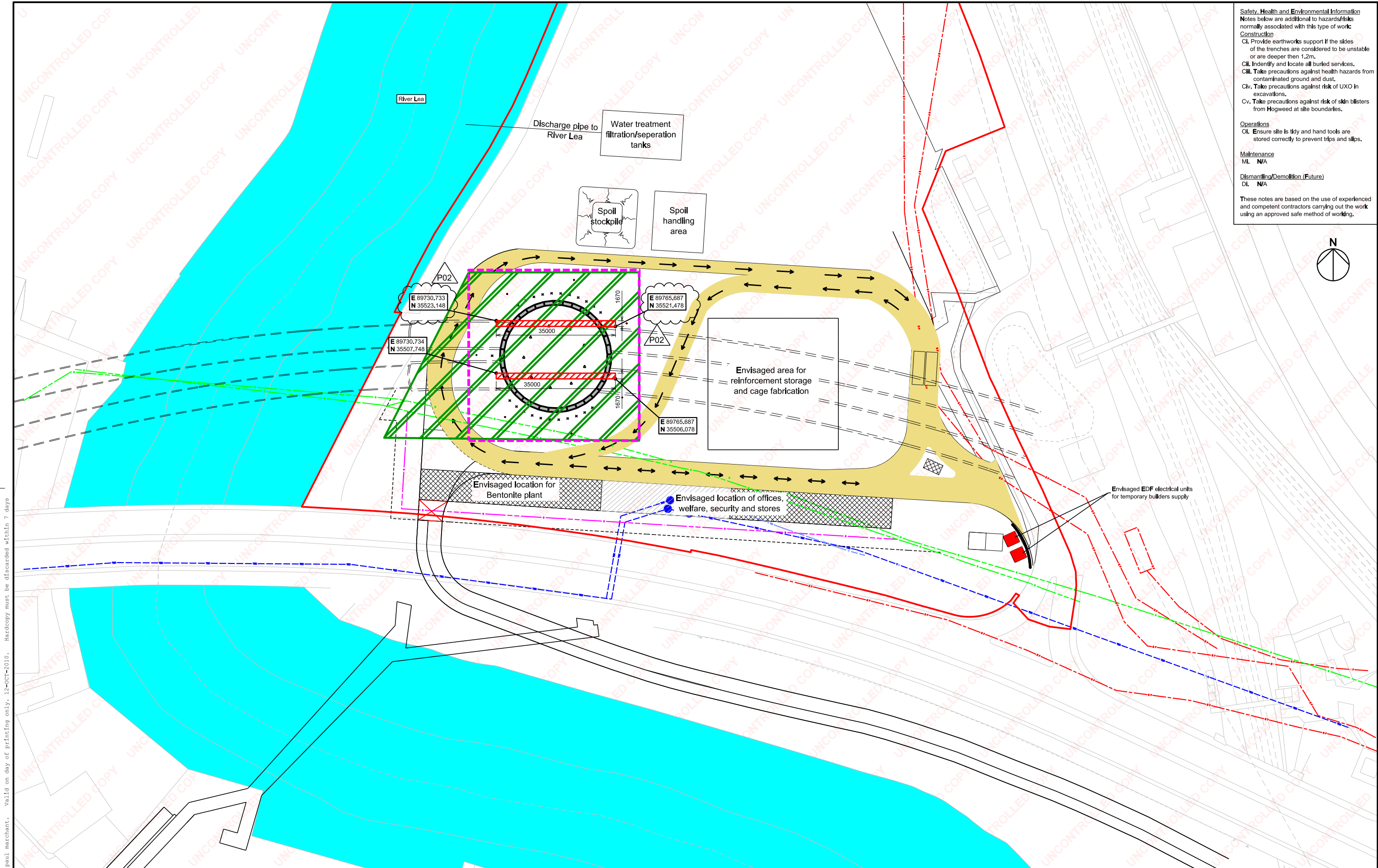
Contract: Intermediate Shaft Design  
 Originator: Jacobs UK Limited  
 Location: Limmo Peninsula Shaft  
 Title: Archaeological Investigations overlain on 1869 Ordnance Survey Figure 2

By: P.MARCHANT  
 Chk: R.SPALDING  
 App: R.ANDREWS  
 Auth: ...

Scale: 1:1000 @ A1  
 Drawing and CAD file No: C123-JUL-T1-DDL-CR144\_SH011-00061  
 Rev: P02  
 Subst: S4

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**Safety, Health and Environmental Information**  
 Notes below are additional to hazards/risks normally associated with this type of work:

**Construction**  
 Ci. Provide earthworks support if the sides of the trenches are considered to be unstable or are deeper than 1.2m.  
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 Di. N/A

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Rev.	Date	Description	By	Chkd	App	Auth
P01	16/09/2010	Issued for inclusion in Document No. C123-JUL-T1-RGN-CR144_SH011_Z-00002	TE	RS	RS	
P02	11/10/2010	Trench Location Revised	PM	RS	RA	

**Notes**  
 1. This drawing to be used in conjunction with information contained in the following report: Addendum to SWS: Trial Trench Evaluation and Detailed Excavation Limmo Peninsula Shaft (Document Reference: C123-JUL-T1-RGN-CR144\_SH011\_Z-00002).  
 2. Dimensions are in millimeters unless noted otherwise.  
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**Key**

- Worksite Boundary
- DLR overburden to be removed
- Archeological Trial Trench
- Potential Excavation Area

- EDF services
- Thames Water services
- Gas Main
- Gas Main diversion
- Construction access road

Scale: 10m 0 10m 20m 30m 40m 50m

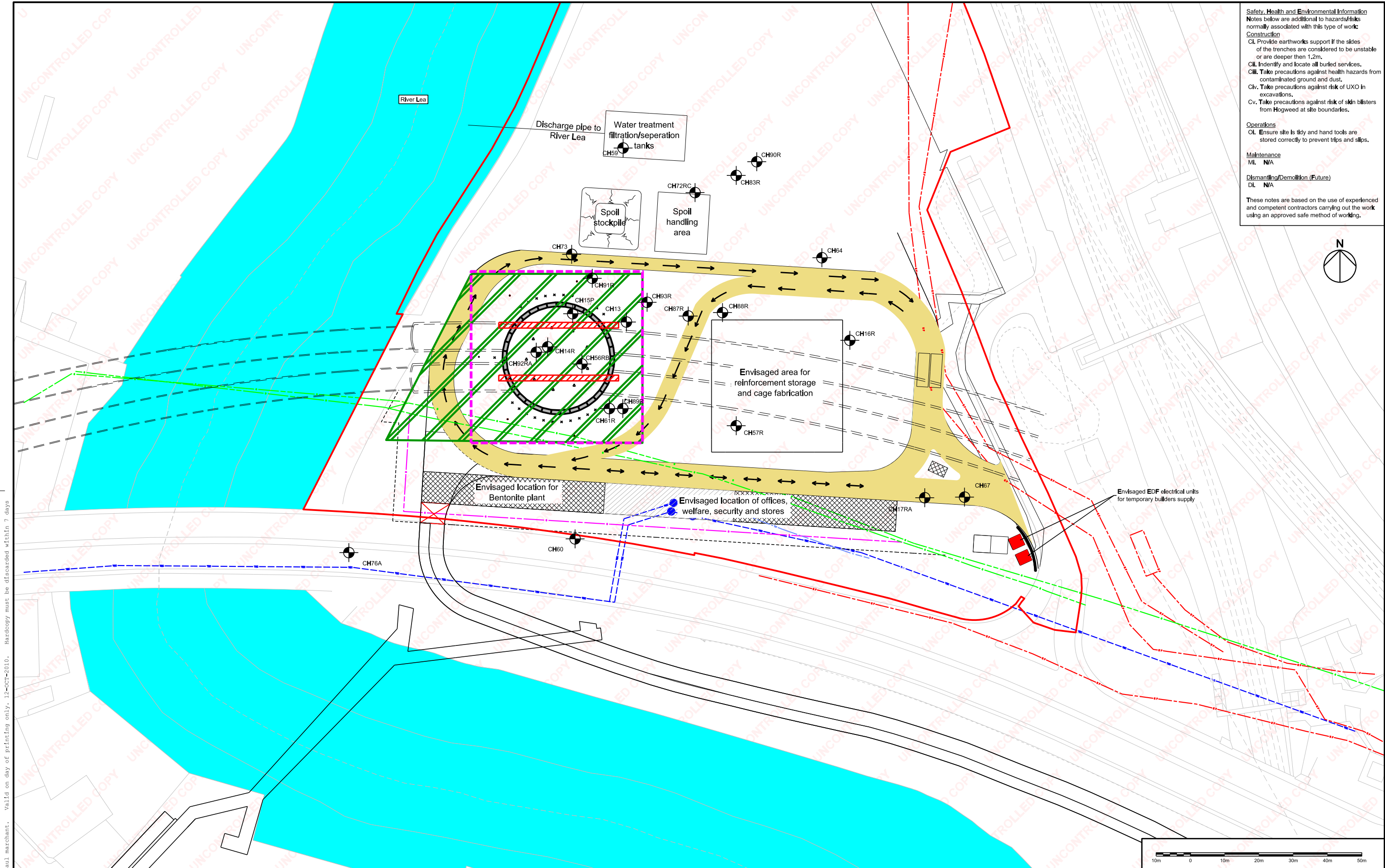
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 London  
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Contract: Intermediate Shaft Design  
 Originator: Jacobs UK Limited  
 Location: Limmo Peninsula Shaft  
 Title: Archaeological Location of Archaeological Investigations Figure 1

By: P.MARCHANT  
 Chk: R.SPALDING  
 App: R.ANDREWS  
 Auth: ...

Scale: 1:500 @ A1  
 Drawing and CAD file No: C123-JUL-T1-DDL-CR144\_SH011-00060  
 Rev: P02  
 Subst: S4

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**Safety, Health and Environmental Information**  
 Notes below are additional to hazards/risks normally associated with this type of work:

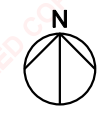
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**Maintenance**  
 Mi. N/A

**Dismantling/Demolition (Future)**  
 Di. N/A

These notes are based on the use of experienced and competent contractors carrying out the work using an approved safe method of working.



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Rev.	Date	Description	By	Chkd	App	Auth
P01	11/10/2010	Issued for inclusion in document No. C123-JUL-T1-RGN-CR144_SH011_Z-00002	PM	RS	RA	

**Notes**

- This drawing to be used in conjunction with information contained in the following report: Addendum to SWS: Trial Trench Evaluation and Detailed Excavation Limmo Peninsula Shaft (Document Reference: C123-JUL-T1-RGN-CR144\_SH011\_Z-00002).
- Dimensions are in millimeters unless noted otherwise.
- Dimensions should not be scaled from this drawing.
- The coordinate system relates to London Survey Grid.
- Instone Wharf and the shaft adit is not included due to a lack of sufficiently detailed design information at this stage.
- See drawing No. C123-JUL-T1-DDL-CR144\_SH011-00060 for site details, trench sizes and setting out.

**Key**

- Worksite Boundary
- DLR overburden to be removed
- Archeological Trial Trench
- Potential Excavation Area

- EDF services
- Thames Water services
- Gas Main
- Gas Main diversion
- Construction access road
- Monitoring Well Location

**Crossrail Limited**  
 25 Canada Square  
 Canary Wharf  
 London  
 E14 5LQ

Contract: Intermediate Shaft Design  
 Originator: Jacobs UK Limited  
 Location: Limmo Peninsula Shaft  
 Title: Trench and Borehole Locations  
 Figure 3

By: P.MARCHANT  
 Chk: R.SPALDING  
 App: R.ANDREWS  
 Auth: ...

Scale: 1:500@A1  
 Drawing and CAD file No: C123-JUL-T1-DDL-CR144\_SH011-00062  
 Rev: P01  
 Subst: S4

RESTRICTED