TRANSPORT FOR LONDON

RIVER CROSSINGS: SILVERTOWN TUNNEL

SUPPORTING TECHNICAL DOCUMENTATION

SILVERTOWN TUNNEL: HIGHWAY INFRASTRUCTURE CONCEPTUAL DESIGN RECOMMENDATIONS

Atkins

April 2013

This report builds upon previous studies undertaken to investigate the highway connections between the proposed Silvertown Tunnel and the existing highway networks to the north and south of the River Thames, in order to identify the preferred options.

This report is part of a wider suite of documents which outline our approach to traffic, environmental, optioneering and engineering disciplines, amongst others. We would like to know if you have any comments on our approach to this work. To give us your views, please respond to our consultation at www.tfl.gov.uk/silvertown-tunnel

Please note that consultation on the Silvertown Tunnel is running from October – December 2014.

ATKINS

Silvertown Tunnel:

Highway Infrastructure Conceptual Design Recommendations

April, 2013

Plan Design Enable

Transport for London

Notice

This document and its contents have been prepared and are intended solely for *Transport for London* information.

Atkins Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

Document History

JOB NUMBER: 5110309				DOCUMENT REF: 5110309-DOC-008		
Revision	**Purpose Description**	**Originated**	**Checked**	**Reviewed**	**Authorised**	**Date**
A	DRAFT ISSUE	MF	PRM	PRM	PRM	16/04/13
B	FORMAL ISSUE	MF	PRM	PRM	PRM	29/04/13
C	MINOR AMENDMENTS	MF	PRM	MF	PRM	20/05/13
D	MINOR AMENDMENTS	CH	MF	PRM	PRM	10/07/13
E	BUDGET ADJUSTMENT	CH	MF	PRM	PRM	24/07/13

Appendices

Appendix D: Silvertown Tunnel Crossing: Re-Use Potential and Waste Characterisation of Arisings Study

Appendix E: Works Programme and Construction Phasing Drawings

Appendix F: Statutory Undertakers' Plant

Appendix G: Preliminary Works Cost Estimate

Appendix H: Designer's Risk Assessment

Appendix I: Greenwich Peninsula Spatial Analysis (Previous Case Study)

Appendix D: Silvertown Tunnel Crossing: Re-Use Potential and Waste Characterisation of Arisings Study

Silvertown Tunnel Crossing
Re-Use Potential and Waste Characterisation of Arisings

March 2013
Report Ref: Waste Characterisation/Silvertown

ATKINS

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Plan Design Enable

Notice

This document and its contents have been prepared and are intended solely for Transport for London's information and use in relation to the potential for re-use and waste characterisation of the large volumes of cut excavation proposed at the southern and northern approach of the proposed Silvertown Tunnel Crossing, London.

Atkins Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

This document has 35 pages including the cover.

Document history

Job number: 5111977			**Document ref: Waste characterisation/Silvertown**			
Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 0.1	Draft	GB	SP	JE	JS	20/03/13

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Table of contents

Tables

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

1. Introduction

Transport for London (TfL) are developing proposals for a new road tunnel (Silvertown Tunnel Crossing) linking the areas north and south of the Thames between the Greenwich Peninsula and Silvertown. The aim is to relieve traffic congestion at the Blackwall Tunnel. In order to allow the decision making to progress towards selection of preferred options for the tunnel crossing TfL have commissioned Atkins to undertake further design work. Their scope (Ref i) for this design work included the following item:

> "Review of contaminated land issues, including the large volumes of cut excavation proposed at the southern approach as well as those around the northern approach. Relevant issues (e.g. enumeration of numbers of large vehicle journeys) should be presented together with a description of how they can be satisfactorily addressed (e.g. work site plans) including any effects optimisations may have on permanent works design solutions."

Following a review of the project requirements the Atkins' scope of works was to include the following:

- a high level review of available chemical data and comparison to appropriate soil guideline values/ water quality standards to assess if material located within areas of cut excavation could be re-used within the areas of fill; and
- where the high level review of available chemical data identified that material was not suitable for re-use, a waste assessment (in line with the Environment Agency Technical Guidance WM2 (Ref. ii) and relevant UK waste legislation) has been undertaken to provide potential waste classifications (i.e. inert, non-hazardous or hazardous).

Whilst the above scope was included it should be noted that it has not been possible to undertake the assessments using chemical data for samples obtained within the areas of cut excavation as this data was not available. Therefore the assessments contained in this report are based on chemical data located within 50 m to 100 m of the northern and southern portal boundaries. A 50 m to 100 m distance has been used as this is a typical distance used for assessing contaminant sources and migration of contaminants in groundwater bodies.

1.1. Site Location

The sites considered in this report are:

- the northern portal site; and
- the southern portal site.

The northern portal site of the proposed Silvertown Tunnel is situated in Silvertown (London Borough of Newham), at Ordnance Survey (OS) grid ref TQ398806 (see Figure 1, Appendix A). There are two highway alignments for the northern portal; North 5A and North 5B (see Drawings 5110309/HW/GA/0207 and 5110309/HW/GA/0208 in Appendix B). The earthworks associated with each highway alignment are understood to be:

- North 5A - a major cutting slope is required directly west of the tunnel portal. Relatively minor cuttings and embankments are required along the proposed road to connect Dock Road to the new roundabout that runs parallel to the Docklands Light Railway Line (DLR). Further earthworks in the form of a cutting and embankment are proposed along the road to allow connection between the new roundabout and Lower Lea Crossing Road; and
- North 5B - major cutting slopes are required at the tunnel portal. Relatively minor cuttings and embankments are required along the proposed road to connect Dock Road to the new roundabout that runs parallel to the DLR. Further earthworks in the form of a cutting and embankment are proposed along the road to allow connection between the new roundabout and Lower Lea Crossing Road.

For the purposes of this report, the boundary of the northern portal is considered to be the maximum extent of the two proposed alignments.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

The southern portal of the proposed Silvertown Tunnel is situated in the Greenwich Peninsula (Royal Borough of Greenwich) in the immediate vicinity of the O_2 (Millennium Dome), at OS grid ref TQ390795 (see Figure 1). There is one highway alignment for the southern portal; South 4 (see Drawing 5110309/HW/GA/0103). The earthworks associated with the South 4 alignment are understood to be:

- South 4 - A major conventional cutting slope is proposed between the tunnel south portal and proposed bridge. The cutting west of the portal extends towards the western end of the proposed junction to allow the construction of a bus link. A relatively low rise conventional slope is proposed south of the western bridge approach embankment.

For the purposes of this report the boundary of the southern portal is considered to be the extent of the South 4 proposed alignment.

1.2. Data Sources

The following information has been reviewed as part of the report:

- British Geological Society (BGS) borehole logs;
- Soil Mechanics, Cable Car for London – Ground Investigation, Factual Report on Ground Investigation, Volume 1: Text, Exploratory Hole Records, Instrumentation and Monitoring and Photographs, Report No: D1002-11/1, June 2011 (Ref iii);
- Soil Mechanics, Cable Car for London – Ground Investigation, Factual Report on Ground Investigation, Volume 2: In Situ Testing, Geotechnical Laboratory Test Results, Drawings and Digital Data, Report No: D1002-11/2, June 2011 (Ref iv);
- Soil Mechanics, Cable Car for London – Ground Investigation, Factual Report on Ground Investigation, Volume 3: Geoenvironmental Laboratory Test Results, Report No: D1002-11/3, June 2011 (Ref v);
- Atkins, TfL Silvertown Crossing, Volume A: Background and Inputs, May 2012 (Ref vi);
- Atkins Drawings for the Silvertown Crossing (Appendix B); and
- Mott MacDonald, Silvertown Crossing Study, Tunnel Engineering, February 2012 (Ref vii).

It should be noted that numerous site investigation reports were made available to Atkins, however, only those reports that included exploratory holes located on or within 100 m of the southern and northern portals of the Silvertown Tunnel Crossing were used as part of the assessment and are included within the list above.

1.3. Limitations

There is no chemical data available for samples obtained within the areas of proposed cut excavation and therefore this report draws upon data from intrusive investigation of a relatively small proportion of the sub-surface conditions located outside of the northern and southern portals of the Silvertown Tunnel Crossing. Inferences drawn from these assessments are subject to the inherent limitations of any such study.

In completing the assessment, Atkins has relied on information from third parties which has not been independently verified.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

2. Re-Use Potential

2.1. Introduction

In order to re-use materials you have to demonstrate they are suitable for use which requires the user to demonstrate that the waste would not pose a risk to human health and/or controlled waters receptors (note, there are other factors that need to be demonstrated including (but not limited to) the volume being used and its geotechnical suitability). This chapter assesses available chemical data located in close proximity of the northern and southern portal boundaries to determine if the materials are suitable for re-use within the scheme in relation to risk to human health and/or controlled waters.

2.2. Methodology

A review of available site investigation reports was undertaken to identify chemical data for soil samples obtained within the areas of proposed cut excavation and within the two site boundaries. As no chemical data was available for soil samples obtained within the areas of cut excavation then data for soil samples obtained within close proximity of the two sites (within 100 m) was used. As mentioned previously a 50 m to 100 m distance has been used as this is a typical distance used for assessing contaminant sources and migration of contaminants in groundwater bodies.

It is understood that the proposed cut excavation material is to be re-used under the main carriageway and embankments. As the embankments would be accessible by the general public, human receptors have been considered. Therefore soil data has been compared to the Environment Agency Soil Guideline Values (SGVs) and Atkins soil screening values (SSVs) for an Open Spaces scenario to assess if the re-use of material would pose a risk to human health.

Atkins has produced SSVs based on soil organic matter (SOM) contents of 1% and 6% SOM. The 1% values provide a more conservative value and are based on a sandy soil type, whereas the 6% values are based on a sandy loam. An insufficient number of samples were analysed for total organic carbon (which is used to derive SOM) to derive a representative SOM and therefore the 1 % values have been used for this assessment. The screening criteria used for this assessment is generic and therefore conservative. Higher screening values can be developed but these would need to be produced through site specific risk assessment which is beyond the scope of these works.

Atkins has derived SSVs for a number of volatile or potentially volatile contaminants (including polycyclic aromatic hydrocarbons (PAHs)) based on both soil saturation limits (where the contaminant will theoretically reach saturation and form free product) and health-based modelled values (given by the Contaminated Land Exposure Assessment (CLEA) model) which can be used where site conditions indicate saturation has not been reached and no free product exists. The SSVs for no free product have been used for this assessment unless a review of the borehole logs indicates free phase product is present.

To assess if the material poses a risk to controlled waters receptors, leachate data should be compared to drinking water standards and environmental quality standards. However, a review of available site investigation reports has identified that there is no leachate data available and therefore it has not been possible to assess if the re-use of materials would pose a risk to controlled waters receptors.

2.3. Results

2.3.1. Northern Portal

Based on the previous site investigation reports reviewed there are no chemical data available for soil samples obtained within the areas of cut excavation or within the northern portal boundary.

The closest site investigation to the northern portal was undertaken by Soil Mechanics between February and April 2011 (Ref iii). The site investigation comprised two groups of exploratory holes located approximately 50 m and 100 m to the south east of the northern portal site. According to the Soil Mechanics

report (Ref iii) the exploratory holes were located on sites that are currently and had been occupied by various industrial/commercial land uses, the same type of land use previously occupied by the northern portal (Ref vii). A total of 35 soil samples were obtained, of which 31 were of Made Ground, three were of River Terrace Deposits and one was of Alluvium. The soil samples were analysed for a range of chemical determinands including:

- metals (arsenic, boron, barium, berrylium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, vanadium and zinc);
- pH, total sulphur, sulphate (water-soluble);
- total petroleum hydrocarbons Criteria Working Group (TPH CWG);
- speciated PAHs;
- volatile organic compounds (VOCs) (including benzene, toluene, ethylbenzene and xylene (BTEX);
- phenols; and
- asbestos screen.

The chemical results have been compared to the Atkins SSVs for an Open Space scenario. Based on a review of the borehole logs only one sample (NIT BH09A at 2.6 m) potentially contained free phase product and therefore was compared to the SSVs for free phase product.

The screening of the data is contained in Appendix C whilst the exceedances are summarised in Table 2-1 below.

Table 2-1 Summary of Exceedances of Atkins SSVs for Open Spaces

Determinand	Number of Exceedances	Atkins SSV (mg/kg)	Concentration of Maximum Exceedance and Location
Aromatics >C21 - C35	2	5380	9150 mg/kg - NT DS02F at 1.3 m
Arsenic	5	138	3480 mg/kg - NT BH02 at 3 m
Benzo(a)anthracene	2	28.7	495 mg/kg - NT TP03 at 1.45 m
Benzo(a)pyrene	11	3.7	227 mg/kg - NT DS02F at 1.3 m
Benzo(b)fluoranthene	2	35.5	353 mg/kg - NT TP03 at 1.45 m
Benzo(g,h,i)perylene	1	0.0187 (free phase product)	0.16 mg/kg - NIT BH09A at 2.6 m
Dibenzo(a,h)anthracene	2	3.96	43.9 mg/kg - NT DS02F at 1.3 m
Dibenzo(a,h)anthracene	1	0.00393 (free phase product)	0.18 mg/kg - NIT BH09A at 2.6 m
Indeno(1,2,3-cd)pyrene	2	34.4	125 mg/kg - NT DS02F at 1.3 m
Indeno(1,2,3-cd)pyrene	1	0.0614 (free phase product)	0.18 mg/kg - NIT BH09A at 2.6 m
Lead	1	1590	4350 mg/kg - NT BH02 at 3 m

Note: Results that exceed the SSVs but are below the method detection limit have not been included in the table above.

The results of the screening show that 14 out of the 31 samples within the Made Ground exceed at least one of the SSVs indicating that the material may present a risk to human health if re-used. In addition 17 of the Made Ground samples contained asbestos and therefore, may or may not pose a risk to human health depending on the percentage of asbestos and the manner in which it is re-used i.e. placed at a depth so that the pathway to human health is removed. Ten out of the 35 samples do not exceed the SSVs or contain asbestos indicating some of the Made Ground and the natural ground (Alluvium and River Terrace Deposits) material could be re-used.

It should be noted that even though the previous land use within the northern portal boundary has been occupied by various industrial/commercial land uses (Ref. vii), as per the sites where data has been used for this

It should be noted that the chemical data used for this assessment has been obtained from boreholes located approximately 50 m to 100 m from the northern portal boundary and therefore may not be representative of the material within the cuttings. The chemistry of the soils, particularly the Made Ground, located within the areas of cut excavation is likely to vary to the data screened in this assessment due to any previous contaminative land uses, however, it does provide an indication of the potential quality of the material that may be present. It is therefore recommended that additional site investigation is undertaken to obtain soil samples from the areas of cut to assess if the material would be suitable for re-use.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

2.3.2. Southern Portal

Based on the previous site investigation reports reviewed there is no chemical data available for soil samples obtained within the areas of cut excavation, within the southern portal boundary or within 100 m. It is therefore not possible to assess if the cut excavation material would be suitable for re-use.

The need for site specific chemical data is also highlighted by the historical context of the site. Information from the Mott MacDonald report (Ref. vii) indicates the Greenwich Peninsula was previously dominated by the Southern Metropolitan Gasworks and the south eastern part of the southern portal is located over a current gas works. Remediation of the Southern Metropolitan Gasworks site has been undertaken however, there is still potential that the areas of cut excavation will contain contaminated material. It is therefore recommended that additional site investigation is undertaken to obtain soil samples from the areas of cut excavation to assess if the material would be suitable for re-use.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

3. Waste Characterisation

3.1. Introduction

The process of classifying wastes is outlined within the Environment Agency guidance documents:

- Interpretation of the Definition and Classification of Hazardous Waste (Ref. **Error! Bookmark not defined.**). It is understood that this guidance is to be updated in late March or April of this year however, the content or exact publication date is unknown; and
- How to Find Out if Waste Oil and Wastes that Contain Oil are Hazardous (Ref. viii).

UK guidance (and European Directives) outlines three types of soil waste, as described below.

3.1.1. Inert Waste

The classification of inert waste is based upon a physical description of the material based upon criteria set within Section 2.1.1 of The EU Council Decision (Ref. ix) and if required, a chemical assessment. The chemical assessment is undertaken through inert waste acceptance criteria (WAC) testing. The testing is only required if there is reason to believe that contaminants may be present within the material. Where testing has been required and undertaken, the landfill accepting the inert material will require copies of the results of this chemical testing.

3.1.2. Non-Hazardous Waste

Classification of non-hazardous waste is based upon the wastes' chemical constituents. The waste must be appropriately characterised through chemical analysis of the granular material for the contaminants that are likely to be present. The concentrations of the chemical constituents are then assessed against hazard classes which have prescribed limits set for the determination of waste being either non-hazardous or hazardous.

3.1.3. Hazardous Waste

Similar to non-hazardous waste, the chemical constituents of the waste material are assessed against the relevant hazard classes and Environment Agency guidance described above.

This chapter of the report provides a waste assessment for the samples that were identified as not suitable for re-use in the previous chapter.

3.2. Methodology

The chemical results of the samples that were not suitable for re-use (see Chapter 2) have been screened using the Atkins' waste soils assessment tool (CAT-WASTE^{SOIL}) which allows preliminary assessment of materials in terms of their potential characterisation as either non-hazardous or hazardous waste for handling/disposal purposes. The results of the screening are provided below. For the sake of clarity it should again be noted that although the data used is obtained from sites with the same type of previous land use (commercial/industrial) due to the distance from the areas of cut excavation the data is not representative of site conditions, but may, with caution, be used as a general indicator of its quality.

3.3. Results

3.3.1. Northern Portal

The CAT-WASTE^{SOIL} output (see Appendix D) indicates that three out of the 14 samples would be classified as hazardous waste by the hazardous properties H7 (carcinogenic) and H14 (ecotoxic). The remaining 11 samples would be classified as non-hazardous. There is potential for seven of the non-hazardous samples to be classified as hazardous as the asbestos screen has identified asbestos. However, the concentration of asbestos present would be required to confirm this as the limit for soils that contain asbestos is 0.1 % w/w, above which they would be classified as hazardous.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

It is unlikely that the samples classified as non-hazardous could be classified as inert waste as many of the borehole log descriptions contain wood which is not inert. In addition the chemical composition of the samples is likely to cause exceedances of the WAC for inert landfills, however, inert WAC testing would be required to confirm this.

3.3.2. Southern Portal

No chemical data was available for samples obtained within the areas of cut excavation or on or within 100 m of the southern portal boundary and therefore it has not been possible to undertake a waste assessment.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

4. Conclusions and Recommendations

TfL are developing proposals for the Silvertown Tunnel Crossing and in order to progress towards selection of preferred options Atkins was commissioned to undertake further assessment. This work included an assessment of the potential for re-use and waste characterisation of the cut excavation materials proposed at the northern and southern portals.

Previous site investigation reports made available to Atkins were reviewed and chemical data for samples within 100 m of the two portal boundaries was used to assess if the material would be suitable for re-use.

The chemical data screened for the northern portal indicates that 25 samples of Made Ground would not be suitable for re-use in terms of human health receptors. However, the chemical data used for the assessment was for soil samples obtained from approximately 50 m to 100 m from the northern portal boundary and therefore may not be representative of the materials located within the proposed areas of cut excavation. It was not possible to assess if the samples would pose a risk to controlled waters receptors as there was no leachate data available.

No chemical data was available within the proposed areas of cut excavation of the southern portal, within the southern portal boundary or within 100 m of it and therefore it was not possible to assess if materials could be re-used.

The waste characterisation assessment was undertaken on samples that were identified as not suitable for re-use. The waste characterisation for the northern portal indicates that three out of the 14 samples would be classified as hazardous waste with the potential for an additional seven samples to be classified as hazardous as they contain asbestos. The remainder of the samples would be classified as non-hazardous.

It was not possible to undertake a waste assessment for the southern portal as there was no chemical data available.

Due to lack of chemical data for samples obtained within the proposed areas of cut excavation within the northern and southern portals it is not possible to calculate any meaningful volumes of the amount of material within the proposed cut excavation areas that can be re-used. It is therefore recommended that further site investigation is undertaken. The site investigation should include: obtaining samples of the Made Ground and natural ground from the proposed areas of cut excavation subsequent chemical analysis (including leachate) and a re-use and waste assessment as contained herein. A grid spacing of between 25 m to 50 m for the exploratory locations would be proposed however, this would have to be confirmed based on an in depth review of previous potential contaminative land uses.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

5. References

i Transport for London. Highways Engineering and related Civil / Structural aspects for Silvertown Tunnel Crossing, Version No. 0.1, 2nd January 2012.
ii Environment Agency. Technical Guidance WM2 – Hazardous Waste, Interpretation of the Definition and Classification of Hazardous Waste, 2nd edition v2.3, April 2011.
iii Soil Mechanics, Cable Car for London – Ground Investigation, Factual Report on Ground Investigation, Volume 1: Text, Exploratory Hole Records, Instrumentation and Monitoring and Photographs.
iv Soil Mechanics, Cable Car for London – Ground Investigation, Factual Report on Ground Investigation, Volume 2: In Situ Testing, Geotechnical Laboratory Test Results, Drawings and Digital Data, Report No: D1002-11/2, June 2011.
v Soil Mechanics, Cable Car for London – Ground Investigation, Factual Report on Ground Investigation, Volume 3: Geoenvironmental Laboratory Test Results, Report No: D1002-11/3, June 2011.
vi Atkins, TfL Silvertown Crossing, Volume A: Background and Inputs, May 2012.
vii Mott MacDonald, Silvertown Crossing Study, Tunnel Engineering, February 2012.
viii Environment Agency, How to Find Out if Waste Oil and Wastes That Contain Oil Are Hazardous - A Guide to the Hazardous Waste Regulations, HWR 08, Version 3.1, 2007.
ix The Council Decision 2003/33/EC. Establishing Criteria and Procedures for the Acceptance of Waste at Landfills Pursuant to Article 16 of Annex II to Directive 1999/31/EC (2002).

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

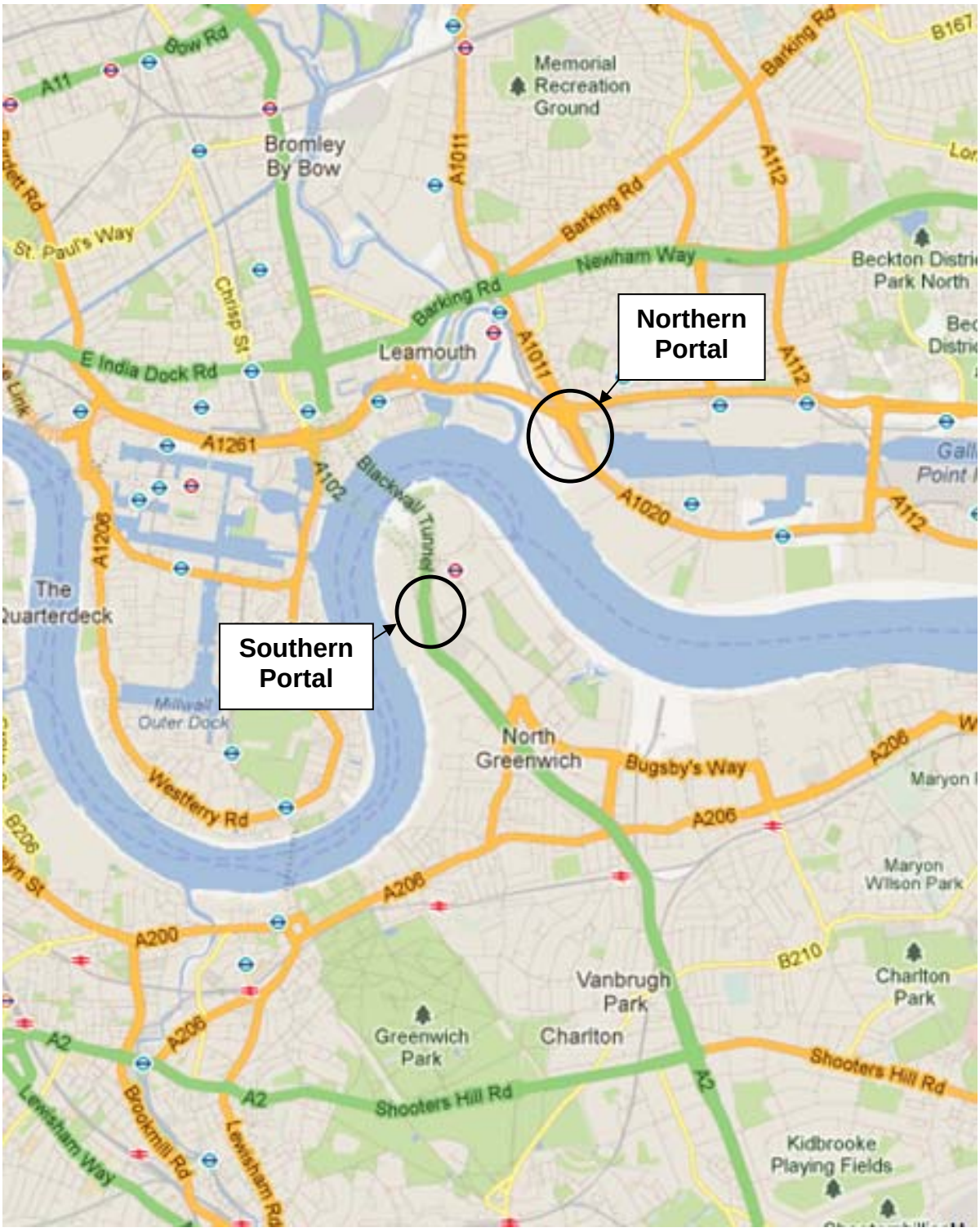
This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Appendices

Appendix A. Figures

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.



ATKINS

ATKINS LIMITED
WATER AND ENVIRONMENT
WOODCOTE GROVE
ASHLEY ROAD
EPSOM
KT18 5BW
Tel: 01372 726140
Fax: 01372 740055

TITLE: Site Location			LEGEND
PROJECT: Silvertown Tunnel Crossing			
DATE: 03/13	DOCUMENT PATH: 5111977/R001	FIGURE: 1	
SCALE: NTS	DRAWN BY: GB	CHECKED BY: JE	STATUS: FOR INFORMATION ONLY

Appendix B. Drawings

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

DO NOT SCALE

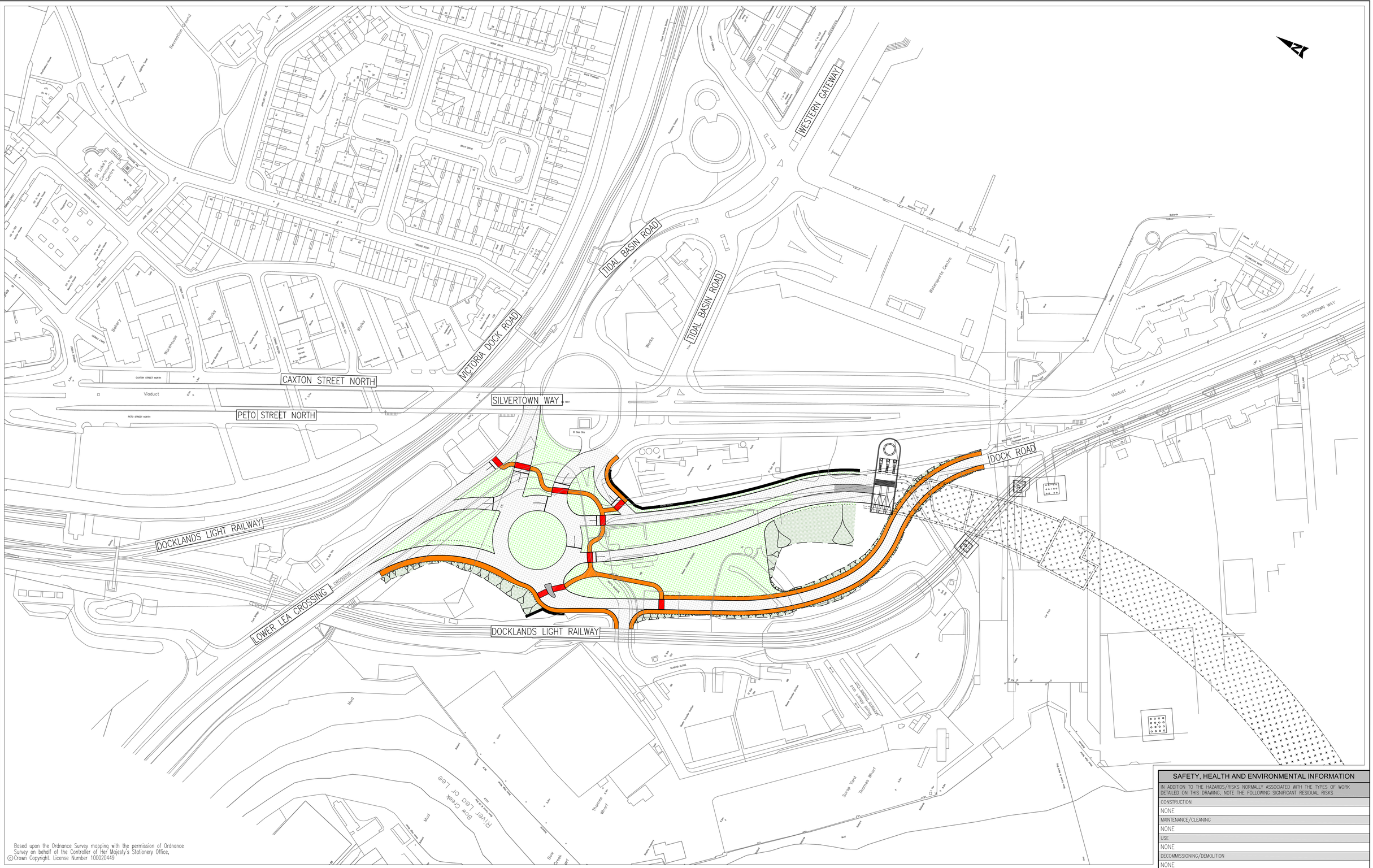
Status	Drawing Number	Rev
P	5110309/HW/GA/0207	A

A1

0 10 100

Date: Feb 26, 2013 - 5:02pm Plotted by: conn4509

File: 5110309 HW GA 0207 - Option 5A .dwg



Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

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 SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

KEY

RETAINING WALL

Stat	Rev	Purpose of Issue	Date	Auth
P	A	INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
A	ORIGINAL ISSUE	SEE TITLE BLOCK			

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: NORTH 5A SCHEME PLAN

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1250	DK Date 05/10/12	SMC Date 24/10/12	MF Date 24/10/12

Status	Drawing Number	Rev
P	5110309/HW/GA/0207	A

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\MK2 October 2012\5110309 HW GA 0207 - Option 5A .dwg

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

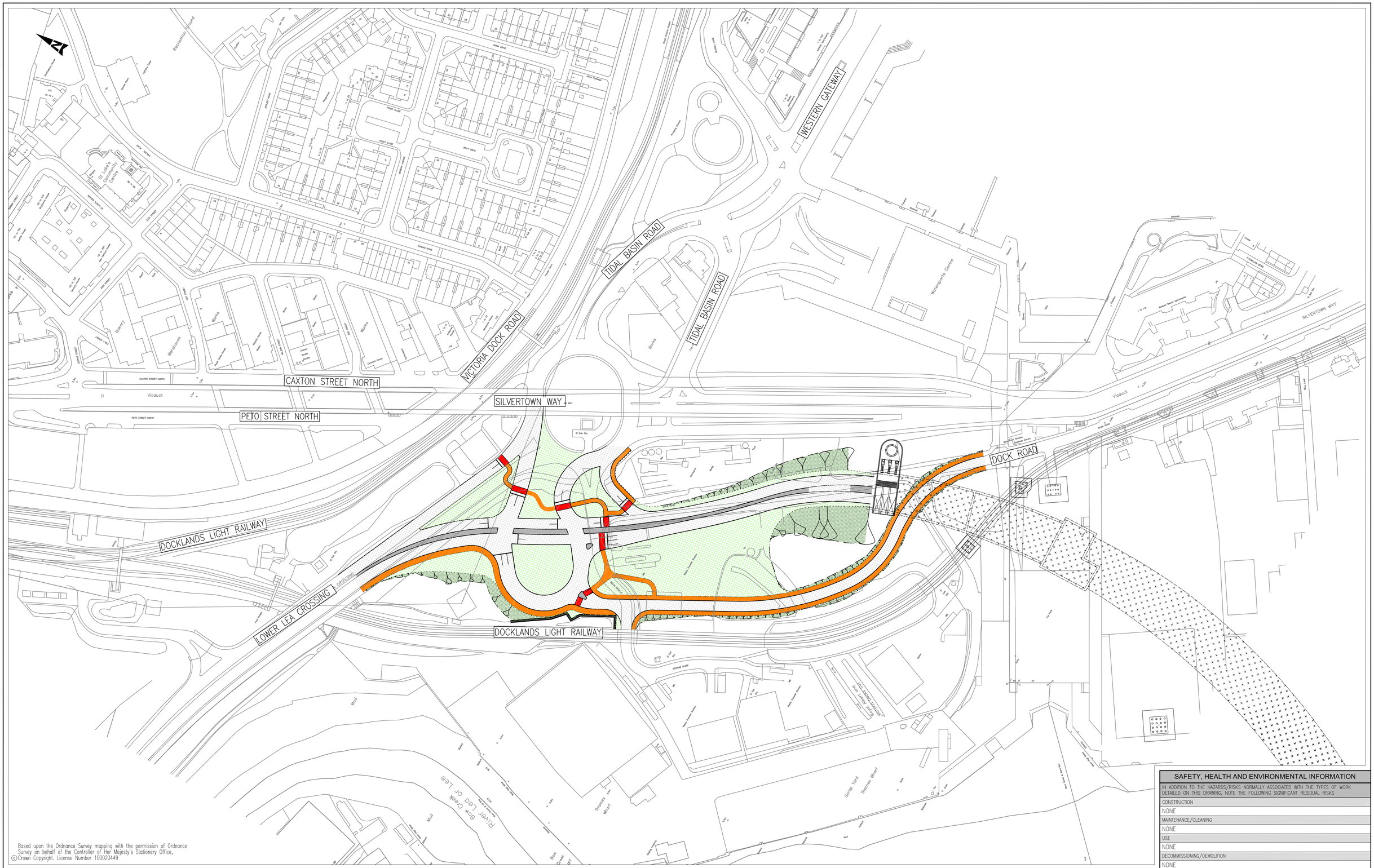
DO NOT SCALE

Rev	Status	Drawing Number
A	P	5110309/HW/GA/0208

A1

0 10 100

File: 5110309 HW GA 0208 – Option 5B (Hamburger) .dwg
Date: Feb 26, 2013 – 5.05pm
Plotted by: conn4509



Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

KEY

RETAINING WALL

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 SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

Stat	Rev	Purpose of Issue	SEE TITLE BLOCK Date	Auth
P	A	INFORMATION		

Rev	Description	By	Date	Chk'd	Auth
A	ORIGINAL ISSUE	SEE TITLE BLOCK			

ATKINS™
Atkins Limited
Consulting Engineers,
Threadneedle House
9–10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: NORTH 5B SCHEME PLAN

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1250	DK Date 05/10/12	SMC Date 24/10/12	MF Date 24/10/12

Status	Drawing Number	Rev
P	5110309/HW/GA/0208	A

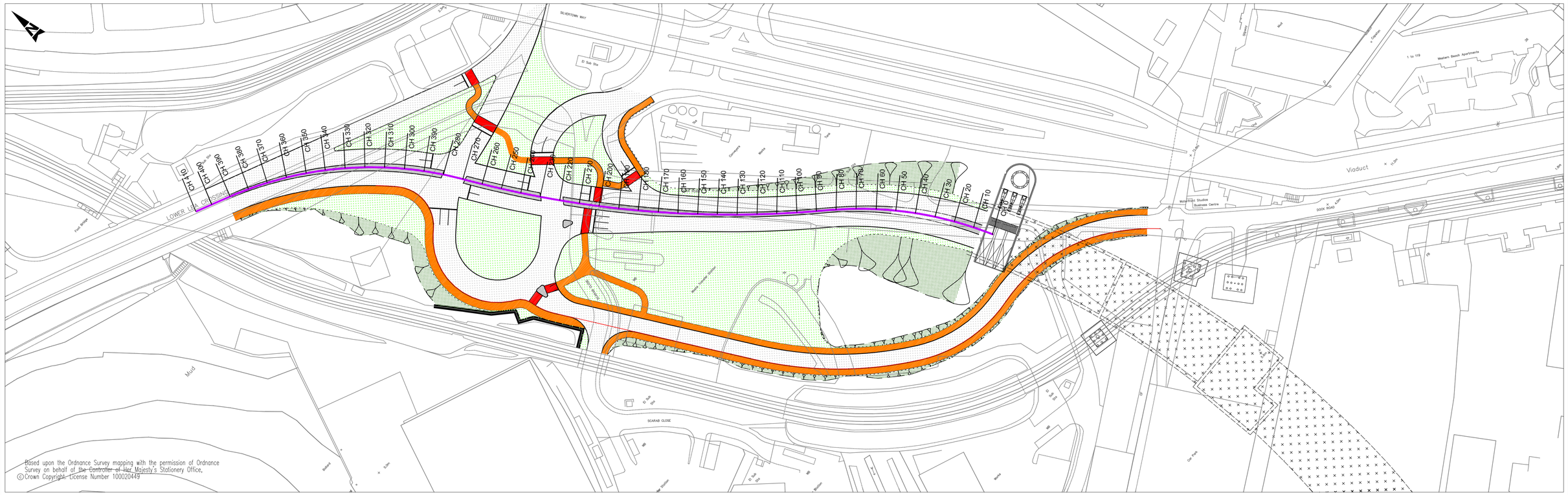
P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\MK2 October 2012\5110309 HW GA 0208 – Option 5B (Hamburger) .dwg

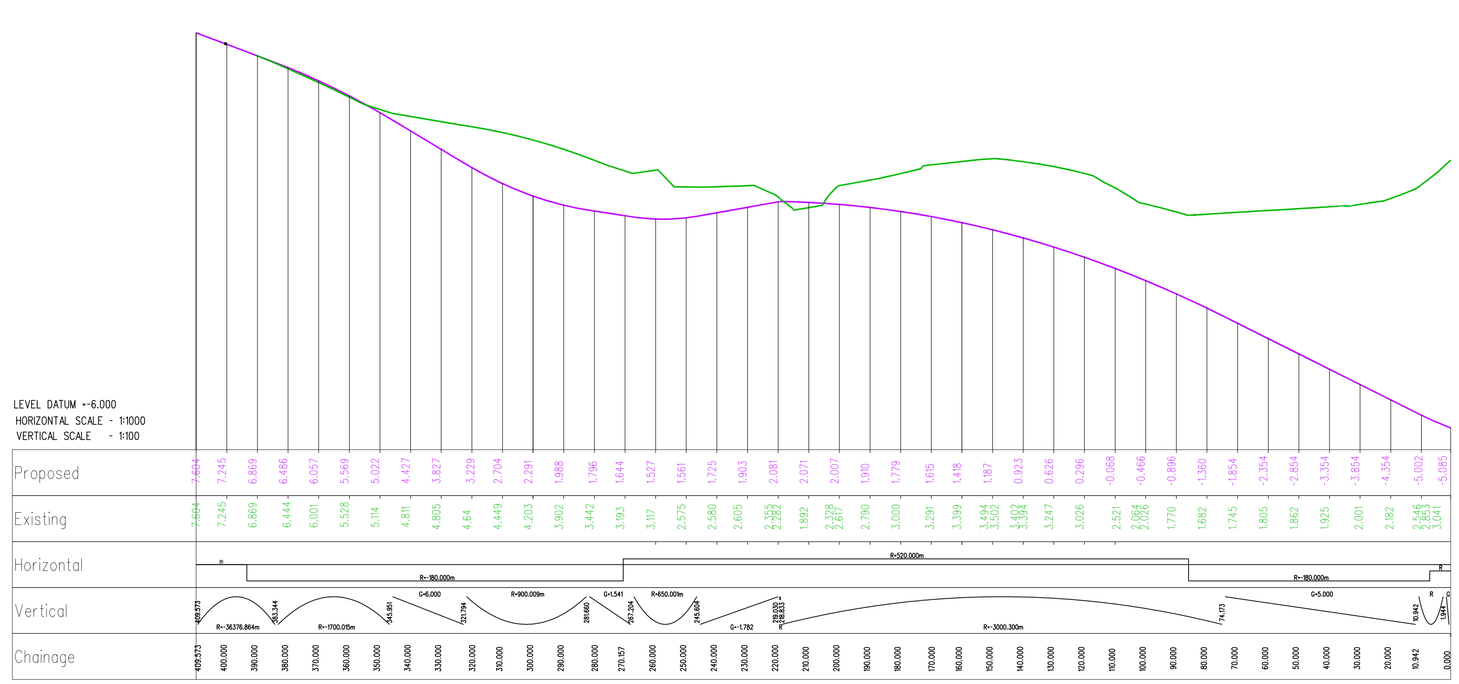
This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

DO NOT SCALE

Status	Drawing Number	Rev
P	5110309/HW/GA/0209	A

A1





Proposed	Existing	Chainage
7.684	7.684	409.573
7.245	7.245	400.000
6.869	6.869	390.000
6.486	6.444	380.000
6.057	6.001	370.000
5.569	5.528	360.000
5.022	5.114	350.000
4.427	4.811	340.000
3.827	4.805	330.000
3.229	4.64	320.000
2.704	4.449	310.000
2.291	4.203	300.000
1.988	3.902	290.000
1.796	3.442	280.000
1.644	3.193	270.157
1.527	3.117	260.000
1.561	2.575	250.000
1.725	2.580	240.000
1.903	2.605	230.000
2.081	2.355 2.328	220.000
2.071	1.832	210.000
2.007	2.328 2.617	200.000
1.910	2.790	190.000
1.779	3.000	180.000
1.615	3.291	170.000
1.418	3.399	160.000
1.187	3.494 3.502	150.000
0.923	3.402 3.394	140.000
0.626	3.247	130.000
0.296	3.026	120.000
-0.068	2.521	110.000
-0.466	2.064 2.026	100.000
-0.896	1.770	90.000
-1.360	1.682	80.000
-1.854	1.745	70.000
-2.354	1.805	60.000
-2.854	1.862	50.000
-3.354	1.925	40.000
-3.854	2.001	30.000
-4.354	2.182	20.000
-5.002	2.246 2.853 3.041	10.942
-5.085		0.000

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION

MAINTENANCE/CLEANING

USE

DECOMMISSIONING/DEMOLITION

Stat	Rev	Purpose of Issue	Date	Auth
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
A	ORIGINAL ISSUE		SEE TITLE BLOCK		

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9–10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: NORTH 5B
LONG-SECTION SHEET 1 OF 2

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 22/10/12	SMC Date 24/10/12	MF Date 24/10/12

Status	Drawing Number	Rev
P	5110309/HW/GA/0209	A

File: 5110309 HW GA 0209 Longsection – Option 5B (Hamburger) Mainline.dwg
Date: Feb 26, 2013 – 5:06pm Plotted by: conn4509

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\MK2 October 2012\5110309 HW GA 0209 Longsection – Option 5B (Hamburger) Mainline.dwg

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

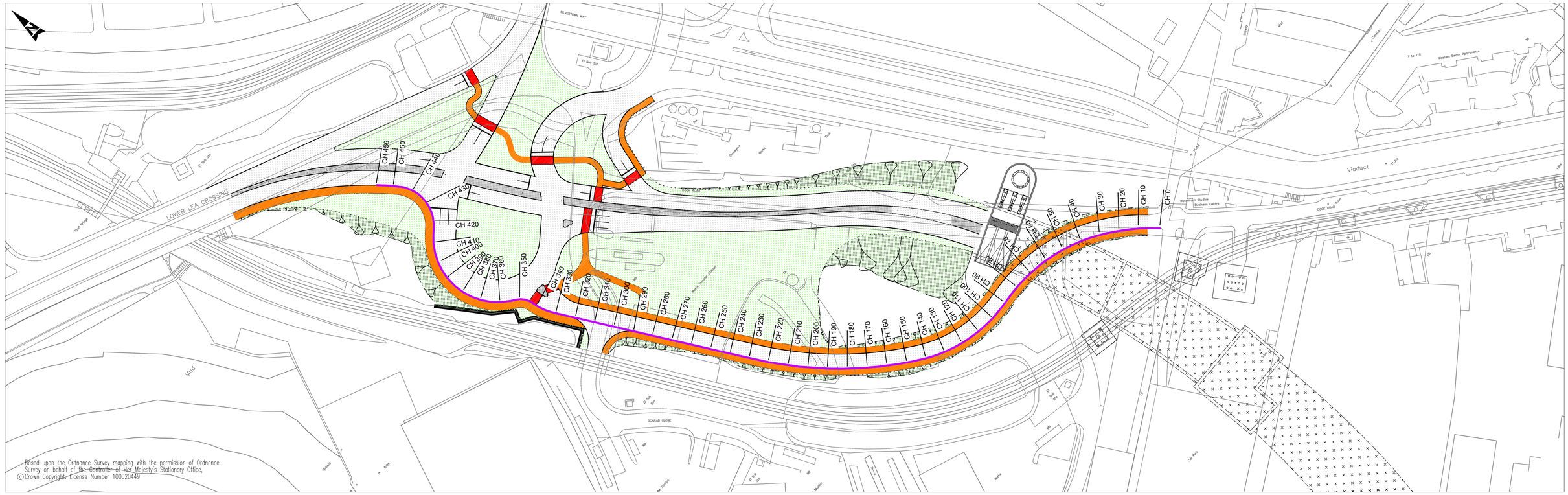
DO NOT SCALE

Status	Drawing Number	Rev
P	5110309/HW/GA/0210	A

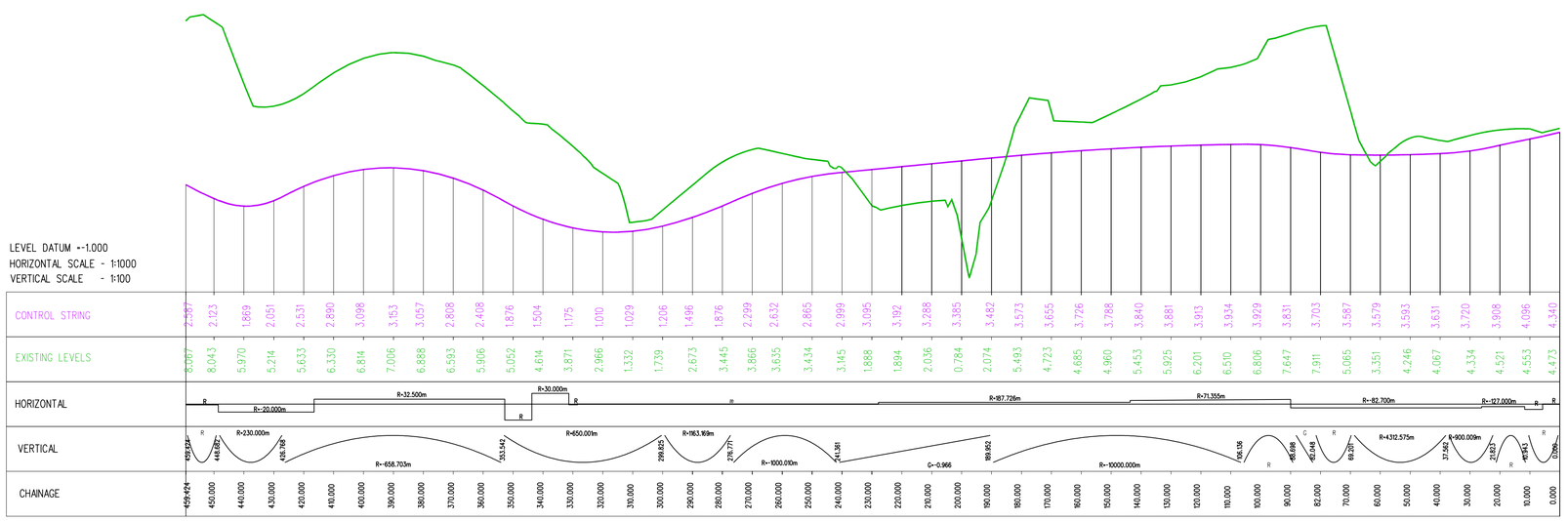
A1

0 10 100

File: 5110309 HW GA 0210 Longsection – Option 5B (Hamburger) Dock Road.dwg
Date: Feb 26, 2013 – 5:07pm Plotted by: conn4509



Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449



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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION

MAINTENANCE/CLEANING

USE

DECOMMISSIONING/DEMOLITION

Stat	Rev	Purpose of Issue	Date	Auth
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
A	ORIGINAL ISSUE		SEE TITLE BLOCK		

ATKINS™
Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: NORTH 5B
LONG-SECTION SHEET 2 OF 2

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 22/10/12	SMC Date 24/10/12	MF Date 24/10/12

Status	Drawing Number	Rev
P	5110309/HW/GA/0210	A

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\MK2 October 2012\5110309 HW GA 0210 Longsection – Option 5B (Hamburger) Dock Road.dwg

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

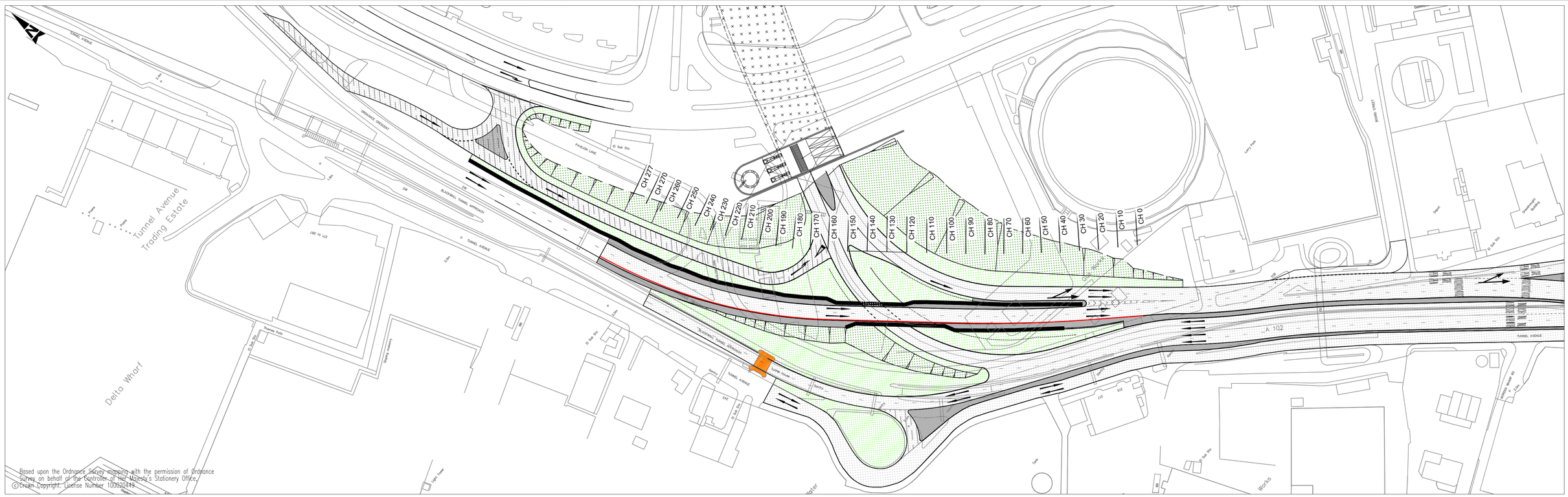
DO NOT SCALE

Status	Drawing Number	Rev
P	5110309/HW/GA/0009	B

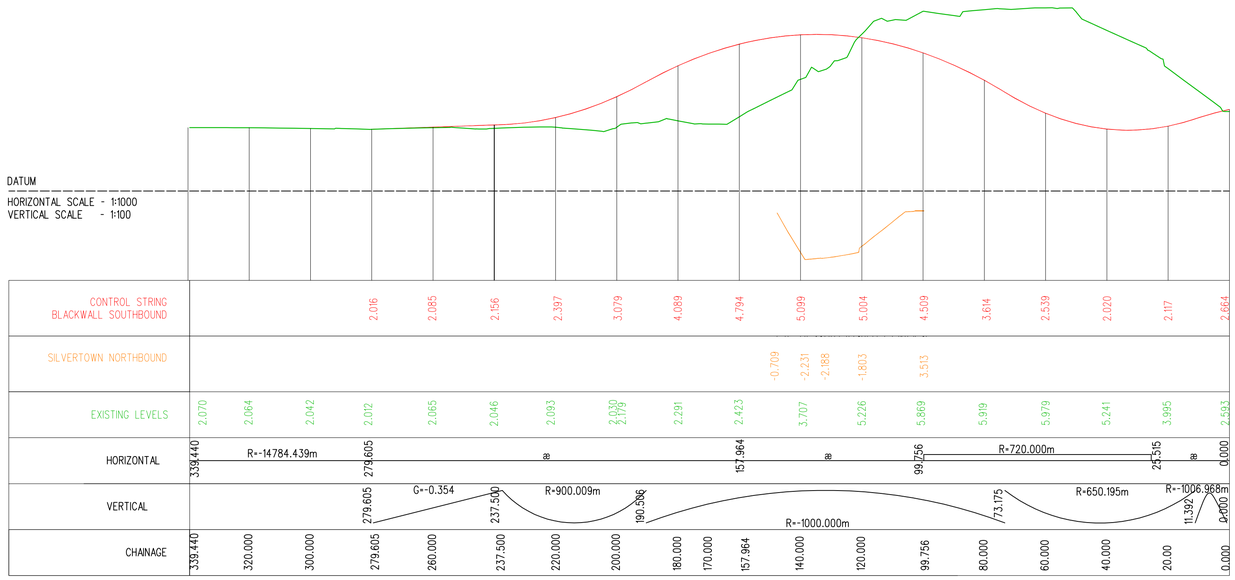
A1

0 10 100

File: 5110309_HW_GA_0009 Rev B.dwg
Date: Feb 26, 2013 - 5:14pm
Plotted by: conn4509



Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office.
© Crown Copyright. License Number 100020449



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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION

MAINTENANCE/CLEANING

USE

DECOMMISSIONING/DEMOLITION

Stat	Rev	Purpose of Issue	Date	Auth
P	A	FOR INFORMATION	21/05/12	PRM
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	PLAN AMENDED	DK	21/05/12	MF	PRM
A	ORIGINAL ISSUE		SEE TITLE BLOCK		

ATKINS™
Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

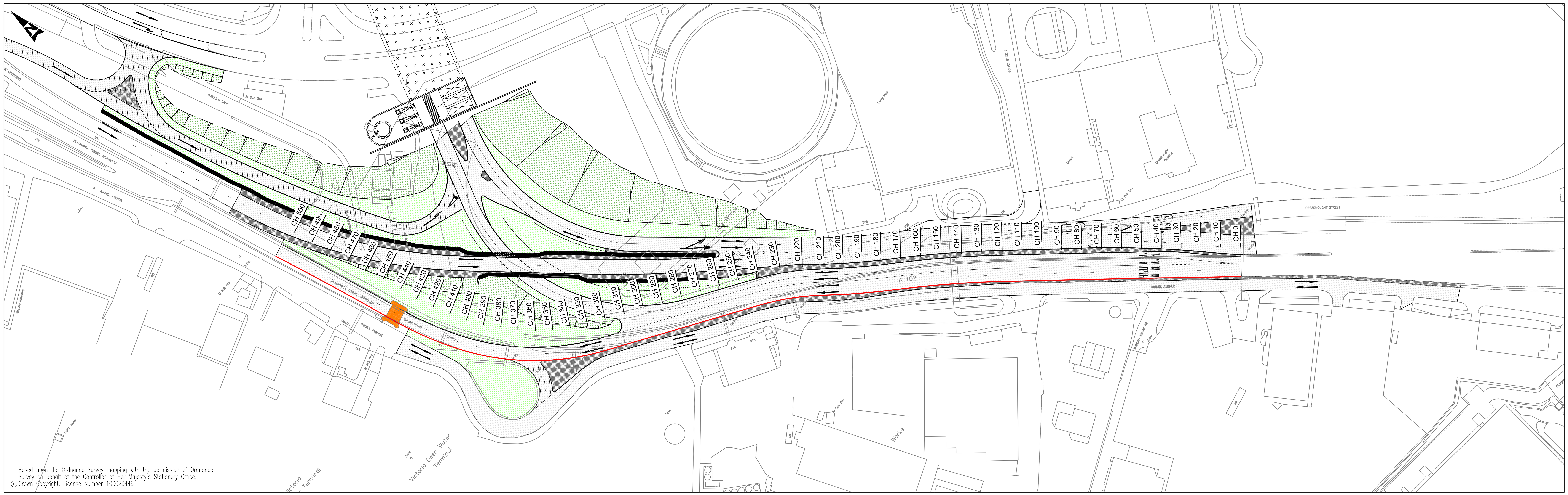
Title: SOUTH 4
LONG-SECTION SHEET 1 OF 4

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 03/04/12	MF Date 23/05/12	PRM Date 23/05/12

Status	Drawing Number	Rev
P	5110309/HW/GA/0009	B

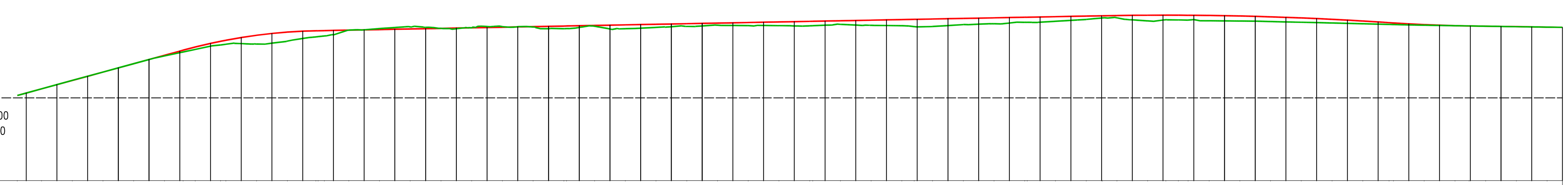
P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\5110309_HW_GA_0009 Rev B.dwg

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.



DATUM

HORIZONTAL SCALE - 1:1000
VERTICAL SCALE - 1:100



CHAINAGE	CONTROL STRING	EXISTING LEVELS
460.000		
450.000	0.155	0.156
440.000	0.428	0.430
430.000	0.702	0.703
470.000	0.975	0.976
460.000	1.248	1.247
450.000	1.521	1.492
440.000	1.771	1.682
430.000	1.963	1.755
420.000	2.095	1.779
410.000	2.169	1.933
400.000	2.194	2.054
390.000	2.213	2.209
380.000	2.232	2.288
370.000	2.251	2.294
360.000	2.270	2.250
350.000	2.289	2.333
340.000	2.308	2.301
330.000	2.327	2.257
320.000	2.346	2.290
310.000	2.365	2.258
300.000	2.384	2.267
290.000	2.403	2.299
280.000	2.422	2.341
270.000	2.441	2.356
260.000	2.460	2.356
250.000	2.479	2.337
240.000	2.499	2.363
230.000	2.518	2.368
220.000	2.537	2.354
210.000	2.554	2.309
200.000	2.575	2.351
190.000	2.594	2.397
180.000	2.613	2.434
170.000	2.632	2.462
160.000	2.651	2.522
150.000	2.670	2.598
140.000	2.685	2.537
130.000	2.690	2.538
120.000	2.686	2.528
110.000	2.673	2.504
100.000	2.651	2.495
90.000	2.620	2.472
80.000	2.579	2.448
70.000	2.529	2.423
60.000	2.470	2.398
50.000	2.408	2.375
40.000	2.363	2.358
30.000	2.340	2.340
20.000	2.324	2.325
10.000	2.309	2.309
0.000	2.294	2.294

HORIZONTAL: R=-1481.299m; R=180.000m; R=127.000m; æ; R=-127.000m; R=360.000m; R=-510.000m; R=-11122.498m

VERTICAL: 502.882; G=-2.732; 448.909; R=-1700.102m; 405.694; G=-0.191; 149.721; R=-10829.543m; 56.447; R=5000.000m; 30.390; G=0.150; 0.000

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION

MAINTENANCE/CLEANING

USE

DECOMMISSIONING/DEMOLITION

Stat	Rev	Purpose of Issue	Date	Auth
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
A	ORIGINAL ISSUE		SEE	TITLE BLOCK	

ATKINS™
Atkins Limited ©
Consulting Engineers,
Threadneedle House
9–10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: SOUTH 4 LONG-SECTION SHEET 2 OF 4

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK, Date 21/04/12	MF, Date 23/05/12	PRM, Date 23/05/12

Status	Drawing Number	Rev
P	5110309/HW/GA/0024	A

Rev A
Drawing Number 5110309/HW/GA/0024
Status P
DO NOT SCALE
0 10 100
A1

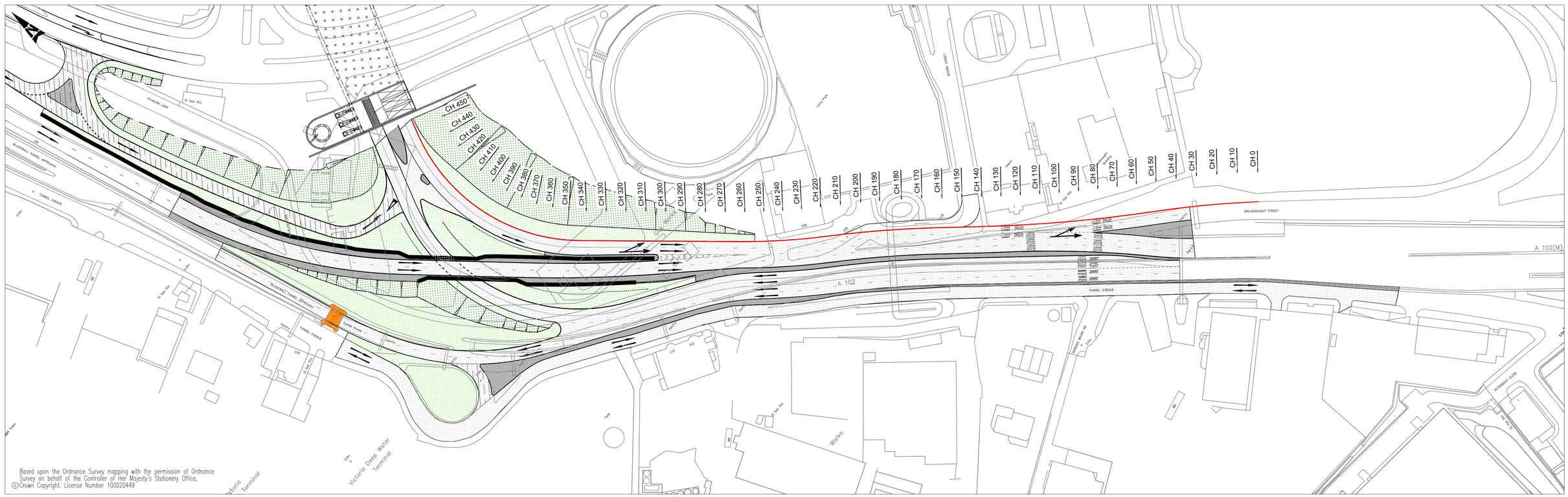
Plotted by: conn4509
File: 5110309_HW_GA_0024.dwg
Date: Feb 26, 2013 - 5:10pm

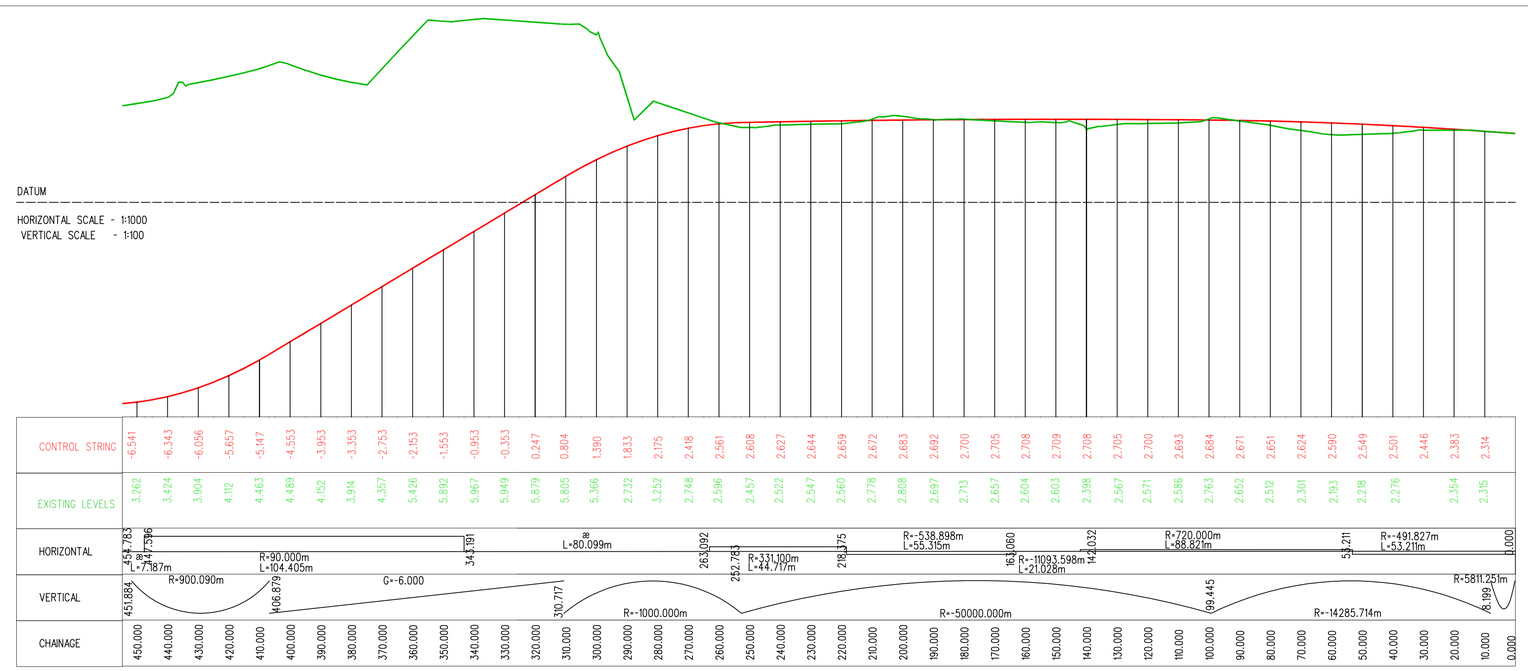
This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

DO NOT SCALE

Status	Drawing Number	Rev
P	5110309/HW/GA/0025	A

A1





CHAINAGE	CONTROL STRING	EXISTING LEVELS
450.000	-6.541	3.262
440.000	-6.343	3.424
430.000	-6.056	3.904
420.000	-5.657	4.112
410.000	-5.147	4.463
400.000	-4.553	4.498
390.000	-3.953	4.152
380.000	-3.353	3.914
370.000	-2.753	4.357
360.000	-2.153	5.426
350.000	-1.553	5.892
340.000	-0.953	5.967
330.000	-0.353	5.949
320.000	0.247	5.879
310.000	0.804	5.805
300.000	1.390	5.366
290.000	1.833	2.732
280.000	2.175	3.252
270.000	2.418	2.748
260.000	2.561	2.596
250.000	2.608	2.457
240.000	2.627	2.522
230.000	2.644	2.547
220.000	2.659	2.560
210.000	2.672	2.778
200.000	2.683	2.808
190.000	2.692	2.697
180.000	2.700	2.713
170.000	2.705	2.657
160.000	2.708	2.604
150.000	2.709	2.603
140.000	2.708	2.398
130.000	2.705	2.567
120.000	2.700	2.571
110.000	2.693	2.586
100.000	2.684	2.763
90.000	2.671	2.652
80.000	2.651	2.512
70.000	2.624	2.301
60.000	2.590	2.193
50.000	2.549	2.218
40.000	2.501	2.276
30.000	2.446	
20.000	2.383	2.354
10.000	2.314	2.315
0.000		

HORIZONTAL	VERTICAL
454.783	451.884
L=7.187m	R=900.090m
447.596	
R=90.000m L=104.405m	406.879
343.191	G=-6.000
L=80.099m	330.717
263.092	R=-1000.000m
252.783	
R=-331.100m L=44.717m	
218.375	R=-50000.000m
R=-538.898m L=55.315m	
163.060	
R=-11093.598m L=21.028m	
142.032	
R=720.000m L=88.821m	99.445
53.211	R=-14285.714m
R=-491.827m L=53.211m	8.199
0.000	R=5811.251m

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION

MAINTENANCE/CLEANING

USE

DECOMMISSIONING/DEMOLITION

Stat	Rev	Purpose of Issue	Date	Auth
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
A	ORIGINAL ISSUE		SEE TITLE BLOCK		

ATKINS™
Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: SOUTH 4
LONG-SECTION SHEET 3 OF 4

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 21/05/12	MF Date 23/05/12	PRM Date 23/05/12

Status	Drawing Number	Rev
P	5110309/HW/GA/0025	A

File: 5110309_HW_GA_0025.dwg Date: Feb 26, 2013 - 5:11pm Plotted by: conn4509

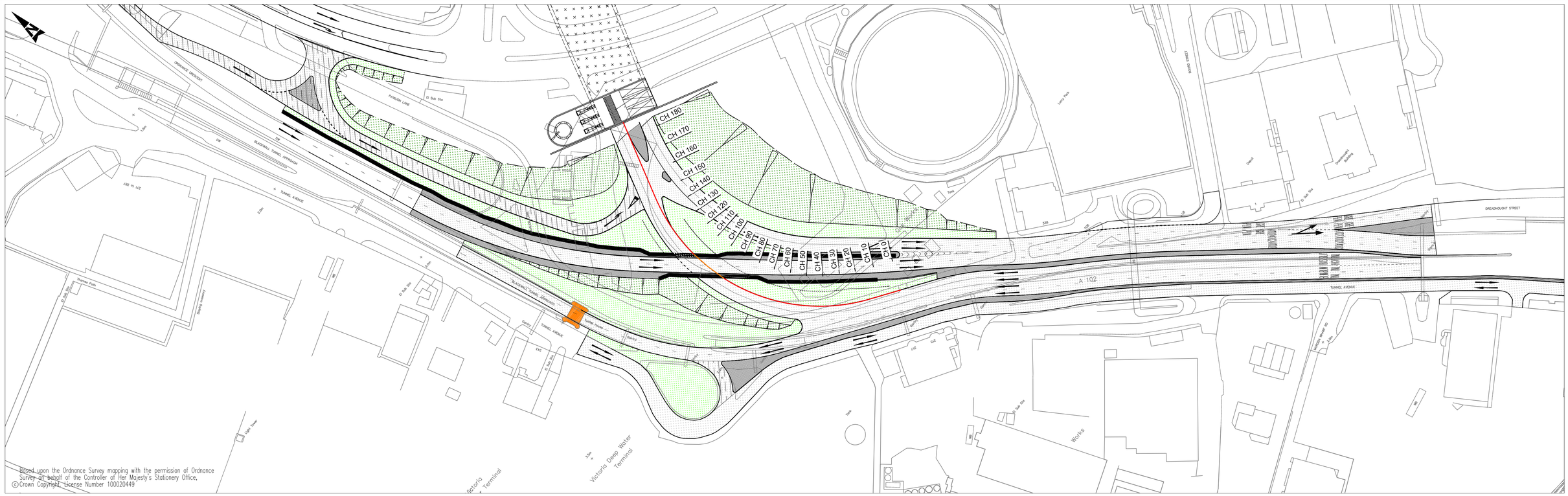
P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\5110309_HW_GA_0025.dwg

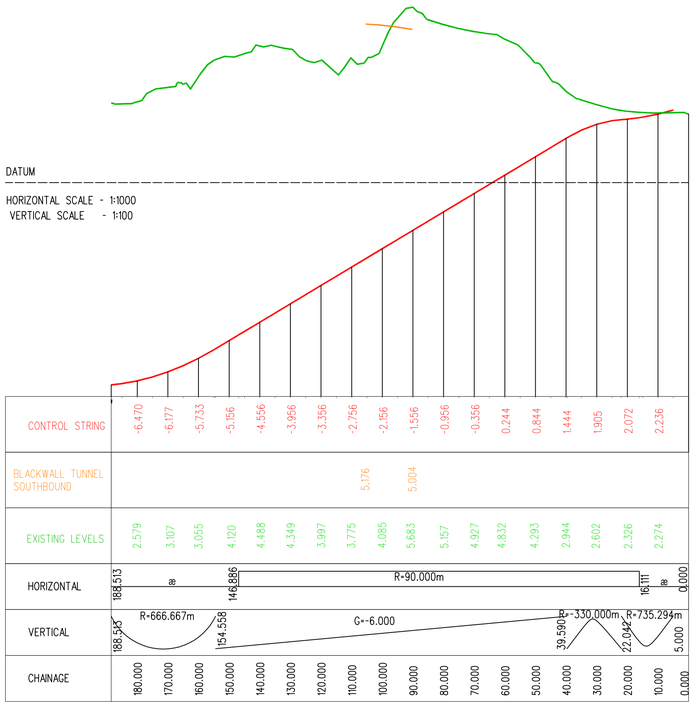
This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

DO NOT SCALE

A1

Status P | Drawing Number 5110309/HW/GA/0026 | Rev A





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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION

MAINTENANCE/CLEANING

USE

DECOMMISSIONING/DEMOLITION

Stat	Rev	Purpose of Issue	Date	Auth
P	A	FOR INFORMATION	SEE TITLEBLOCK	

Rev	Description	By	Date	Chk'd	Auth
A	ORIGINAL ISSUE		SEE TITLEBLOCK		

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9–10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: SOUTH 4
LONG-SECTION SHEET 4 OF 4

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 21/04/12	MF Date 23/05/12	PRM Date 23/05/12

Status	Drawing Number	Rev
P	5110309/HW/GA/0026	A

File: 5110309_HW_GA_0026.dwg Date: Feb 26, 2013 - 5:12pm Plotted by: conn4509

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\5110309_HW_GA_0026.dwg

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

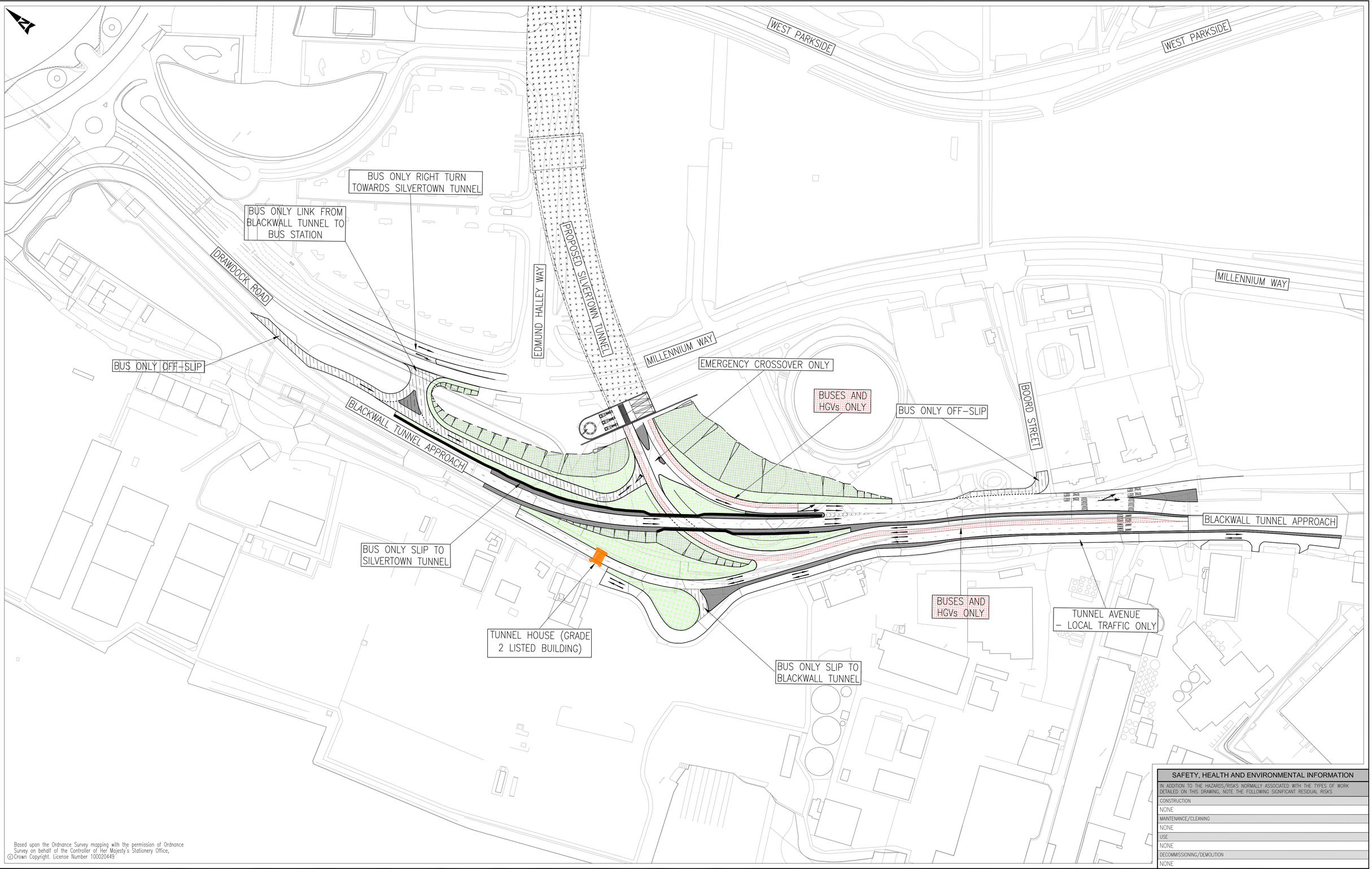
DO NOT SCALE

A1

Rev B
Status P
Drawing Number 5110309/HW/GA/0103

0 10 100

Date: Feb 26, 2013 - 5:18pm Plotted by: conn4509
File: 5110309_HW_GA_0103 B.dwg



Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

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 SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

KEY

BUSES ONLY

RETAINING WALL

Stat	Rev	Purpose of Issue	Date	Auth
P	A	FOR INFORMATION	31/10/12	MF
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	WHITE LINING AMENDING	DK	MF	MF	31/10
A	ORIGINAL ISSUE	SEE TITLE BLOCK			

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: SOUTH 4 - WITH BUS LINK TO SILVERTOWN TUNNEL SCHEME PLAN

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1250	SMC Date 26/04/12	MJC Date 16/05/12	MF Date 16/05/12

Status	Drawing Number	Rev
P	5110309/HW/GA/0103	B

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\Contract Drawings\0100\5110309_HW_GA_0103 B.dwg

Appendix C. Soil Screening for Potential Re-Use

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Determinand	Unit	SSVs for Open Space Land Use - no free product	SSVs for Open Space Land Use - free product	Borehole	NIT BH01	NIT BH01A	NIT BH01A	NIT BH02	NIT BH02	NIT BH09	NIT BH09	NIT BH09A	NIT BH09G	NIT BH09G	NIT TP01	NIT TP01	NIT TP04	NIT TP04
				Depth	0.5	4	7	4	8	0.2	7	2.6	4.7	6.2	0.25	1.5	0.3	1.9
				Strata	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground
				Free phase observed?	no	no	no	no	no	no	no	yes	no	no	no	no	no	no
Asbestos Screen	N/A				CH CR AM	CH CR	CH CR AM	NAIIS	NAIIS	CH AM	CH AM	CH AM	CH	CR	CH	NAIIS	AM	AM
Moisture 105 DegC	%				14.1	20.7	21.9	29.7	18.4	17.4	33.3	21.1	21	22	14	29.9	24.7	23.2
pH units (AR)	pH Units				9.8	9.7	9	9.3	9.5	10.3	8.6	10.8	10.6	10.3	9.5	9	10.3	10.9
SO4-- (H2O sol) mg/l	mg/kg				2650	504	879	1190	1680	2160	1130	1550	1790	996	1070	993	383	3090
1,1,1,2-Tetrachloroethane	ug/kg	660000	660000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,1,1-Trichloroethane	ug/kg	203000000	1380000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,1,2-Trichloroethane	ug/kg	506000	506000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,1-Dichloropropene	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,1-Dichloroethane	ug/kg	57400000	1620000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,1-Dichloroethene	ug/kg	1280000	1280000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,2,3-Trichlorobenzene	ug/kg				3	4	4	3	4	4	4	4	4	4	3	4	4	4
1,2,3-Trichloropropane	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,2,4-Trichlorobenzene	ug/kg				*3*	*4*	*4*	*3*	*4*	*4*	*4*	*4*	*4*	*4*	*3*	*4*	*4*	*4*
1,2,4-Trimethylbenzene	ug/kg	149000	149000		3	6	*1*	*1*	2	1	4	9	18	3	*1*	*1*	13	1
1,2-Dibromo-3-chloropropa	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,2-Dichlorobenzene	ug/kg				*1*	*1*	*1*	*1*	*1*	6	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,2-Dichloroethane	ug/kg	8050	8050		*1*	*1*	*1*	*1*	*1*	1	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
cis 1,2-Dichloroethene	ug/kg	254000	254000		*3*	*4*	*4*	*5*	*6*	*2*	*3*	*3*	*6*	*6*	*3*	*4*	*4*	*4*
1,2-Dibromoethane	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,2-Dichloropropane	ug/kg	51700	51700		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,3,5-Trimethylbenzene	ug/kg				2	4	*1*	*1*	1	*1*	3	1	*1*	3	*1*	*1*	*1*	*1*
1,3-Dichlorobenzene	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
cis 1,3-Dichloropropene	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,3-Dichloropropane	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
1,4-Dichlorobenzene	ug/kg				*1*	*1*	*1*	*1*	*1*	1	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
2,2-Dichloropropane	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
2-Chlorotoluene	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	6	*1*	*1*	*1*	*1*	*1*
4-Chlorotoluene	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	3	*1*	*1*	*1*	*1*	*1*
p-Isopropyltoluene	ug/kg				*1*	5	*1*	*1*	*1*	*1*	*1*	11	19	8	*1*	*1*	3	*1*
Acenaphthylene	mg/kg				0.6	*0.1*	*0.1*	*0.08*	*0.1*	0.31	*0.12*	*0.1*	0.48	*0.1*	0.16	*0.11*	0.31	*0.1*
Acenaphthene	mg/kg	18400	157		2.88	0.37	*0.1*	*0.08*	0.18	0.4	*0.12*	*0.1*	3.37	0.28	0.36	*0.11*	0.29	*0.1*
Aliphatics >C8 - C10	mg/kg	21600	82.5		*5*	*5*	*5*	*4*	*5*	*4.95*	*6*	*5.3*	5.58	*5*	*5*	*6*	*5*	*5*
Aliphatics >C10 - C12	mg/kg	21700	49.9		*5*	*5*	*5*	*4*	*5*	*4.95*	*6*	*5.3*	*5*	*5*	*5*	*6*	*5*	*5*
Aliphatics >C12 - C16	mg/kg	21700	21		56.1	10.42	*5*	*4*	*5*	52.8	*6*	13.6	26.8	7.28	13.6	*6*	15	12
Aliphatics >C16 - C21	mg/kg				161	23.8	8.22	*4*	*5*	133	11.29	29	36.1	*5*	70.3	13.6	41	28.4
Aliphatics >C21 - C35	mg/kg				359	71	16.1	*8.76*	*10.74*	311	33.4	94.2	134	*11.23*	234	31	146	49.9
Aliphatics >C16 - 35	mg/kg	590000	590000		520	94.8	24.32	12.76	15.74	444	44.69	123.2	170.1	16.23	304.3	44.6	187	78.3
Anthracene	mg/kg	96600	3.48		7.72	0.57	*0.1*	*0.08*	*0.1*	0.7	*0.12*	0.11	6.3	0.49	0.44	*0.11*	0.58	0.1
Aromatics >C8 - C10	mg/kg	8040	614		*5*	*5*	*5*	*4*	*5*	*5*	*6*	*5*	*5*	*5*	*5*	*6*	*5*	*5*
Aromatics >C10 - C12	mg/kg	8560	370		*5*	*5*	*5*	*4*	*5*	*5*	*6*	*5*	*5*	*5*	*5*	*6*	*5*	*5*
Aromatics >C12 - C16	mg/kg	8700	155		46.1	8.27	*5*	*4*	*5*	19.1	*6*	5.92	38.7	*5*	10.6	*6*	8.06	6.1
Aromatics >C16 - C21	mg/kg	5380	5380		222	22.2	*5*	*4*	*5*	77.1	9.01	20	139	6.44	35	7.06	32.5	18.5
Aromatics >C21 - C35	mg/kg	5380	5380		540	68.9	12	*8.76*	*10.74*	237	26.5	55.3	267	14.2	170	29.5	135	38.2
Arsenic (MS)	mg/kg	138	138		12.6	9.6	10.9	10.6	8.3	13.1	14.5	10.6	11.3	11.3	10	11.2	12.1	11.1
Barium	mg/kg	5240	5240		714	88.1	119	67.7	101	232	123	74.4	84.8	73.2	199	82.2	161	143
Beryllium	mg/kg	903	903		0.67	0.72	0.41	1	0.6	0.59	1.12	0.7	0.5	0.61	0.59	0.93	0.79	0.75
Benzo(a)anthracene	mg/kg	28.7	1.71		12.5	1.17	*0.1*	*0.08*	0.18	2.48	0.13	0.3	8.05	0.41	1.49	0.3	1.83	0.3
Benzo(a)pyrene	mg/kg	3.7	0.911		9.64	0.98	*0.1*	*0.08*	0.15	2.3	0.13	0.23	4.8	0.29	1.62	0.3	1.74	0.22
Benzo(b)fluoranthene	mg/kg	35.5	1.22		11.25	1	*0.1*	*0.08*	0.23	2.88	0.18	0.29	5.78	0.33	2.08	0.39	2.3	0.29
Benzo(g,h,i)perylene	mg/kg	451	0.0187		5.6	0.66	*0.1*	*0.08*	0.13	1.55	0.13	0.16	2.2	0.17	1.3	0.21	1.35	0.2
Benzo(k)fluoranthene	mg/kg	381	0.686		3.8	0.44	*0.1*	*0.08*	*0.1*	1	*0.12*	0.1	1.86	0.1	0.63	0.1	0.76	*0.1*
Benzene	mg/kg	42.5	42.5		*0.012*	*0.013*	*0.013*	*0.01*	*0.012*	*0.012*	*0.015*	*0.013*	*0.013*	*0.013*	*0.012*	*0.014*	*0.013*	*0.033*
Bromobenzene	ug/kg	642000	642000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Bromochloromethane	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Bromoform	ug/kg	1930000	1930000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Bromomethane	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Bromodichloromethane	ug/kg	22200	22200		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
C6-C7	mg/kg				*0.2*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*	*0.3*	*0.7*
C7-C8	mg/kg				*0.2*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*	*0.3*	*0.7*
>C8 - C10	mg/kg				*0.2*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.3*	0.4	*0.3*	*0.2*	*0.3*	0.3	*0.7*
C5-C6	mg/kg				*0.2*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*	*0.3*	*0.7*
Chlorobenzene	ug/kg	17900000	651000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*

Notes:
Numbers in italics are below method detection limit
Asbestos
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NAIIS No asbestos identified in sample

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Silvertown Tunnel - Soil Screening for Potential Re-Use

Determinand	Unit	SSVs for Open Space Land Use - no free product	SSVs for Open Space Land Use - free product	Borehole	NIT BH01	NIT BH01A	NIT BH01A	NIT BH02	NIT BH02	NIT BH09	NIT BH09	NIT BH09A	NIT BH09G	NIT BH09G	NIT TP01	NIT TP01	NIT TP04	NIT TP04
				Depth	0.5	4	7	4	8	0.2	7	2.6	4.7	6.2	0.25	1.5	0.3	1.9
				Strata	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground
				Free phase observed?	no	no	no	no	no	no	no	yes	no	no	no	no	no	no
Cadmium (MS)	mg/kg	83.6	83.6		0.61	0.32	*0.2*	0.26	0.37	0.5	0.7	0.26	*0.22*	*0.22*	0.58	0.28	0.47	0.27
Chloroethane	ug/kg	988000000	2440000		*2*	*3*	*3*	*2*	*2*	*2*	*3*	*3*	*3*	*3*	*2*	*3*	*3*	*3*
Chloroform	ug/kg	1390000	1390000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Chloromethane	ug/kg	48000	48000		*3*	*4*	*4*	*3*	*4*	*4*	*4*	*4*	*4*	*4*	*3*	*4*	*4*	*4*
Chromium (MS)	mg/kg	729	729		21.3	29.2	19.5	39.6	24.7	20.8	51.7	30.1	22	28.2	24.4	35	26	26.9
Chrysene	mg/kg	3010	0.44		10.31	1.03	*0.1*	*0.08*	0.2	1.96	*0.12*	0.19	5.8	0.35	1.52	0.23	1.79	0.2
Carbon Tetrachloride	ug/kg	62800	62800		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Copper (MS)	mg/kg	40600	40600		63.8	31.5	80.4	31.1	41.4	53.4	51.1	22.7	16.6	34.8	48	27	48.2	58.9
Dichlorodifluoromethane	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Dibenzo(a,h)anthracene	mg/kg	3.96	0.00393		1.42	0.16	*0.1*	*0.08*	*0.1*	0.33	*0.12*	*0.1*	0.5	*0.1*	0.29	*0.11*	0.3	*0.1*
Dibromochloromethane	ug/kg	137000	137000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Dibromomethane	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Ethyl Benzene	mg/kg	35200	508		*0.012*	*0.013*	*0.013*	*0.01*	*0.012*	*0.012*	*0.015*	*0.013*	*0.013*	*0.013*	*0.012*	*0.014*	0.019	*0.033*
Iron	mg/kg				27000	30200	27200	34200	20800	22000	36400	24400	21500	26500	30000	35500	29400	26500
Fluorene	mg/kg	12600	125		3.24	0.37	*0.1*	*0.08*	*0.1*	0.29	*0.12*	*0.1*	4.76	0.29	0.24	*0.11*	0.25	*0.1*
Fluoranthene	mg/kg	13000	18.9		31	2.5	0.14	*0.08*	0.4	5.59	0.3	0.54	23.8	1.24	3.1	0.6	3.9	0.63
Hexachlorobutadiene	ug/kg				*2*	*3*	*3*	*2*	*2*	*2*	*3*	*3*	*3*	*3*	*2*	*3*	*3*	*3*
Mercury (MS)	mg/kg	4.3	4.3		1.54	*0.49*	0.55	*0.5*	0.61	1.19	0.83	*0.49*	*0.5*	*0.55*	1.12	*0.5*	0.68	*0.51*
Indeno(1,2,3-cd)pyrene	mg/kg	34.4	0.0614		6.88	0.74	*0.1*	*0.08*	0.11	1.89	0.18	0.18	3.06	0.21	1.36	0.23	1.39	0.2
iso-Propylbenzene	ug/kg	34900000	388000		*1*	3	*1*	*1*	*1*	*1*	*1*	4	25	6	*1*	*1*	9	*1*
MTBE	ug/kg	85500000	17400000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
m and p-Xylene	mg/kg	58800	613		*0.012*	*0.013*	*0.013*	*0.01*	*0.012*	*0.012*	*0.015*	*0.013*	*0.013*	*0.013*	*0.012*	*0.014*	0.017	*0.033*
Naphthalene	mg/kg	5420	75		2.25	0.4	*0.1*	*0.08*	*0.1*	0.41	*0.12*	*0.1*	2.48	0.14	2.52	*0.11*	0.48	0.29
n-Butylbenzene	ug/kg				*1*	3	*1*	*1*	*1*	*1*	3	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Nickel (MS)	mg/kg	3070	3070		19.3	27.4	18.3	32.5	18.8	20.5	39.3	26.6	17.3	19.9	16.6	33.3	22	21.9
Propylbenzene	ug/kg	35600000	399000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	4	*1*
o-Xylene	mg/kg	60800	467		*0.012*	*0.013*	*0.013*	*0.01*	*0.012*	*0.012*	*0.015*	*0.013*	*0.013*	*0.013*	*0.012*	*0.014*	0.021	*0.033*
Total PAHs (USEPA 16)	mg/kg				160	*14.8*	*1.69*	*1.28*	*2.73*	29.5	*2.56*	*3.51*	119.43	*7.04*	21.9	*3.74*	22.79	*4*
Lead	mg/kg	1590	1590		410.3	101	408.9	144.7	387	351.4	145.7	95.5	92	235.1	816.6	138.2	229	319.8
Phenol Index	mg/kg				*0.6*	*0.6*	*0.6*	*0.5*	*0.6*	*0.6*	*0.7*	*0.6*	*0.6*	*0.6*	*0.6*	*0.7*	*0.7*	*0.7*
Phenanthrene	mg/kg				27.2	2.12	*0.1*	*0.08*	0.29	2.64	0.3	0.47	28	1.5	1.83	0.2	2.05	0.6
Total GRO	mg/kg				*0.2*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.3*	0.5	*0.3*	*0.2*	*0.3*	0.4	*0.7*
Pyrene	mg/kg	9710	2.2		23.7	1.93	0.12	*0.08*	0.29	4.81	0.24	0.44	18.2	0.96	2.94	0.5	3.49	0.5
Selenium (MS)	mg/kg	2320	2320		*0.5*	*0.5*	*0.5*	0.9	*0.5*	*0.5*	0.8	*0.5*	*0.5*	*0.6*	*0.5*	0.6	*0.5*	*0.5*
sec-Butylbenzene	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	11	*1*
Styrene	ug/kg	4220000	607000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
trans 1,2-Dichloroethene	ug/kg	599000	599000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
trans 1,3-Dichloropropene	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Trichlorofluoromethane	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
tert-Butylbenzene	ug/kg				*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	42	*1*
Tetrachloroethene	ug/kg	4340000	415000		8	*4*	4	*3*	*4*	*4*	*4*	*4*	733	418	13	*4*	*4*	5
Toluene	mg/kg	79300	835		*0.012*	*0.013*	*0.013*	*0.01*	*0.012*	*0.012*	*0.015*	*0.013*	*0.013*	*0.013*	*0.012*	*0.014*	*0.013*	*0.033*
Trichloroethene	ug/kg	251000	251000		7	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	6	*1*	*1*	1
Vanadium (MS)	mg/kg	1410	1410		46.4	43.6	23.5	66.2	35.7	30.4	79	45.8	27.2	35.6	44.9	61.8	43.1	39.6
Vinyl Chloride	ug/kg	2450	2450		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Zinc (MS)	mg/kg	183000	183000		419.4	88	395.8	92.8	132.6	347.9	165.3	89.4	58.2	77.4	179	86.1	159.6	146.8
1,1,2,2-Tetrachloroethane	ug/kg	880000	880000		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	3	*1*
Boron.	mg/kg				1.5	1.5	1.3	2.2	1.2	1.9	3.2	1.8	1.2	1.1	1.6	1.3	1	1.1
Benzene	ug/kg	42500	42500		2	9	*1*	*1*	1	1	3	*1*	3	*1*	*1*	*1*	3	4
Ethyl Benzene	ug/kg	35200000	508000		*2*	5	*3*	*2*	*2*	*2*	*3*	3	*3*	3	*2*	*3*	*3*	*3*
m and p-Xylene	ug/kg	58800000	613000		6	11	*5*	*4*	6	*5*	6	8	6	*5*	*5*	*6*	*5*	*5*
Naphthalene	ug/kg	5420000	75000		229	155	*6*	8	20	8	361	24	351	104	9	*7*	19	53
o-Xylene	ug/kg	60800000	467000		3	6	*3*	*2*	4	*2*	3	5	4	*3*	*2*	*3*	4	*3*
Toluene	ug/kg	79300000	835000		*6*	*6*	*6*	*5*	*6*	*6*	*7*	*6*	*6*	*6*	*6*	*7*	*7*	*7*
Total Sulphur.	%				0.123	0.263	0.191	0.187	0.109	0.268	0.19	0.175	0.13	0.137	0.167	0.329	0.134	0.234
Total Organic Carbon	%M/M																1.629	
Organic Matter	%												0.94					

Notes:
Numbers in italics are below method detection limit
Asbestos
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NAIIS No asbestos identified in sample

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Determinand	Unit	SSVs for Open Space Land Use - no free product	SSVs for Open Space Land Use - free product	NIT TP05	NIT TP05	NIT TP07	NIT TP07	NIT TP09	NIT TP09	NT BH01	NT BH01	NT BH01	NT BH02	NT BH02	NT BH02	NT DS01	NT DS01	NT DS02F	NT DS02F
				0.3	0.8	0.4	2	1.4	3.1	0.5	10	4	13	3	7	2	3.5	1.3	4
				Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	River Terrace Deposits	Alluvium	River Terrace Deposits	Made Ground	River Terrace Deposits	Made Ground	Made Ground	Made Ground	Made Ground
				no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Asbestos Screen	N/A			CH CR	CH AM	CH	AM	NAIIS	AM	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS	NAIIS
Moisture 105 DegC	%			17.6	11.8	22.3	25.8	26.6	27.6	31	4.8	28.9	12.5	35	65.5	28.4	33	18.6	63.6
pH units (AR)	pH Units			8.7	9.4	8.8	9.7	8.2	9.9	8.4	8.4	7.3	8.8	6.5	5.9	7.2	7.4	7.9	7.4
SO4-- (H2O sol) mg/l	mg/kg			627	358	482	592	831	1480	2560	158	238	229	3660	489	4780	5470	3770	4920
1,1,1,2-Tetrachloroethane	ug/kg	660000	660000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,1,1-Trichloroethane	ug/kg	203000000	1380000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,1,2-Trichloroethane	ug/kg	506000	506000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,1-Dichloropropene	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,1-Dichloroethane	ug/kg	57400000	1620000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,1-Dichloroethene	ug/kg	1280000	1280000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,2,3-Trichlorobenzene	ug/kg			4	3	4	4	4	4	4	3	3	3	5	9	4	4	4	8
1,2,3-Trichloropropane	ug/kg			*1*	*1*	*1*	*1*	12	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,2,4-Trichlorobenzene	ug/kg			*4*	*3*	*4*	*4*	*4*	*4*	*4*	*3*	*3*	*3*	*5*	*9*	*4*	*4*	*4*	*8*
1,2,4-Trimethylbenzene	ug/kg	149000	149000	*1*	1	*1*	11	11	4	1	*1*	*1*	*1*	8	12	*1*	1	9	*3*
1,2-Dibromo-3-chloropropa	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,2-Dichlorobenzene	ug/kg			8	54	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,2-Dichloroethane	ug/kg	8050	8050	2	7	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
cis 1,2-Dichloroethene	ug/kg	254000	254000	*4*	*3*	*4*	*4*	*7*	*7*	*3*	*2*	*2*	*6*	*3*	*6*	*3*	*3*	*2*	*5*
1,2-Dibromoethane	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,2-Dichloropropane	ug/kg	51700	51700	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,3,5-Trimethylbenzene	ug/kg			*1*	*1*	*1*	1	7	3	*1*	*1*	*1*	*1*	5	6	*1*	*1*	6	*3*
1,3-Dichlorobenzene	ug/kg			*1*	5	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
cis 1,3-Dichloropropene	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,3-Dichloropropane	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
1,4-Dichlorobenzene	ug/kg			2	5	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
2,2-Dichloropropane	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
2-Chlorotoluene	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
4-Chlorotoluene	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
p-Isopropyltoluene	ug/kg			*1*	5	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	16	*1*	*3*
Acenaphthylene	mg/kg			0.2	0.09	*0.1*	1.79	*0.11*	0.12	0.13	*0.08*	*0.08*	*0.09*	1.14	*0.23*	*0.11*	*0.12*	4.68	0.25
Acenaphthene	mg/kg	18400	157	0.41	0.15	0.97	0.49	0.22	2.13	0.3	*0.08*	*0.08*	*0.09*	0.22	*0.23*	*0.11*	*0.12*	61.7	2.64
Aliphatics >C8 - C10	mg/kg	21600	82.5	*5*	*5*	*5*	*5*	*5.57*	*6*	*6*	*4*	*4*	*5*	*6*	*12*	*6*	*6*	*5*	*11*
Aliphatics >C10 - C12	mg/kg	21700	49.9	*5*	*5*	*5*	*5*	*5.57*	*6*	*6*	*4*	*4*	*5*	*6*	*12*	*6*	*6*	*5*	*11*
Aliphatics >C12 - C16	mg/kg	21700	21	153	13.9	12.1	13.9	*5.57*	39	*6*	*4*	*4*	*5*	*6*	*12*	*6*	*6*	*5*	*11*
Aliphatics >C16 - C21	mg/kg			1010	54	49.3	27.8	7.51	102.5	11.52	*4*	*4*	*5*	*6*	*12*	5.68	6.81	18.3	20.16
Aliphatics >C21 - C35	mg/kg			6250	268	238	38	16.1	410	42.6	*9.2*	*8.76*	*10.01*	*13.48*	35.9	110.6	60.6	133	495
Aliphatics >C16 - 35	mg/kg	590000	590000	7260	322	287.3	65.8	23.61	512.5	54.12	13.2	12.76	15.01	19.48	47.9	116.28	67.41	151.3	515.16
Anthracene	mg/kg	96600	3.48	0.66	0.33	1.74	3.25	0.19	1.82	1.48	*0.08*	*0.08*	0.35	10.23	0.99	0.27	*0.12*	198	9.78
Aromatics >C8 - C10	mg/kg	8040	614	*5*	*5*	*5*	*5*	*5*	*6*	*6*	*4*	*4*	*5*	*6*	*12*	*6*	*6*	*5*	*11*
Aromatics >C10 - C12	mg/kg	8560	370	*5*	*5*	*5*	9.49	*5*	*6*	*6*	*4*	*4*	*5*	*6*	*12*	*6*	*6*	41.9	*11*
Aromatics >C12 - C16	mg/kg	8700	155	33.3	8.11	9.19	18	10.68	34	*6*	*4*	*4*	*5*	17.5	14.26	*6*	*6*	415	21.62
Aromatics >C16 - C21	mg/kg	5380	5380	257	31.4	56	72.1	27.4	108	41.2	*4*	*4*	*5*	128.6	41.2	11.9	7.54	4090	165
Aromatics >C21 - C35	mg/kg	5380	5380	2900	158	201	218	74.7	413	139.4	*9.2*	*8.76*	*10.01*	255	120	55	18.1	9150	409
Arsenic (MS)	mg/kg	138	138	14.4	9.9	11.9	17	13.7	13.2	72.3	7	14.6	45.5	3480	127.7	303.3	129.9	65.7	28
Barium	mg/kg	5240	5240	206	102	100.5	192	103.7	133	232	26.9	74	28.3	256	72	35.9	71.7	56.9	48.5
Beryllium	mg/kg	903	903	0.61	0.37	0.58	0.94	0.99	0.91	1.15	0.3	1.48	0.31	1.06	1.15	1.71	1.72	0.49	0.9
Benzo(a)anthracene	mg/kg	28.7	1.71	12.3	0.93	3.63	8.37	0.4	3.5	5.1	*0.08*	*0.08*	0.55	15.31	1.39	1.15	0.33	301	16.57
Benzo(a)pyrene	mg/kg	3.7	0.911	14.7	0.94	2.8	8.6	0.38	2.53	4.68	*0.08*	*0.08*	0.33	9.52	0.93	0.8	0.19	227	12.31
Benzo(b)fluoranthene	mg/kg	35.5	1.22	18.6	1.2	3.56	11	0.42	3.2	5.32	*0.08*	*0.08*	0.53	15.02	1.2	1.45	0.37	267	13.54
Benzo(g,h,i)perylene	mg/kg	451	0.0187	10.22	0.75	1.53	6.04	0.26	1.34	2.65	*0.08*	*0.08*	0.21	3.89	0.32	0.46	*0.12*	95	4.45
Benzo(k)fluoranthene	mg/kg	381	0.686	5.47	0.41	1.13	3.79	0.18	1.2	1.91	*0.08*	*0.08*	0.22	6	0.52	0.57	0.16	97.8	4.89
Benzene	mg/kg	42.5	42.5	*0.012*	*0.011*	*0.013*	0.05	*0.034*	*0.014*	*0.014*	*0.011*	*0.01*	*0.011*	*0.015*	*0.029*	*0.014*	*0.015*	*0.012*	*0.027*
Bromobenzene	ug/kg	642000	642000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Bromochloromethane	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Bromoform	ug/kg	1930000	1930000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Bromomethane	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Bromodichloromethane	ug/kg	22200	22200	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
C6-C7	mg/kg			*0.2*	*0.2*	*0.3*	*0.3*	*0.7*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.6*	*0.3*	*0.3*	*0.2*	*0.5*
C7-C8	mg/kg			*0.2*	*0.2*	*0.3*	*0.3*	*0.7*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.6*	*0.3*	*0.3*	*0.2*	*0.5*
>C8 - C10	mg/kg			*0.2*	*0.2*	*0.3*	*0.3*	*0.7*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.6*	*0.3*	*0.3*	*0.2*	*0.5*
C5-C6	mg/kg			*0.2*	*0.2*	*0.3*	*0.3*	*0.7*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.6*	*0.3*	*0.3*	*0.2*	*0.5*
Chlorobenzene	ug/kg	17900000	651000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*

Notes:
Numbers in italics are below method detection limit
Asbestos
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NAIIS No asbestos identified in sample

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Determinand	Unit	SSVs for Open Space Land Use - no free product	SSVs for Open Space Land Use - free product	NIT TP05	NIT TP05	NIT TP07	NIT TP07	NIT TP09	NIT TP09	NT BH01	NT BH01	NT BH01	NT BH02	NT BH02	NT BH02	NT DS01	NT DS01	NT DS02F	NT DS02F
				0.3	0.8	0.4	2	1.4	3.1	0.5	10	4	13	3	7	2	3.5	1.3	4
				Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	River Terrace Deposits	Alluvium	River Terrace Deposits	Made Ground	River Terrace Deposits	Made Ground	Made Ground	Made Ground	Made Ground
				no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Cadmium (MS)	mg/kg	83.6	83.6	0.64	0.64	0.24	0.38	0.27	0.3	4.37	*0.2*	0.35	0.26	0.39	0.5	0.43	0.3	0.63	0.4
Chloroethane	ug/kg	988000000	2440000	*2*	*2*	*3*	*3*	*3*	*3*	*3*	*2*	*2*	*2*	*3*	*6*	*3*	*3*	*2*	*5*
Chloroform	ug/kg	1390000	1390000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Chloromethane	ug/kg	48000	48000	*4*	*3*	*4*	*4*	*4*	*4*	*4*	*3*	*3*	*3*	*5*	*9*	*4*	*4*	*4*	*8*
Chromium (MS)	mg/kg	729	729	25	14.8	25	24.5	38.1	33	36	10	44.6	13.1	8.2	26.9	19.9	40.4	20.5	25.8
Chrysene	mg/kg	3010	0.44	12.5	0.94	3.44	7.06	0.3	2.61	3.96	*0.08*	*0.08*	0.49	12.09	1.04	1.17	0.3	270	13.57
Carbon Tetrachloride	ug/kg	62800	62800	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Copper (MS)	mg/kg	40600	40600	85.7	45.4	30.2	63.3	31.7	49	82.8	5.3	14.4	61.1	241.7	49.1	56.3	35.3	21.2	19.3
Dichlorodifluoromethane	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Dibenzo(a,h)anthracene	mg/kg	3.96	0.00393	2.57	0.17	0.46	1.63	*0.11*	0.39	0.68	*0.08*	*0.08*	*0.09*	1.6	*0.23*	0.15	*0.12*	43.9	1.7
Dibromochloromethane	ug/kg	137000	137000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Dibromomethane	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Ethyl Benzene	mg/kg	35200	508	*0.012*	*0.011*	*0.013*	*0.013*	*0.034*	*0.014*	*0.014*	*0.011*	*0.01*	*0.011*	*0.015*	*0.029*	*0.014*	*0.015*	*0.012*	*0.027*
Iron	mg/kg			34400	17300	21300	32500	32200	32800	37500	13100	30500	17600	64000	32800	25100	42500	16900	23100
Fluorene	mg/kg	12600	125	0.16	0.18	1.04	1.37	0.23	1.96	0.26	*0.08*	*0.08*	*0.09*	0.68	0.35	*0.11*	*0.12*	107	5.03
Fluoranthene	mg/kg	13000	18.9	11.42	2.2	8.2	15.9	0.98	8.07	10.96	*0.08*	*0.08*	1	38.8	3.59	2.05	0.67	720	37.1
Hexachlorobutadiene	ug/kg			*2*	*2*	*3*	*3*	*3*	*3*	*3*	*2*	*2*	*2*	*3*	*6*	*3*	*3*	*2*	*5*
Mercury (MS)	mg/kg	4.3	4.3	1.04	*0.5*	*0.52*	0.87	*0.52*	*0.54*	0.54	*0.5*	*0.5*	*0.5*	*0.5*	*0.53*	*0.6*	*0.5*	0.69	*0.46*
Indeno(1,2,3-cd)pyrene	mg/kg	34.4	0.0614	10.53	0.82	1.76	7.4	0.3	1.74	3.57	*0.08*	*0.08*	0.21	5.45	0.41	0.6	*0.12*	125	6.57
iso-Propylbenzene	ug/kg	34900000	388000	*1*	*1*	*1*	3	*1*	1	*1*	*1*	*1*	*1*	*2*	*3*	*1*	12	*1*	*3*
MTBE	ug/kg	85500000	17400000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
m and p-Xylene	mg/kg	58800	613	*0.012*	*0.011*	*0.013*	0.015	*0.034*	*0.014*	*0.014*	*0.011*	*0.01*	*0.011*	*0.015*	*0.029*	*0.014*	*0.015*	*0.012*	*0.027*
Naphthalene	mg/kg	5420	75	0.16	0.16	0.49	10.43	0.18	1.44	*0.12*	*0.08*	*0.08*	*0.09*	1.26	0.23	*0.11*	*0.12*	41.9	2.28
n-Butylbenzene	ug/kg			*1*	*1*	*1*	3	*1*	1	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	9	*3*
Nickel (MS)	mg/kg	3070	3070	21.7	13	15.6	30.2	40	36	27	9.5	36.5	11.8	20.3	42.7	22.1	29.3	13.4	30.9
Propylbenzene	ug/kg	35600000	399000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
o-Xylene	mg/kg	60800	467	*0.012*	*0.011*	*0.013*	*0.013*	*0.034*	*0.014*	*0.014*	*0.011*	*0.01*	*0.011*	*0.015*	*0.029*	*0.014*	*0.015*	*0.012*	*0.027*
Total PAHs (USEPA 16)	mg/kg			113.8	12.65	*44.61*	110.66	*5.67*	45.61	*52.33*	*1.34*	*1.28*	*6.13*	175.48	*16*	*11.41*	*3.76*	3972.25	200.16
Lead	mg/kg	1590	1590	354	131.1	112.3	396.4	58.3	158	478.8	4.7	28.4	50.8	4350	146.2	89.7	37	118.6	23.9
Phenol Index	mg/kg			*0.6*	*0.6*	*0.6*	*0.7*	*0.7*	*0.7*	*0.7*	*0.5*	*0.5*	*0.6*	*0.8*	*1.4*	*0.7*	*0.7*	*0.6*	*1.4*
Phenanthrene	mg/kg			1.69	1.41	7.27	11.01	0.63	7.49	2.87	*0.08*	*0.08*	0.86	27.4	2.23	1.06	0.37	859	41
Total GRO	mg/kg			*0.2*	*0.2*	*0.3*	*0.3*	*0.7*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.3*	*0.6*	*0.3*	*0.3*	*0.2*	*0.5*
Pyrene	mg/kg	9710	2.2	12.3	1.94	6.41	12.5	0.78	6.1	8.36	*0.08*	*0.08*	0.79	26.8	2.14	1.27	0.4	554	28.3
Selenium (MS)	mg/kg	2320	2320	*0.5*	*0.5*	*0.5*	0.7	0.9	0.5	1.1	*0.5*	1.5	*0.5*	2.7	3.5	0.8	0.9	1	2.3
sec-Butylbenzene	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	3	*1*	*1*	*1*	*3*
Styrene	ug/kg	4220000	607000	*1*	*1*	*1*	4	1	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	1	*3*
trans 1,2-Dichloroethene	ug/kg	599000	599000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
trans 1,3-Dichloropropene	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Trichlorofluoromethane	ug/kg			2	88	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
tert-Butylbenzene	ug/kg			*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Tetrachloroethene	ug/kg	4340000	415000	10	*3*	5	*4*	27	21	*4*	*3*	*3*	*3*	*5*	*9*	*4*	*4*	*4*	*8*
Toluene	mg/kg	79300	835	*0.012*	*0.011*	*0.013*	*0.013*	*0.034*	*0.014*	*0.014*	*0.011*	*0.01*	*0.011*	*0.015*	0.032	*0.014*	*0.015*	*0.012*	*0.027*
Trichloroethene	ug/kg	251000	251000	6	2	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Vanadium (MS)	mg/kg	1410	1410	32.2	16.6	32	51.5	56	48.8	61.7	15	70.2	18.4	47.5	46.9	33.6	65.8	22.7	46
Vinyl Chloride	ug/kg	2450	2450	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Zinc (MS)	mg/kg	183000	183000	212.7	249	87.1	151.7	94	127.4	221.9	17.1	85	78.6	160.5	97	337.9	154.6	62.2	55
1,1,2,2-Tetrachloroethane	ug/kg	880000	880000	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*3*	*1*	*1*	*1*	*3*
Boron.	mg/kg			0.7	*0.5*	*0.5*	*0.5*	2.2	1.8	5.1	0.6	4.4	0.5	4.2	34	2	4.5	1	16.3
Benzene	ug/kg	42500	42500	*1*	*1*	*1*	109	10	1	3	*1*	*1*	*1*	6	17	3	3	7	8
Ethyl Benzene	ug/kg	35200000	508000	*2*	*2*	*3*	24	10	*3*	*3*	*2*	*2*	*2*	*3*	6	*3*	*3*	5	5
m and p-Xylene	ug/kg	58800000	613000	*5*	*5*	*5*	16	34	6	7	*4*	*4*	*5*	14	35	6	7	17	16
Naphthalene	ug/kg	5420000	75000	11	23	*6*	6740	281	213	13	*5*	*5*	*6*	117	209	8	13	2310	102
o-Xylene	ug/kg	60800000	467000	2	2	*3*	7	12	3	3	*2*	*2*	*2*	8	14	3	3	10	8
Toluene	ug/kg	79300000	835000	*6*	*6*	*6*	*7*	23	*7*	*7*	*5*	*5*	*6*	*8*	41	*7*	*7*	*6*	*14*
Total Sulphur.	%			0.152	0.078	0.351	0.218	0.604	0.41	0.144	0.072	0.072	0.128	1.854	2.326	0.567	0.615	2.01	1.95
Total Organic Carbon	%M/M						7.18												
Organic Matter	%																		12.95

Notes:
Numbers in italics are below method detection limit
Asbestos
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NAIIS No asbestos identified in sample

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Determinand	Unit	SSVs for Open Space Land Use - no free product	SSVs for Open Space Land Use - free product	NT TP03	NT TP03	NT TP03	NT TP04	NT TP04
				0.5	0.7	1.45	0.7	1.6
				Made Ground	Made Ground	Made Ground	Made Ground	Made Ground
				no	no	no	no	no
Asbestos Screen	N/A			NAIIS	CH	NAIIS	NAIIS	NAIIS
Moisture 105 DegC	%			12.4	15	17.3	18.3	23.6
pH units (AR)	pH Units			12	10.4	9	8.7	8.3
SO4-- (H2O sol) mg/l	mg/kg			472	4250	5520	5360	1740
1,1,1,2-Tetrachloroethane	ug/kg	660000	660000	*1*	*1*	*1*	*1*	*1*
1,1,1-Trichloroethane	ug/kg	203000000	1380000	*1*	*1*	*1*	*1*	*1*
1,1,2-Trichloroethane	ug/kg	506000	506000	*1*	*1*	*1*	*1*	*1*
1,1-Dichloropropene	ug/kg			*1*	*1*	*1*	*1*	*1*
1,1-Dichloroethane	ug/kg	57400000	1620000	*1*	*1*	*1*	*1*	*1*
1,1-Dichloroethene	ug/kg	1280000	1280000	*1*	*1*	*1*	*1*	*1*
1,2,3-Trichlorobenzene	ug/kg			3	4	4	4	4
1,2,3-Trichloropropane	ug/kg			*1*	*1*	*1*	*1*	*1*
1,2,4-Trichlorobenzene	ug/kg			*3*	*4*	4	*4*	*4*
1,2,4-Trimethylbenzene	ug/kg	149000	149000	1	6	7	*1*	*5*
1,2-Dibromo-3-chloropropa	ug/kg			*1*	*1*	*1*	*1*	*1*
1,2-Dichlorobenzene	ug/kg			*1*	*1*	*1*	*1*	*1*
1,2-Dichloroethane	ug/kg	8050	8050	*1*	*1*	*1*	*1*	*1*
cis 1,2-Dichloroethene	ug/kg	254000	254000	*6*	*6*	*6*	*6*	*7*
1,2-Dibromoethane	ug/kg			*1*	*1*	*1*	*1*	*1*
1,2-Dichloropropane	ug/kg	51700	51700	*1*	*1*	*1*	*1*	*1*
1,3,5-Trimethylbenzene	ug/kg			*1*	4	7	*1*	*1*
1,3-Dichlorobenzene	ug/kg			*1*	*1*	*1*	*1*	*1*
cis 1,3-Dichloropropene	ug/kg			*1*	*1*	*1*	*1*	*1*
1,3-Dichloropropane	ug/kg			*1*	*1*	*1*	*1*	*1*
1,4-Dichlorobenzene	ug/kg			*1*	*1*	*1*	*1*	*1*
2,2-Dichloropropane	ug/kg			*1*	*1*	*1*	*1*	*1*
2-Chlorotoluene	ug/kg			*1*	*1*	*1*	*1*	*1*
4-Chlorotoluene	ug/kg			*1*	*1*	*1*	*1*	*1*
p-Isopropyltoluene	ug/kg			*1*	*1*	*1*	*1*	*8*
Acenaphthylene	mg/kg			0.22	0.68	6.15	*0.1*	*0.1*
Acenaphthene	mg/kg	18400	157	0.47	3.3	4.79	*0.1*	0.12
Aliphatics >C8 - C10	mg/kg	21600	82.5	*5*	*5*	*5*	*5*	*5*
Aliphatics >C10 - C12	mg/kg	21700	49.9	*5*	*5*	*5*	*5*	*5*
Aliphatics >C12 - C16	mg/kg	21700	21	4.71	*5*	5.47	*5*	10.1
Aliphatics >C16 - C21	mg/kg			18.2	10.39	12.8	*5*	*5*
Aliphatics >C21 - C35	mg/kg			102.3	40	26.5	16	*11.47*
Aliphatics >C16 - 35	mg/kg	590000	590000	120.5	50.39	39.3	21	16.47
Anthracene	mg/kg	96600	3.48	1	4.74	40.5	0.2	0.5
Aromatics >C8 - C10	mg/kg	8040	614	*5*	*5*	*5*	*5*	*5*
Aromatics >C10 - C12	mg/kg	8560	370	*5*	6.78	17.9	*5*	*5*
Aromatics >C12 - C16	mg/kg	8700	155	6.11	28	105	*5*	10.14
Aromatics >C16 - C21	mg/kg	5380	5380	57	141	2220	9.52	35.5
Aromatics >C21 - C35	mg/kg	5380	5380	279	442	8380	61.1	72.1
Arsenic (MS)	mg/kg	138	138	111.1	143	510.6	0.5	356.9
Barium	mg/kg	5240	5240	75.1	109	192	244	145
Beryllium	mg/kg	903	903	0.52	1.59	2.3	2.24	0.64
Benzo(a)anthracene	mg/kg	28.7	1.71	12.4	20.1	495	1.51	1.54
Benzo(a)pyrene	mg/kg	3.7	0.911	10.41	16.9	209	1.51	1
Benzo(b)fluoranthene	mg/kg	35.5	1.22	13	19.1	353	2.26	1.7
Benzo(g,h,i)perylene	mg/kg	451	0.0187	5.9	9.05	79.6	1.25	0.75
Benzo(k)fluoranthene	mg/kg	381	0.686	3.66	5.92	95	0.76	0.67
Benzene	mg/kg	42.5	42.5	*0.011*	*0.012*	*0.012*	*0.012*	*0.013*
Bromobenzene	ug/kg	642000	642000	*1*	*1*	*1*	*1*	*1*
Bromochloromethane	ug/kg			*1*	*1*	*1*	*1*	*1*
Bromoform	ug/kg	1930000	1930000	*1*	*1*	*1*	*1*	*1*
Bromomethane	ug/kg			*1*	*1*	*1*	*1*	*1*
Bromodichloromethane	ug/kg	22200	22200	*1*	*1*	*1*	*1*	*1*
C6-C7	mg/kg			*0.2*	*0.2*	*0.2*	*0.2*	*0.3*
C7-C8	mg/kg			*0.2*	*0.2*	*0.2*	*0.2*	*0.3*
>C8 - C10	mg/kg			*0.2*	*0.2*	*0.2*	*0.2*	*0.3*
C5-C6	mg/kg			*0.2*	*0.2*	*0.2*	*0.2*	*0.3*
Chlorobenzene	ug/kg	17900000	651000	*1*	*1*	*1*	*1*	*1*

Notes:
Numbers in italics are below method detection limit
Asbestos
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NAIIS No asbestos identified in sample

Determinand	Unit	SSVs for Open Space Land Use - no free product	SSVs for Open Space Land Use - free product	NT TP03	NT TP03	NT TP03	NT TP04	NT TP04
				0.5	0.7	1.45	0.7	1.6
				Made Ground	Made Ground	Made Ground	Made Ground	Made Ground
				no	no	no	no	no
Cadmium (MS)	mg/kg	83.6	83.6	0.36	1.23	0.8	*0.2*	0.68
Chloroethane	ug/kg	988000000	2440000	*2*	*2*	*2*	*2*	*3*
Chloroform	ug/kg	1390000	1390000	*1*	*1*	*1*	*1*	3
Chloromethane	ug/kg	48000	48000	*3*	*4*	*4*	*4*	*4*
Chromium (MS)	mg/kg	729	729	16.9	20.5	22.3	*1.2*	10.2
Chrysene	mg/kg	3010	0.44	11.5	18	461	1.66	1.6
Carbon Tetrachloride	ug/kg	62800	62800	*1*	*1*	*1*	*1*	*1*
Copper (MS)	mg/kg	40600	40600	50.2	87.5	256.3	*1.6*	857.3
Dichlorodifluoromethane	ug/kg			*1*	*1*	*1*	*1*	*1*
Dibenzo(a,h)anthracene	mg/kg	3.96	0.00393	1.95	3.09	28.8	0.34	0.27
Dibromochloromethane	ug/kg	137000	137000	*1*	*1*	*1*	*1*	*1*
Dibromomethane	ug/kg			*1*	*1*	*1*	*1*	*1*
Ethyl Benzene	mg/kg	35200	508	*0.011*	*0.012*	*0.012*	*0.012*	*0.013*
Iron	mg/kg			17800	23300	41800	62100	53000
Fluorene	mg/kg	12600	125	0.32	2.79	12.2	*0.1*	0.16
Fluoranthene	mg/kg	13000	18.9	19	37.5	1400	2.53	2.96
Hexachlorobutadiene	ug/kg			*2*	*2*	*2*	*2*	*3*
Mercury (MS)	mg/kg	4.3	4.3	*0.5*	0.55	1.73	*0.5*	1.59
Indeno(1,2,3-cd)pyrene	mg/kg	34.4	0.0614	6.6	10.48	85.1	1.15	0.73
iso-Propylbenzene	ug/kg	34900000	388000	*1*	*1*	*1*	1	*1*
MTBE	ug/kg	85500000	17400000	*1*	*1*	*1*	*1*	*1*
m and p-Xylene	mg/kg	58800	613	*0.011*	0.02	*0.012*	*0.012*	*0.013*
Naphthalene	mg/kg	5420	75	0.18	4.55	15.5	*0.1*	*0.1*
n-Butylbenzene	ug/kg			*1*	*1*	*1*	*1*	*1*
Nickel (MS)	mg/kg	3070	3070	15.6	93	47.8	*2*	16.3
Propylbenzene	ug/kg	35600000	399000	*1*	*1*	*1*	*1*	*1*
o-Xylene	mg/kg	60800	467	*0.011*	*0.012*	*0.012*	*0.012*	*0.013*
Total PAHs (USEPA 16)	mg/kg			113.39	213.19	4861	*16.63*	*17.03*
Lead	mg/kg	1590	1590	107	216.3	443.8	*0.7*	557.1
Phenol Index	mg/kg			*0.6*	*0.6*	*0.6*	*0.6*	*0.7*
Phenanthrene	mg/kg			7.13	26.4	364	0.93	2.57
Total GRO	mg/kg			*0.2*	*0.2*	*0.2*	*0.2*	*0.3*
Pyrene	mg/kg	9710	2.2	19	30.9	1210	2.14	2.21
Selenium (MS)	mg/kg	2320	2320	*0.5*	0.8	1.5	*0.5*	2.6
sec-Butylbenzene	ug/kg			*1*	*1*	*1*	*1*	*1*
Styrene	ug/kg	4220000	607000	1	2	1	*1*	*3*
trans 1,2-Dichloroethene	ug/kg	599000	599000	*1*	*1*	*1*	*1*	*1*
trans 1,3-Dichloropropene	ug/kg			*1*	*1*	*1*	*1*	*1*
Trichlorofluoromethane	ug/kg			*1*	*1*	*1*	*1*	*1*
tert-Butylbenzene	ug/kg			*1*	*1*	*1*	*1*	*1*
Tetrachloroethene	ug/kg	4340000	415000	*3*	*4*	4	7	16
Toluene	mg/kg	79300	835	*0.011*	*0.012*	*0.012*	*0.012*	*0.013*
Trichloroethene	ug/kg	251000	251000	1	*1*	*1*	4	10
Vanadium (MS)	mg/kg	1410	1410	29.4	42.7	67.9	*0.6*	28
Vinyl Chloride	ug/kg	2450	2450	*1*	*1*	*1*	*1*	*1*
Zinc (MS)	mg/kg	183000	183000	55	193.7	291	*15.9*	245.1
1,1,2,2-Tetrachloroethane	ug/kg	880000	880000	*1*	*1*	*1*	*1*	*1*
Boron.	mg/kg			*0.5*	*0.5*	1.7	4.2	3.4
Benzene	ug/kg	42500	42500	*1*	2	2	*1*	*1*
Ethyl Benzene	ug/kg	35200000	508000	*2*	4	5	5	8
m and p-Xylene	ug/kg	58800000	613000	5	14	19	16	24
Naphthalene	ug/kg	5420000	75000	57	209	823	17	318
o-Xylene	ug/kg	60800000	467000	2	8	10	7	10
Toluene	ug/kg	79300000	835000	*6*	7	7	*6*	*7*
Total Sulphur.	%			0.181	0.227	0.542	0.843	0.816
Total Organic Carbon	%M/M			0.96				
Organic Matter	%							

Notes:
Numbers in italics are below method detection limit
Asbestos
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NAIIS No asbestos identified in sample

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Appendix D. CAT-WASTE^{SOIL} Output

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

CAT-WASTE SOIL

Classification Assessment Tool of Soil Wastes - Hazard Summary Sheet

McArdle ATKINS

Site Name	Silvertown Tunnel Crossing
Location	London
Site ID	F1
Job Number	5111977
Date	3/18/2013 1:17:47 PM
User Name	gemma.buss@atkinsglobal.com
Company Name	Atkins

Hole ID	Sample Depth	Hazardous Waste Y/N	H1	H2	H3A	H3B	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	H15
NIT BH01	0.5m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NIT BH09A	2.6m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NIT BH09G	4.7m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NIT TP05	0.3m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NIT TP07	2.0m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NIT BH01	0.5m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NT BH02	3.0m	Y	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No
NT DS01	2.0m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NT DS02F	1.3m	Y	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No
NT DS02F	4.0m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NT TP03	0.5m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NT TP03	0.7m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
NT TP03	1.45m	Y	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No
NT TP04	1.6m	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

This document forms part of the Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations (April 2013) Report.

Atkins Limited
Epsom Gateway
2 Ashley Avenue
Epsom
Surrey
KT18 5AL

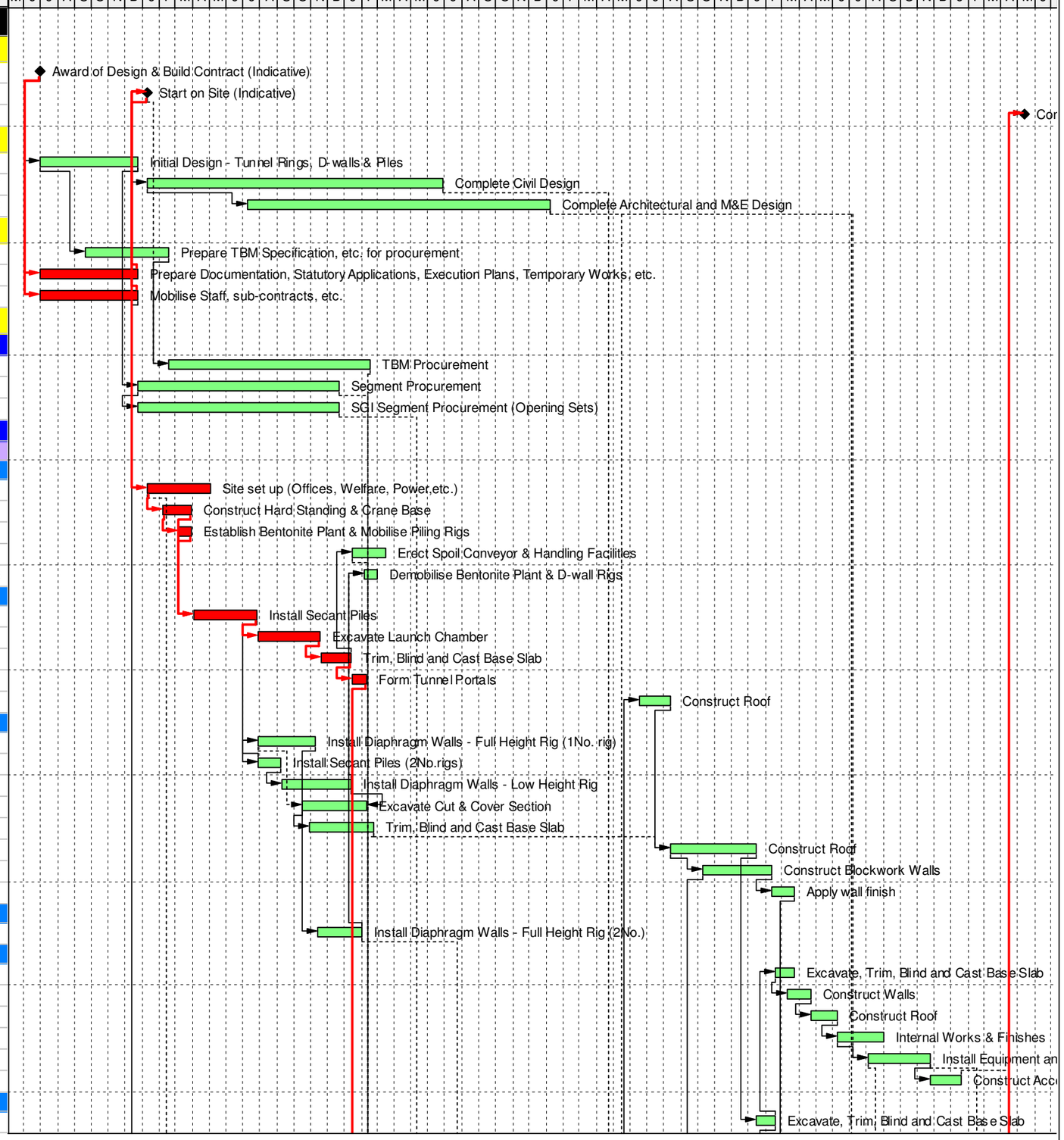
© Atkins Ltd except where stated otherwise.

The Atkins logo, ‘Carbon Critical Design’ and the strapline ‘Plan Design Enable’ are trademarks of Atkins Ltd.

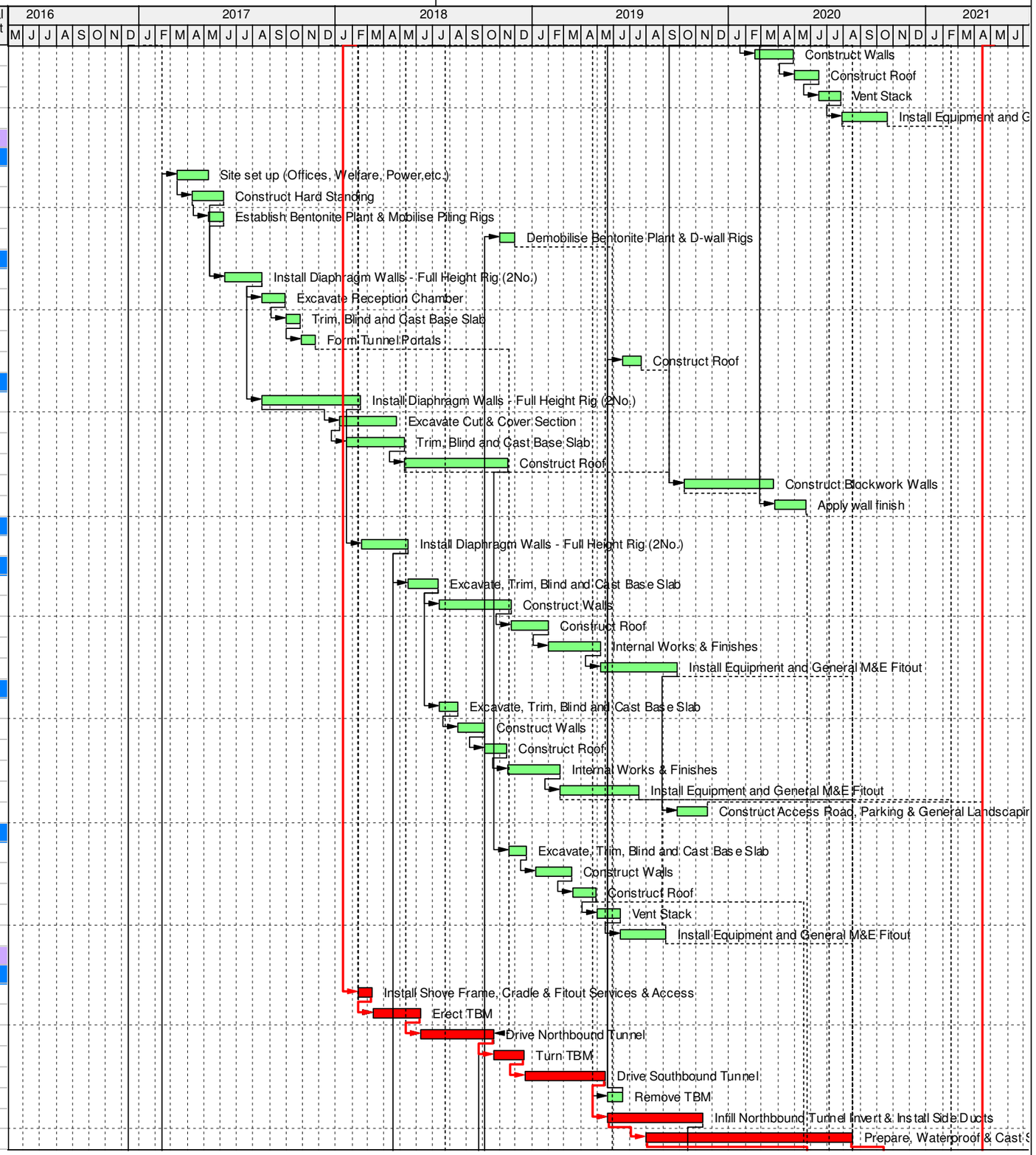
Appendix E: Works Programme and Construction Phasing Drawings

Title	Reference
Silvertown Tunnel: Tunnelling and Highways Programme	
NORTH5C – Construction Sequence Phase 1	5110309-HW-GA-0220
NORTH5C – Construction Sequence Phase 2	5110309-HW-GA-0221
NORTH5C – Construction Sequence Phase 3	5110309-HW-GA-0222
SOUTH4A – Construction Sequence Phase 1	5110309-HW-UT-0119
SOUTH4A – Construction Sequence Phase 2	5110309-HW-UT-0120
SOUTH4A – Construction Sequence Phase 3	5110309-HW-UT-0121
SOUTH4A – Construction Sequence Phase 4	5110309-HW-UT-0122

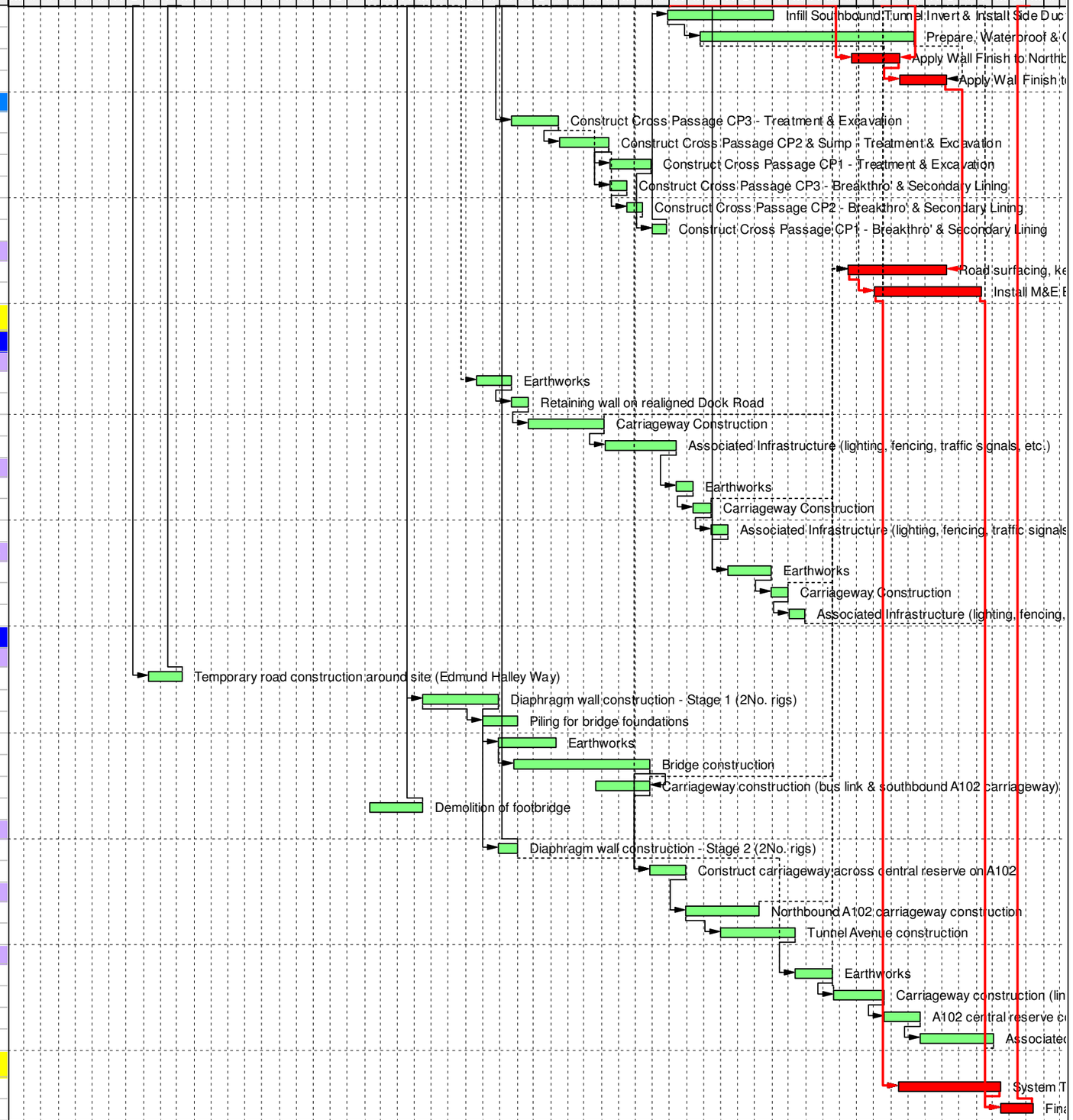
Activity ID	Activity Name	Remaining Duration	Start	Finish	Total Float
Silvertown Crossing Study		1197	30-Jun-16	13-May-21	0
Key Dates		1197	30-Jun-16	13-May-21	0
KD.1000	Award of Design & Build Contract (Indicative)	0	30-Jun-16*		0
KD.1010	Start on Site (Indicative)	0	09-Jan-17*		0
KD.1020	Construction Completion & Handover	0		13-May-21	0
Design		617	30-Jun-16	07-Jan-19	360
A1000	Initial Design - Tunnel Rings, D-walls & Piles	126	30-Jun-16	23-Dec-16	15
A1010	Complete Civil Design	365	09-Jan-17	28-Jun-18	217
A1020	Complete Architectural and M&E Design	365	10-Jul-17	07-Jan-19	360
Preconstruction		156	30-Jun-16	17-Feb-17	15
PC1000	Prepare TBM Specification, etc. for procurement	100	19-Sep-16	17-Feb-17	15
PC1010	Prepare Documentation, Statutory Applications, Execution Plans, Te	126	30-Jun-16	23-Dec-16	0
PC1020	Mobilise Staff, sub-contracts, etc.	126	30-Jun-16	23-Dec-16	0
Tunnel Works		1007	24-Dec-16	09-Feb-21	64
Construction Procurement		421	24-Dec-16	17-Feb-18	110
PR.1000	TBM Procurement	365	18-Feb-17	17-Feb-18	22
PR.1010	Segment Procurement	365	24-Dec-16	23-Dec-17	78
PR.1020	SGI Segment Procurement (Opening Sets)	365	24-Dec-16	23-Dec-17	166
Construction		1007	09-Jan-17	09-Feb-21	64
Silvertown		992	09-Jan-17	19-Jan-21	79
Site Preparatory Works		295	09-Jan-17	16-Mar-18	776
ST.1050	Site set up (Offices, Welfare, Power,etc.)	80	09-Jan-17	03-May-17	0
ST.1060	Construct Hard Standing & Crane Base	40	06-Feb-17	31-Mar-17	0
ST.1070	Establish Bentonite Plant & Mobilise Piling Rigs	20	06-Mar-17	31-Mar-17	0
ST.1080	Erect Spoil Conveyor & Handling Facilities	45	15-Jan-18	16-Mar-18	20
ST.1090	Demobilise Bentonite Plant & D-wall Rigs	20	05-Feb-18	02-Mar-18	786
TBM Launch Chamber		582	03-Apr-17	12-Aug-19	9
ST.1100	Install Secant Piles	80	03-Apr-17	27-Jul-17	0
ST.1110	Excavate Launch Chamber	80	28-Jul-17	17-Nov-17	0
ST.1120	Trim, Blind and Cast Base Slab	30	20-Nov-17	12-Jan-18	0
ST.1130	Form Tunnel Portals	20	15-Jan-18	09-Feb-18	0
ST.1140	Construct Roof	40	18-Jun-19	12-Aug-19	9
Cut and Cover		652	28-Jul-17	24-Mar-20	20
ST.1150	Install Diaphragm Walls - Full Height Rig (1No. rig)	75	28-Jul-17	10-Nov-17	25
ST.1160	Install Secant Piles (2No.rigs)	30	28-Jul-17	08-Sep-17	10
ST.1170	Install Diaphragm Walls - Low Height Rig	80	11-Sep-17	12-Jan-18	10
ST.1180	Excavate Cut & Cover Section	75	16-Oct-17	09-Feb-18	10
ST.1190	Trim, Blind and Cast Base Slab	75	30-Oct-17	23-Feb-18	10
ST.1200	Construct Roof	100	13-Aug-19	14-Jan-20	9
ST.1210	Construct Blockwork Walls	80	09-Oct-19	11-Feb-20	20
ST.1220	Apply wall finish	30	12-Feb-20	24-Mar-20	20
Retained Cut		50	13-Nov-17	02-Feb-18	207
ST.1230	Install Diaphragm Walls - Full Height Rig (2No.)	50	13-Nov-17	02-Feb-18	207
Tunnel Services Building (STSB Building)		225	19-Feb-20	19-Jan-21	79
ST.1260	Excavate, Trim, Blind and Cast Base Slab	25	19-Feb-20	24-Mar-20	9
ST.1270	Construct Walls	30	11-Mar-20	23-Apr-20	9
ST.1280	Construct Roof	30	24-Apr-20	08-Jun-20	9
ST.1290	Internal Works & Finishes	60	09-Jun-20	01-Sep-20	9
ST.1300	Install Equipment and General M&E Fitout	80	04-Aug-20	24-Nov-20	9
ST.1310	Construct Access Road, Parking & General Landscaping	30	25-Nov-20	19-Jan-21	79
Vent Station		195	15-Jan-20	20-Oct-20	14
ST.1320	Excavate, Trim, Blind and Cast Base Slab	25	15-Jan-20	18-Feb-20	9



Activity ID	Activity Name	Remaining Duration	Start	Finish	Total Float
ST.1330	Construct Walls	50	19-Feb-20	30-Apr-20	14
ST.1340	Construct Roof	30	01-May-20	15-Jun-20	14
ST.1350	Vent Stack	30	16-Jun-20	27-Jul-20	14
ST.1360	Install Equipment and General M&E Fitout	60	28-Jul-20	20-Oct-20	14
Greenwich		787	13-Mar-17	22-May-20	239
Site Preparatory Works		429	13-Mar-17	29-Nov-18	142
GR.1000	Site set up (Offices, Welfare, Power,etc.)	40	13-Mar-17	10-May-17	7
GR.1010	Construct Hard Standing	40	10-Apr-17	08-Jun-17	7
GR.1020	Establish Bentonite Plant & Mobilise Piling Rigs	20	11-May-17	08-Jun-17	7
GR.1030	Demobilise Bentonite Plant & D-wall Rigs	20	02-Nov-18	29-Nov-18	142
TBM Reception Chamber		522	09-Jun-17	22-Jul-19	105
GR.1040	Install Diaphragm Walls - Full Height Rig (2No.)	50	09-Jun-17	17-Aug-17	7
GR.1050	Excavate Reception Chamber	30	18-Aug-17	29-Sep-17	216
GR.1060	Trim, Blind and Cast Base Slab	20	02-Oct-17	27-Oct-17	216
GR.1070	Form Tunnel Portals	20	30-Oct-17	24-Nov-17	216
GR.1080	Construct Roof	25	18-Jun-19	22-Jul-19	105
Cut and Cover		677	18-Aug-17	22-May-20	20
GR.1100	Install Diaphragm Walls - Full Height Rig (2No.)	120	18-Aug-17	16-Feb-18	7
GR.1110	Excavate Cut & Cover Section	75	08-Jan-18	24-Apr-18	251
GR.1120	Trim, Blind and Cast Base Slab	75	22-Jan-18	09-May-18	251
GR.1130	Construct Roof	135	10-May-18	16-Nov-18	251
GR.1140	Construct Blockwork Walls	110	09-Oct-19	24-Mar-20	50
GR.1150	Apply wall finish	40	25-Mar-20	22-May-20	20
Retained Cut		59	19-Feb-18	15-May-18	7
GR.1160	Install Diaphragm Walls - Full Height Rig (2No.)	59	19-Feb-18	15-May-18	7
Tunnel Fire Tanks and Pump Rooms Building		340	16-May-18	26-Sep-19	237
GR.1310	Excavate, Trim, Blind and Cast Base Slab	40	16-May-18	11-Jul-18	237
GR.1320	Construct Walls	95	12-Jul-18	22-Nov-18	237
GR.1330	Construct Roof	40	23-Nov-18	31-Jan-19	237
GR.1340	Internal Works & Finishes	65	01-Feb-19	07-May-19	237
GR.1350	Install Equipment and General M&E Fitout	100	08-May-19	26-Sep-19	237
Tunnel Services Building (PTSB Building)		340	12-Jul-18	21-Nov-19	357
GR.1200	Excavate, Trim, Blind and Cast Base Slab	25	12-Jul-18	15-Aug-18	357
GR.1210	Construct Walls	35	16-Aug-18	04-Oct-18	357
GR.1220	Construct Roof	30	05-Oct-18	15-Nov-18	357
GR.1230	Internal Works & Finishes	60	16-Nov-18	21-Feb-19	357
GR.1240	Install Equipment and General M&E Fitout	100	22-Feb-19	17-Jul-19	357
GR.1250	Construct Access Road, Parking & General Landscaping	40	27-Sep-19	21-Nov-19	357
Vent Station		195	19-Nov-18	06-Sep-19	251
GR.1260	Excavate, Trim, Blind and Cast Base Slab	25	19-Nov-18	21-Dec-18	251
GR.1270	Construct Walls	50	07-Jan-19	15-Mar-19	251
GR.1280	Construct Roof	30	18-Mar-19	30-Apr-19	251
GR.1290	Vent Stack	30	01-May-19	13-Jun-19	251
GR.1300	Install Equipment and General M&E Fitout	60	14-Jun-19	06-Sep-19	251
Bored Tunnel		702	12-Feb-18	08-Dec-20	0
Tunnel Construction		702	12-Feb-18	08-Dec-20	0
BT.1000	Install Shove Frame, Cradle & Fitout Services & Access	20	12-Feb-18	09-Mar-18	0
BT.1010	Erect TBM	60	12-Mar-18	07-Jun-18	0
BT.1020	Drive Northbound Tunnel	96	08-Jun-18	22-Oct-18	0
BT.1030	Turn TBM	40	23-Oct-18	17-Dec-18	0
BT.1040	Drive Southbound Tunnel	96	18-Dec-18	17-May-19	0
BT.1050	Remove TBM	20	20-May-19	17-Jun-19	9
BT.1060	Infill Northbound Tunnel Invert & Install Side Ducts	126	20-May-19	13-Nov-19	0
BT.1070	Prepare, Waterproof & Cast Secondary Lining to Northbound Tunne	260	30-Jul-19	17-Aug-20	0



Activity ID	Activity Name	Remaining Duration	Start	Finish	Total Float
BT.1080	Infill Southbound Tunnel Invert & Install Side Ducts	126	29-Jul-19	04-Feb-20	1
BT.1090	Prepare, Waterproof & Cast Secondary Lining to Southbound Tunne	260	24-Sep-19	12-Oct-20	1
BT.1100	Apply Wall Finish to Northbound Tunnel	60	23-Jun-20	15-Sep-20	0
BT.1110	Apply Wall Finish to Southbound Tunnel	60	16-Sep-20	08-Dec-20	0
Cross Passages		185	23-Oct-18	26-Jul-19	1
CP.1020	Construct Cross Passage CP3 - Treatment & Excavation	50	23-Oct-18	14-Jan-19	1
CP.1050	Construct Cross Passage CP2 & Sump - Treatment & Excavation	65	15-Jan-19	15-Apr-19	1
CP.1070	Construct Cross Passage CP1 - Treatment & Excavation	50	16-Apr-19	28-Jun-19	1
CP.1110	Construct Cross Passage CP3 - Breakthro' & Secondary Lining	20	16-Apr-19	16-May-19	11
CP.1160	Construct Cross Passage CP2 - Breakthro' & Secondary Lining	20	17-May-19	14-Jun-19	11
CP.1200	Construct Cross Passage CP1 - Breakthro' & Secondary Lining	20	01-Jul-19	26-Jul-19	1
General Works		161	15-Jun-20	09-Feb-21	0
GW.1000	Road surfacing, kerbs, footways, fire protection, etc.	126	15-Jun-20	08-Dec-20	0
GW.1010	Install M&E Equipment	126	03-Aug-20	09-Feb-21	0
Highway Infrastructure Works		1024	09-Jan-17	04-Mar-21	7
Silvertown Site		396	20-Aug-18	31-Mar-20	234
Phase 1		241	20-Aug-18	12-Aug-19	71
HWS.1000	Earthworks	45	20-Aug-18	22-Oct-18	71
HWS.1010	Retaining wall on realigned Dock Road	22	23-Oct-18	21-Nov-18	71
HWS.1020	Carriageway Construction	87	22-Nov-18	05-Apr-19	71
HWS.1030	Associated Infrastructure (lighting, fencing, traffic signals, etc.)	87	08-Apr-19	12-Aug-19	71
Phase 2		66	13-Aug-19	13-Nov-19	71
HWS.2000	Earthworks	22	13-Aug-19	12-Sep-19	71
HWS.2010	Carriageway Construction	22	13-Sep-19	14-Oct-19	71
HWS.2020	Associated Infrastructure (lighting, fencing, traffic signals, etc.)	22	15-Oct-19	13-Nov-19	71
Phase 3		89	14-Nov-19	31-Mar-20	234
HWS.3000	Earthworks	45	14-Nov-19	29-Jan-20	71
HWS.3010	Carriageway Construction	22	30-Jan-20	28-Feb-20	71
HWS.3020	Associated Infrastructure (lighting, fencing, traffic signals, etc.)	22	02-Mar-20	31-Mar-20	234
Greenwich Site		1024	09-Jan-17	04-Mar-21	7
Phase 1		609	09-Jan-17	26-Jun-19	7
HWG.1000	Temporary road construction around site (Edmund Halley Way)	45	09-Jan-17	10-Mar-17	7
HWG.1010	Diaphragm wall construction - Stage 1 (2No. rigs)	95	16-May-18	27-Sep-18	7
HWG.1020	Piling for bridge foundations	45	31-Aug-18	01-Nov-18	7
HWG.1030	Earthworks	65	28-Sep-18	10-Jan-19	7
HWG.1040	Bridge construction	160	26-Oct-18	26-Jun-19	7
HWG.1050	Carriageway construction (bus link & southbound A102 carriageway	65	22-Mar-19	26-Jun-19	7
HWG.1060	Demolition of footbridge	65	09-Feb-18	15-May-18	7
Phase 2		225	28-Sep-18	29-Aug-19	7
HWG.2000	Diaphragm wall construction - Stage 2 (2No. rigs)	25	28-Sep-18	01-Nov-18	142
HWG.2010	Construct carriageway across central reserve on A102	45	27-Jun-19	29-Aug-19	7
Phase 3		130	30-Aug-19	12-Mar-20	7
HWG.3000	Northbound A102 carriageway construction	85	30-Aug-19	09-Jan-20	7
HWG.3010	Tunnel Avenue construction	85	01-Nov-19	12-Mar-20	7
Phase 4		240	13-Mar-20	04-Mar-21	7
HWG.4010	Earthworks	45	13-Mar-20	19-May-20	7
HWG.4020	Carriageway construction (links from A102 to tunnel portal)	65	20-May-20	19-Aug-20	7
HWG.4030	A102 central reserve construction	45	20-Aug-20	22-Oct-20	7
HWG.4040	Associated infrastructure (lighting, fencing, traffic signals, etc)	85	23-Oct-20	04-Mar-21	7
Commissioning & Testing		160	15-Sep-20	13-May-21	0
CT.1000	System Testing & Commissioning	120	15-Sep-20	15-Mar-21	0
CT.1010	Final Integrated Testing, Commissioning and Handover	40	16-Mar-21	13-May-21	0



Rev B

Drawing Number 5110309/HW/GA/0220

Status P

DO NOT SCALE

100 0 10

A1

This drawing is to be read in conjunction with Section F of the *Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations* (April 2013) Report.

CAXTON STREET NORTH

PETO STREET NORTH

SILVERTOWN WAY

VICTORIA DOCK ROAD

TIDAL BASIN ROAD

TIDAL BASIN ROAD

DOCK ROAD

DOCKLANDS LIGHT RAILWAY

LOWER LEA CROSSING

DOCKLANDS LIGHT RAILWAY

NO THROUGH TRAFFIC DUE TO TUNNEL CONSTRUCTION

NORMAL ACCESS MAINTAINED WITH SOME RESTRICTIONS TO FACILITATE NEW CONSTRUCTION

CONSTRUCTION OF LOWER LEA CROSSING REALIGNMENT TO THE ROUNDABOUT

CONSTRUCTION OF ELONGATED CIRCULATORY CARRIAGEWAY

CONSTRUCTION OF THE LINK TO DOCK ROAD

POSSIBLE ACCESS TO WHARF TO BE AGREED

Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

KEY

- RETAINING WALL
- TRAFFIC
- HIGHWAY WORKS
- TUNNELING WORKS
- POSSIBLE ACCESS TO WHARF (TO BE AGREED)

Stat	Rev	Purpose of Issue	Date	Auth
P	B	FOR INFORMATION	24/04/13	PRM
P	A	INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	DESIGN AMENDED	DK	24/04/13	MF	PRM
A	ORIGINAL ISSUE	SEE	TITLE	BLOCK	

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
NONE

MAINTENANCE/CLEANING
NONE

USE
NONE

DECOMMISSIONING/DEMOLITION
NONE

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9–10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: NORTH 5C CONSTRUCTION SEQUENCE PHASE 1

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 05/10/12	MF Date 15/04/13	PRM Date 15/04/13

Status	Drawing Number	Rev
P	5110309/HW/GA/0220	B

File: 5110309_HW_GA_0220 RevB.dwg
Date: Apr 29, 2013 - 3:50pm
Plotted by: KELL9073

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\MK2 October 2012\5110309_HW_GA_0220 RevB.dwg

Rev B

Drawing Number 5110309/HW/GA/0221

Status P

DO NOT SCALE

A1

0 10 100

This drawing is to be read in conjunction with Section F of the *Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations* (April 2013) Report.

CAXTON STREET NORTH

PETO STREET NORTH

VICTORIA DOCK ROAD

TIDAL BASIN ROAD

SILVERTOWN WAY

DOCKLANDS LIGHT RAILWAY

LOWER LEA CROSSING

DOCK ROAD

Watersports Centre

Viaduct

Works

Warehouse

Mud

River Lea or Bow Creek

Thames Wharf

Script Yard

Royal Albert Dock

Victoria Dock

NO THROUGH TRAFFIC DUE TO TUNNEL CONSTRUCTION

BREAKOUT REDUNDANT CARRIAGEWAY

INSTALLATION OF TRAFFIC SIGNALS

COMPLETION OF SOUTHBOUND LINK

CONSTRUCTION OF SURFACE WATER STORAGE FACILITIES IN THE CENTRE ISLAND

POSSIBLE ACCESS TO WHARF TO BE AGREED

Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

KEY

- RETAINING WALL
- TRAFFIC
- HIGHWAY WORKS
- TUNNELING WORKS
- POSSIBLE ACCESS TO WHARF (TO BE AGREED)

Stat	Rev	Purpose of Issue	Date	Auth
P	B	FOR INFORMATION	24/04/13	PRM
P	A	INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	DESIGN AMENDED	DK	24/04/13	MF	PRM
A	ORIGINAL ISSUE	SEE TITLE BLOCK			

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9–10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: NORTH 5C CONSTRUCTION SEQUENCE PHASE 2

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 05/10/12	MF Date 15/04/13	PRM Date 15/04/13

Status P

Drawing Number 5110309/HW/GA/0221

Rev B

File: 5110309_HW_GA_0221 Rev B.dwg
Date: Apr 29, 2013 - 4:58pm
Plotted by: KELL9073

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\MK2 October 2012\5110309_HW_GA_0221 Rev B.dwg

Rev B

Drawing Number 5110309/HW/GA/0222

Status P

DO NOT SCALE

100 0 10

A1

This drawing is to be read in conjunction with Section F of the *Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations* (April 2013) Report.

CONSTRUCTION OF NORTH AND SOUTHBOUND CARRIAGEWAY LINK

NO THROUGH TRAFFIC DUE TO TUNNEL CONSTRUCTION

BREAKOUT REDUNDANT CARRIAGEWAY

PHASE 3 REQUIRES THE COMPLETION OF ALL EARTHWORKS OPERATIONS RELATED TO TUNNELLING WORKS

CONSTRUCTION OF REALIGNED DOCK ROAD

CAXTON STREET NORTH

PETO STREET NORTH

SILVERTOWN WAY

VICTORIA DOCK ROAD

TIDAL BASIN ROAD

DOCKLANDS LIGHT RAILWAY

LOWER LEA CROSSING

DOCK ROAD

Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, ©Crown Copyright. License Number 100020449

KEY

- RETAINING WALL
- TRAFFIC
- HIGHWAY WORKS
- TUNNELING WORKS

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 SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

Stat	Rev	Purpose of Issue	Date	Auth	Rev	Description	By	Date	Chk'd	Auth
P	B	FOR INFORMATION	24/04/13	PRM	B	DESIGN AMENDED	DK	24/04/13	MR	PRM
P	A	INFORMATION	SEE TITLE BLOCK		A	ORIGINAL ISSUE	SEE TITLE BLOCK			

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: NORTH 5C CONSTRUCTION SEQUENCE PHASE 3

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 15/04/13	MF Date 15/04/13	PRM Date 15/04/13

Status P

Drawing Number 5110309/HW/GA/0222

Rev B

File: 5110309_HW_GA_0222 Rev B.dwg

Date: Apr 29, 2013 - 5:00pm Plotted by: KELL9073

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\MK2 October 2012\5110309_HW_GA_0222 Rev B.dwg

Rev B

Drawing Number 5110309/HW/UT/0119

Status P

DO NOT SCALE

A1

0 10 100

File: 5110309_HW_GA_0119 rev B.dwg

Date: Apr 29, 2013 - 5:47pm Plotted by: KELL9073

This drawing is to be read in conjunction with Section F of the *Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations* (April 2013) Report.

TEMPORARY ROAD CONSTRUCTION TO PROVIDE AN ALTERNATIVE ROUTE TO THE SEVERED MILLENNIUM WAY

PARTIAL CONSTRUCTION OF THE BUS LINK

CONSTRUCT TURNING FACILITY AT THE SEVERED END OF MILLENNIUM WAY

TEMPORARY CLOSURE OF BOORD STREET EXCEPT FOR ACCESS

CONSTRUCTION OF DIAPHRAGM WALLS

CONSTRUCTION OF THE REALIGNED SOUTHBOUND A102 CARRIAGEWAY WITH TIE-IN TO THE EXISTING A102 AND NEW BRIDGE

PARTIAL CONSTRUCTION OF THE SOUTHBOUND CARRIAGEWAY FROM THE MERGE NOSING ONWARDS

CONSTRUCTION OF BRIDGE ABUTMENTS AND DECK

DEMOLITION OF THE FOOTBRIDGE

PROPOSED SILVERTOWN TUNNEL

EDMUND HALLEY WAY

MILLENNIUM WAY

BOORD STREET

BLACKWALL TUNNEL APPROACH

BLACKWALL TUNNEL APPROACH

Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

KEY

- RETAINING WALL
- TRAFFIC
- HIGHWAY WORKS
- ROAD CLOSURE
- TEMPORARY CONSTRUCTION FOR DIVERSION
- TUNNELING WORKS
- EXISTING FOOTBRIDGE TO BE DEMOLISHED

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION	
NONE	
MAINTENANCE/CLEANING	
NONE	
USE	
NONE	
DECOMMISSIONING/DEMOLITION	
NONE	

Stat	Rev	Purpose of Issue	Date	Auth
P	A	FOR INFORMATION	24/04/13	PRM
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	DESIGN AMENDED	DK	24/04/13	MF	PRM
A	ORIGINAL ISSUE	SEE TITLE BLOCK			

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: SOUTH 4A CONSTRUCTION SEQUENCE PHASE 1

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 12/04/13	MF Date 15/04/13	PRM Date 15/04/13

Status	Drawing Number	Rev
P	5110309/HW/UT/0119	B

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\Contract Drawings\D100\5110309_HW_GA_0119 rev B.dwg

Rev B

Status P

Drawing Number 5110309/HW/UT/0120

DO NOT SCALE

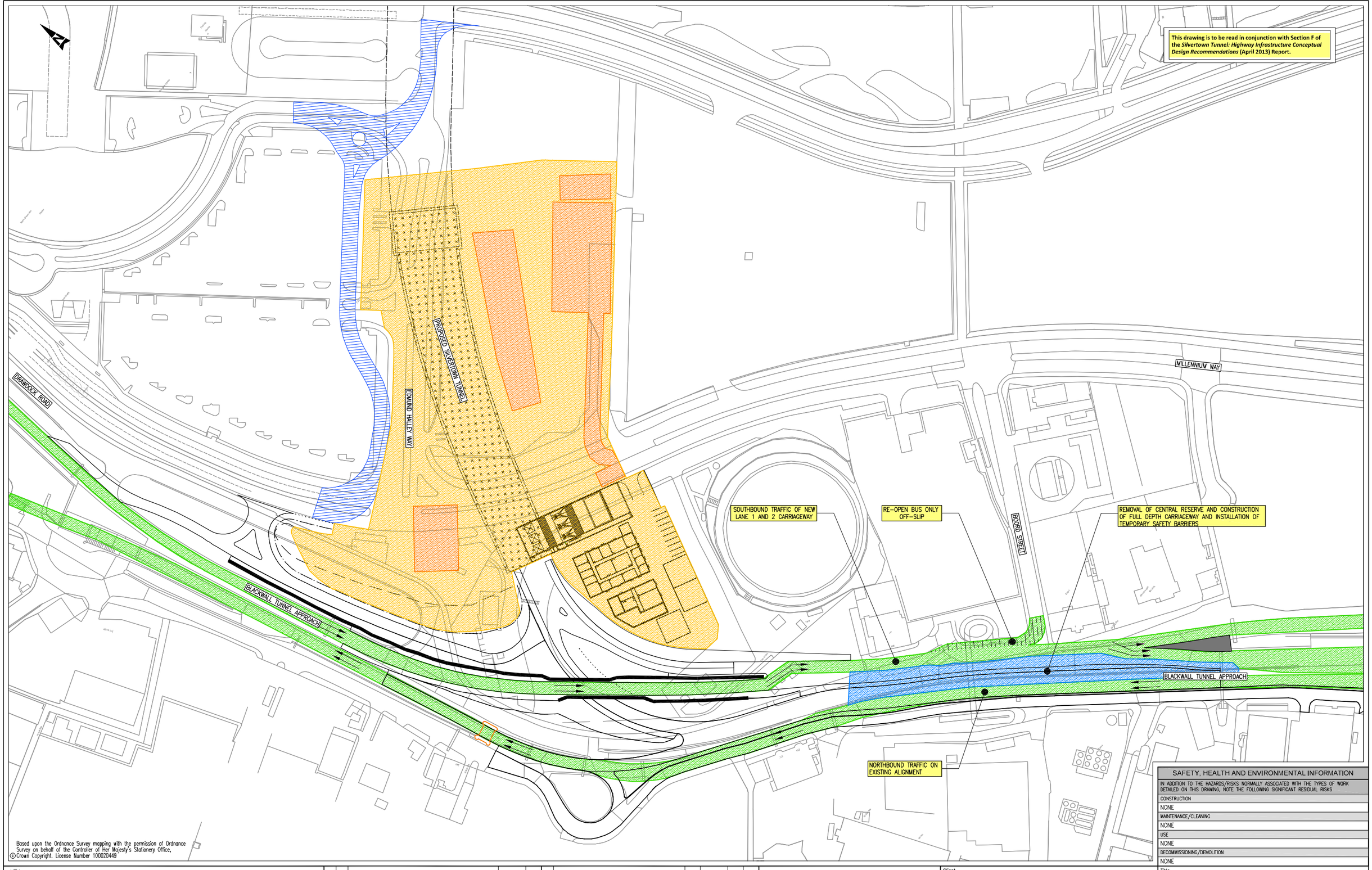
A1

0 10 100

File: 5110309_HW_GA_0120 rev B.dwg

Date: Apr 29, 2013 - 5:48pm Plotted by: KELL9073

This drawing is to be read in conjunction with Section F of the *Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations* (April 2013) Report.



Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

KEY

- RETAINING WALL
- TRAFFIC
- HIGHWAY WORKS
- TEMPORARY DIVERSION CARRIAGEWAY CONSTRUCTION FOR DIVERSION
- TUNNELING WORKS

Stat	Rev	Purpose of Issue	Date	Auth
P	A	FOR INFORMATION	24/04/13	PRM
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	DESIGN AMENDED	DK	24/04/13	MF	PRM
A	ORIGINAL ISSUE	SEE TITLE BLOCK			

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9–10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: SOUTH 4A CONSTRUCTION SEQUENCE PHASE 2

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 12/04/13	MF Date 12/04/13	PRM Date 12/04/13

Status	Drawing Number	Rev
P	5110309/HW/UT/0120	B

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\Contract Drawings\0100\5110309_HW_GA_0120 rev B.dwg

Rev B

Status P

Drawing Number 5110309/HW/UT/0121

DO NOT SCALE

A1

0 10 100

File: 5110309_HW_GA_0121 Rev B.dwg

Date: Apr 29, 2013 - 5:49pm

Plotted by: KELL9073

This drawing is to be read in conjunction with Section F of the *Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations* (April 2013) Report.

DRAWDOCK ROAD

BLACKWALL TUNNEL APPROACH

EDMUND HALLEY WAY

PROPOSED SILVERTOWN TUNNEL

MILLENNIUM WAY

BUS ONLY OFF-SLIP

BOORD STREET

BLACKWALL TUNNEL APPROACH

MAINTAIN ACCESS DURING WORKS

NORTHBOUND TRAFFIC DIVERTED ONTO ORIGINAL SOUTHBOUND CARRIAGEWAY REJOINING THE NORTHBOUND IMMEDIATELY BEFORE THE GATEWAY

WORKS TO CONNECT THE TWO SECTIONS OF TUNNEL AVENUE

REALIGNMENT OF NORTHBOUND CARRIAGEWAY

Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

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 SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

KEY

- RETAINING WALL
- TRAFFIC
- HIGHWAY WORKS
- TEMPORARY CONSTRUCTION FOR DIVERSION
- TUNNELING WORKS

Stat	Rev	Purpose of Issue	Date	Auth
P	B	FOR INFOMATION	24/04/13	PRM
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	DESIGN AMENDED	DK	24/04/13	MF	PRM
A	ORIGINAL ISSUE	SEE TITLE BLOCK			

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: SOUTH 4A CONSTRUCTION SEQUENCE PHASE 3

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 12/04/13	MF Date 12/04/13	PRM Date 12/04/13

Status	Drawing Number	Rev
P	5110309/HW/UT/0121	B

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\Contract Drawings\0100\5110309_HW_GA_0121 Rev B.dwg

Rev B

Status P

Drawing Number 5110309/HW/UT/0122

DO NOT SCALE

A1

0 10 100

File: 5110309_HW_GA_0122.dwg

Date: Apr 29, 2013 - 5:51pm

Plotted by: KELL9073

This drawing is to be read in conjunction with Section F of the *Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations* (April 2013) Report.

REINSTATEMENT OF MILLENNIUM WAY AND EDMUND HALLEY WAY

BUS ONLY LINK FOR BLACKWALL TUNNEL

PROPOSED SILVERTOWN TUNNEL

EDMUND HALLEY WAY

ALL OUTSTANDING FINISHES WILL BE COMPLETED DURING THIS PHASE

PHASE 4 REQUIRES THE EXCAVATION AND COMPLETION OF ALL EARTHWORKS OPERATIONS RELATED TO THE TUNNELING WORK

BLACKWALL TUNNEL APPROACH

CONSTRUCTION OF REINFORCED CONCRETE BASE SLAB

COMPLETION OF DIAPHRAGM WALLS

BUS ONLY SLIP TO BLACKWALL TUNNEL

BUS ONLY OFF-SLIP

CONSTRUCTION OF THE A102 CENTRAL RESERVE

ANY OTHER OUTSTANDING EARTHWORKS

MILLENNIUM WAY

BOORD STREET

Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

KEY

- RETAINING WALL
- TRAFFIC
- HIGHWAY WORKS
- TEMPORARY DIVERSION CARRIAGEWAY
- TUNNELING WORKS

Stat	Rev	Purpose of Issue	Date	Auth
P	B	FOR INFORMATION	24/04/13	PRM
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	NOTES AMENDED	SMC	24/04/13	MF	PRM
A	ORIGINAL ISSUE	SEE TITLE BLOCK			

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9–10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: SOUTH 4A CONSTRUCTION SEQUENCE PHASE 4

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	DK Date 12/04/13	MF Date 15/04/13	PRM Date 15/04/13

Status	Drawing Number	Rev
P	5110309/HW/UT/0122	B

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\Contract Drawings\0100\5110309_HW_GA_0122.dwg

Appendix F: Statutory Undertakers' Plant

Title	Reference
Statutory Undertakers Plant (North Junction)	5110309-HW-UT-0010
Statutory Undertakers Plant (South Junction)	5110309-HW-UT-0011
Statutory Undertakers Plant Diversion Plan (North Junction)	5110309-HW-UT-0028
Statutory Undertakers Plant Diversion Plan (South Junction)	5110309-HW-UT-0029

Rev A

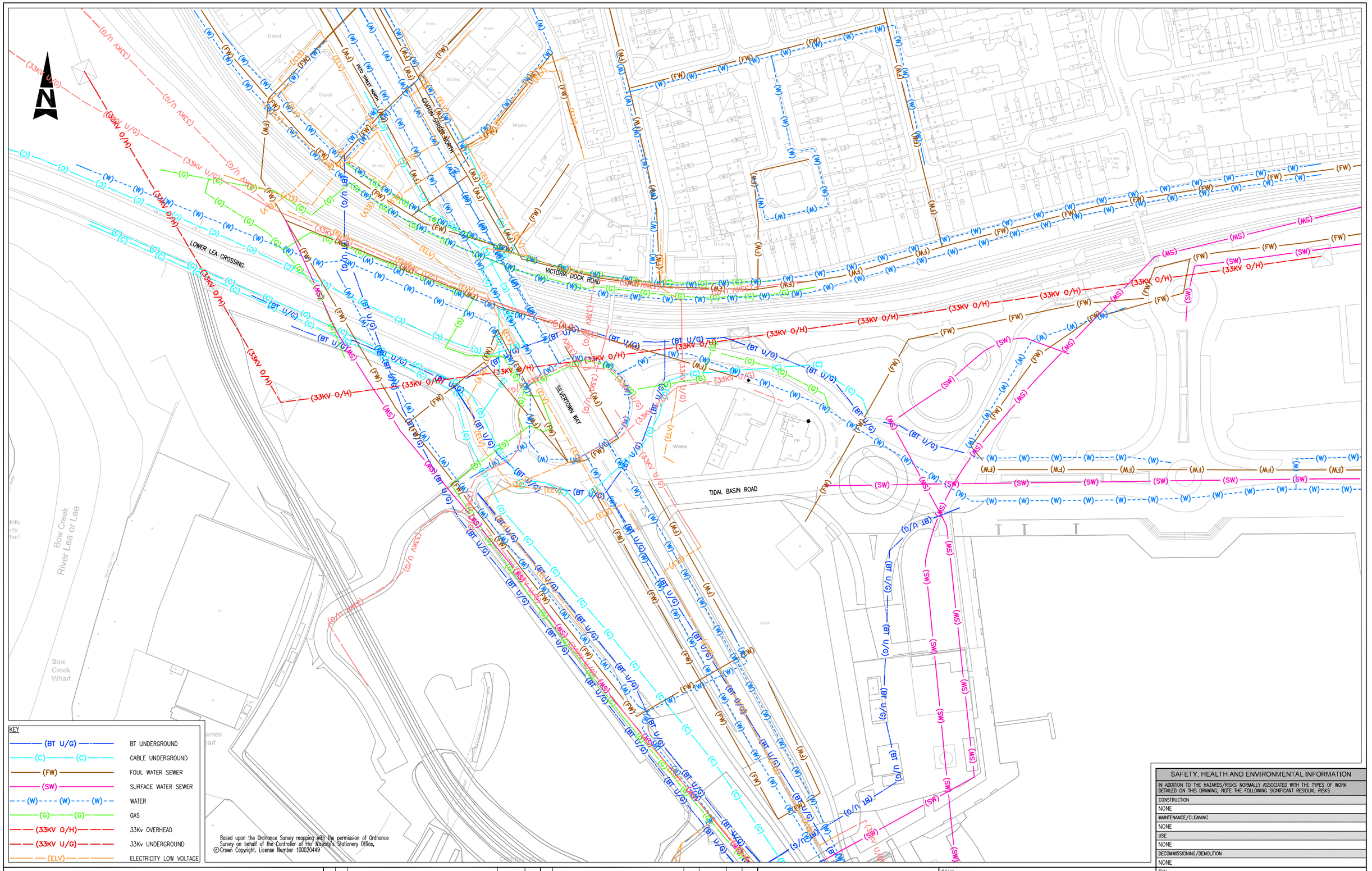
Drawing Number 5110309/HW/UT/0010

Status P

DO NOT SCALE

A1

0 10 100



KEY

(BT U/G)	BT UNDERGROUND
(C)	CABLE UNDERGROUND
(FW)	FOUL WATER SEWER
(SW)	SURFACE WATER SEWER
(W)	WATER
(G)	GAS
(33KV O/H)	33Kv OVERHEAD
(33KV U/G)	33Kv UNDERGROUND
(ELV)	ELECTRICITY LOW VOLTAGE

Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

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 SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

P	A	FOR INFORMATION	SEE	TITLE	BLOCK	A	ORIGINAL ISSUE	SEE	TITLE	BLOCK
Stat	Rev	Purpose of Issue		Date	Auth	Rev	Description		By	Date	Chk'd	Auth

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

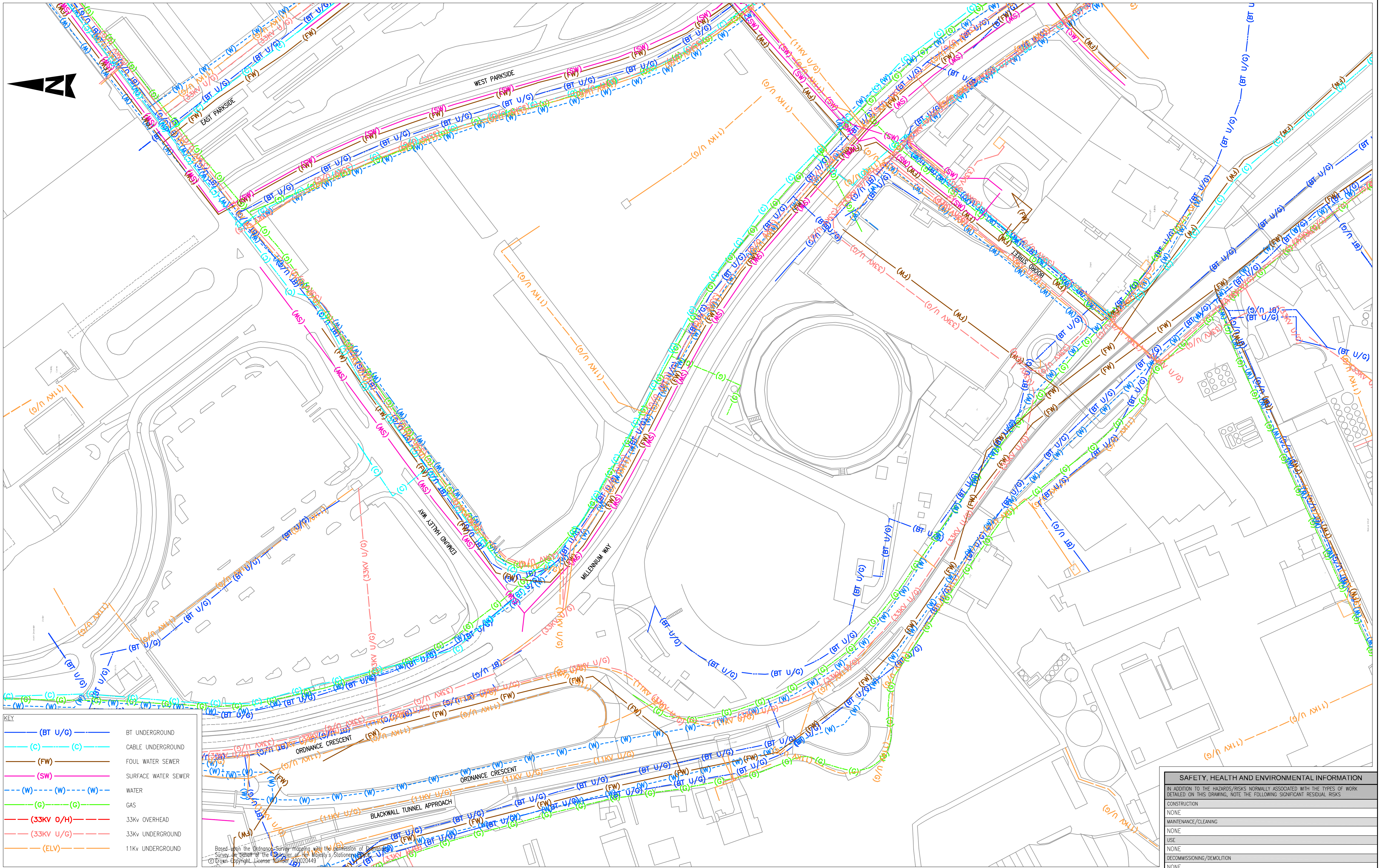
Title: (NORTH JUNCTION) STATUTORY UNDERTAKERS PLANT

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	MJG Date 05/04/12	MJC Date 16/05/12	MF Date 16/05/12

Status	Drawing Number	Rev
P	5110309/HW/UT/0010	A

File: 5110309_HW_UT_0010.dwg
Date: Apr 15, 2013 - 10:06pm
Plotted by: KELL9073

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\5110309_HW_UT_0010.dwg



Rev A | Drawing Number 5110309/HW/UT/0011 | Status P

DO NOT SCALE

A1

Plotted by: KELL9073

File: 5110309_HW_UT_0011.dwg

Date: Apr 15, 2013 - 10:07pm

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION	NONE
MAINTENANCE/CLEANING	NONE
USE	NONE
DECOMMISSIONING/DEMOLITION	NONE

Stat	Rev	Purpose of Issue	Date	Auth	Rev	Description	By	Date	Chk'd	Auth
P	A	FOR INFORMATION	SEE TITLE BLOCK		A	ORIGINAL ISSUE	SEE	TITLE	BLOCK	

ATKINS

Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: (SOUTH JUNCTION) STATUTORY UNDERTAKERS PLANT

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:1000	MJG Date 05/04/12	MJC Date 16/05/12	MF Date 16/05/12

Status	Drawing Number	Rev
P	5110309/HW/UT/0011	A

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\5110309_HW_UT_0011.dwg

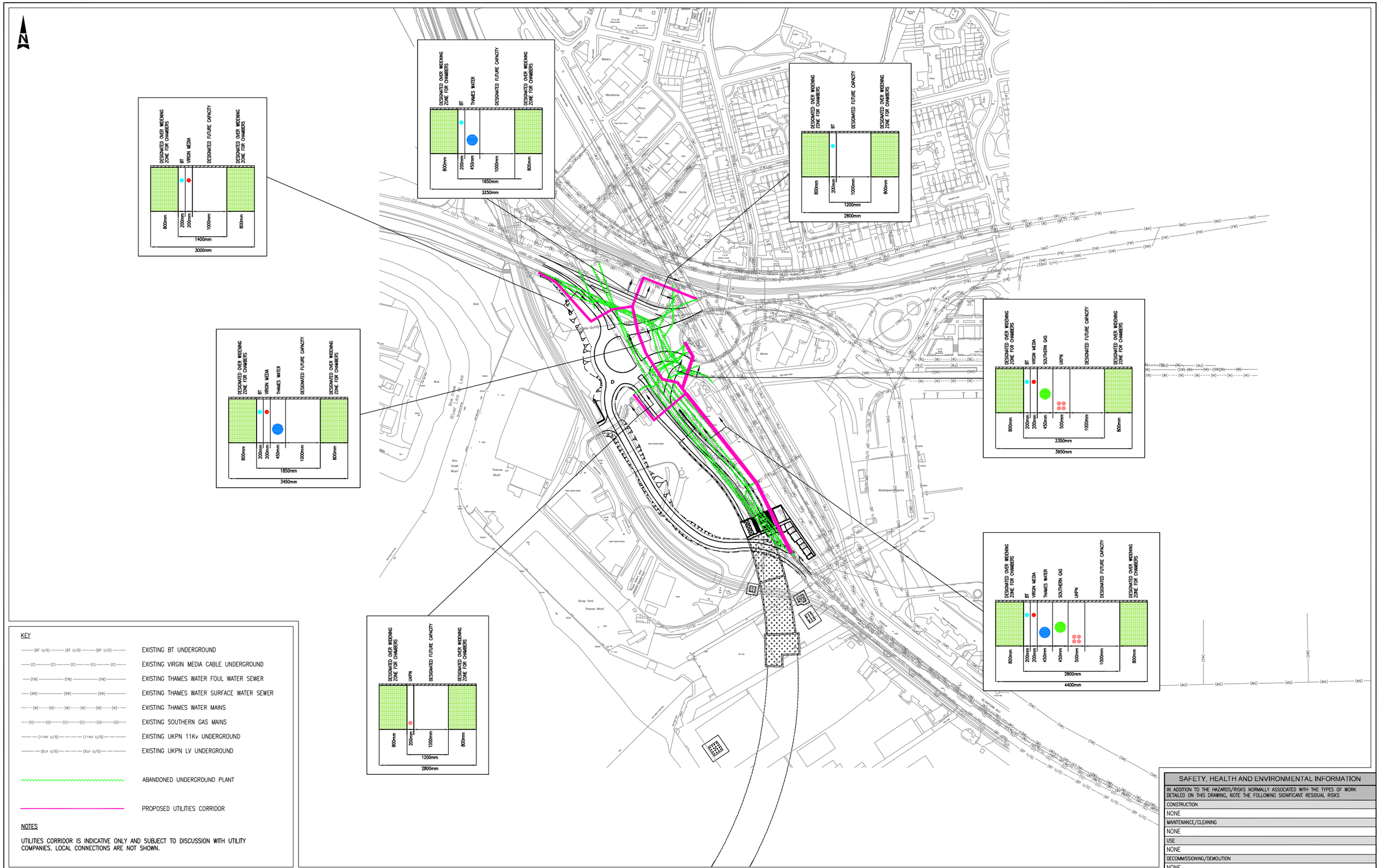
Rev B

Status P

Drawing Number 5110309/HW/UT/0028

DO NOT SCALE

A1 0 10 100



KEY

- EXISTING BT UNDERGROUND
- EXISTING VIRGIN MEDIA CABLE UNDERGROUND
- EXISTING THAMES WATER FOUL WATER SEWER
- EXISTING THAMES WATER SURFACE WATER SEWER
- EXISTING THAMES WATER MAINS
- EXISTING SOUTHERN GAS MAINS
- EXISTING UKPN 11Kv UNDERGROUND
- EXISTING UKPN LV UNDERGROUND
- ABANDONED UNDERGROUND PLANT
- PROPOSED UTILITIES CORRIDOR

NOTES

UTILITIES CORRIDOR IS INDICATIVE ONLY AND SUBJECT TO DISCUSSION WITH UTILITY COMPANIES. LOCAL CONNECTIONS ARE NOT SHOWN.

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

Stat	Rev	Purpose of Issue	Date	Auth
P	B	FOR INFORMATION	29/04/13	PRM
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	DESIGN AMENDED	DK	29/04/13	MF	PRM
A	ORIGINAL ISSUE	SEE	TITLE	BLOCK	

Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

Atkins Limited
Consulting Engineers,
Threadneedle House
9-10 Market Road
Chelmsford, Essex, England,
CM1 1XA
Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

©

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: STATUTORY UNDERTAKERS PLANT DIVERSION PLAN (NORTH JUNCTION)

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:2000	DK Date 02/04/13	MF Date 15/04/13	PRM Date 15/04/13

Status P

Drawing Number 5110309/HW/UT/0028

Rev B

File: 5110309_HW_UT_0028 Rev B.dwg
Date: Apr 29, 2013 - 4:28pm
Plotted by: KELL9073

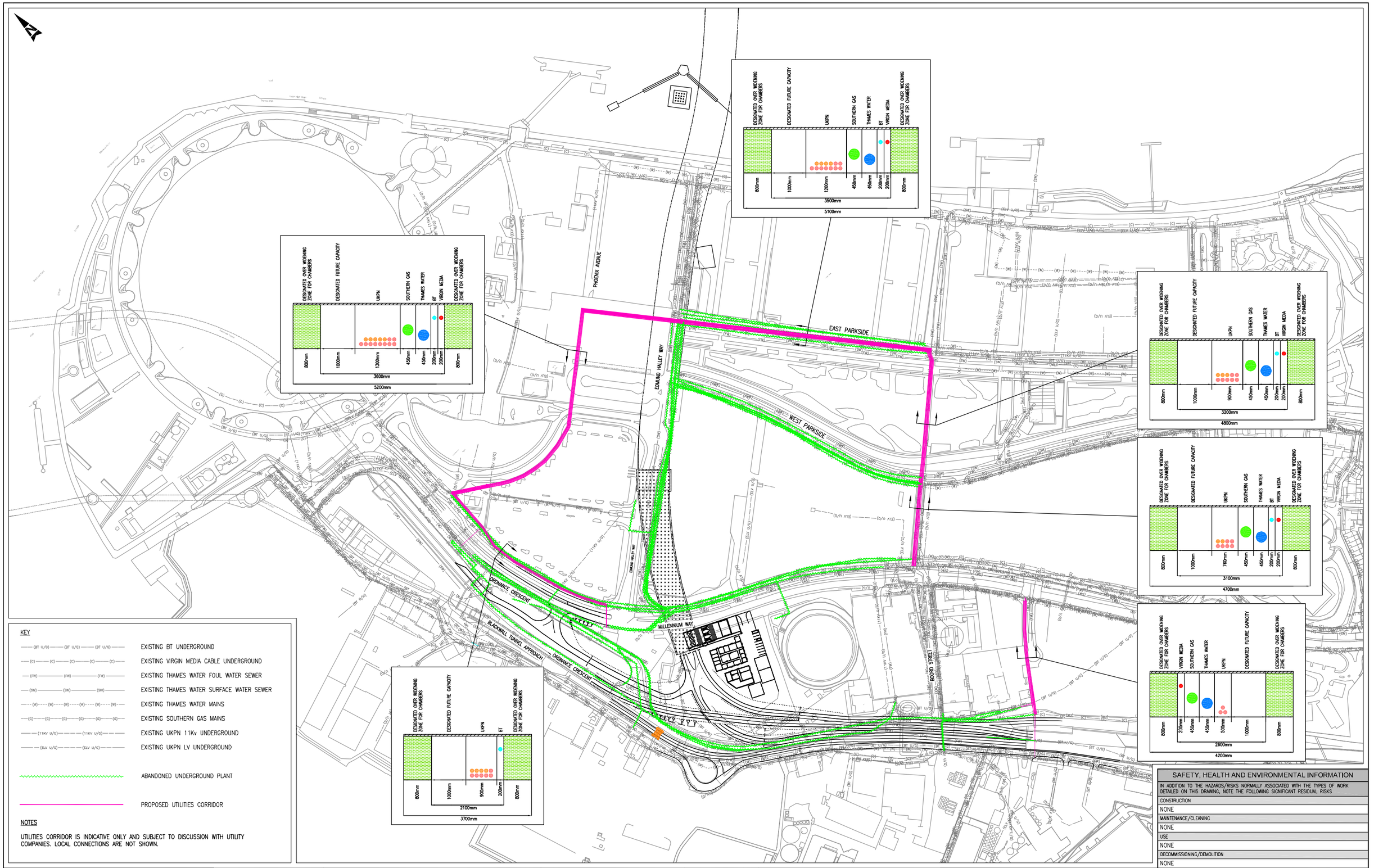
P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\5110309_HW_UT_0028 Rev B.dwg

Status P | Drawing Number 5110309/HW/UT/0029 | Rev B

DO NOT SCALE

A1

0 10 100



KEY

- EXISTING BT UNDERGROUND
- EXISTING VIRGIN MEDIA CABLE UNDERGROUND
- EXISTING THAMES WATER FOUL WATER SEWER
- EXISTING THAMES WATER SURFACE WATER SEWER
- EXISTING THAMES WATER MAINS
- EXISTING SOUTHERN GAS MAINS
- EXISTING UKPN 11Kv UNDERGROUND
- EXISTING UKPN LV UNDERGROUND
- ABANDONED UNDERGROUND PLANT
- PROPOSED UTILITIES CORRIDOR

NOTES

UTILITIES CORRIDOR IS INDICATIVE ONLY AND SUBJECT TO DISCUSSION WITH UTILITY COMPANIES. LOCAL CONNECTIONS ARE NOT SHOWN.

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 SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

Stat	Rev	Purpose of Issue	Date	Auth
P	B	FOR INFORMATION	29/04/13	PRM
P	A	FOR INFORMATION	SEE TITLE BLOCK	

Rev	Description	By	Date	Chk'd	Auth
B	DESIGN AMENDED	DK	29/04/13	MF	PRM
A	ORIGINAL ISSUE	SEE TITLE BLOCK			

ATKINS™

Atkins Limited
Consulting Engineers,
Threadneedle House
9–10 Market Road
Chelmsford, Essex, England,
CM1 1XA

Tel: (01245) 245245
Fax: (01245) 345010
www.atkinsglobal.com

© Based upon the Ordnance Survey mapping with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. License Number 100020449

Client: Transport for London

Project: SILVERTOWN CROSSING - HIGHWAYS

Title: STATUTORY UNDERTAKERS PLANT DIVERSION PLAN (SOUTH JUNCTION)

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:2000	DK Date 25/03/13	MF Date 15/04/13	PRM Date 15/04/13

Status	Drawing Number	Rev
P	5110309/HW/UT/0029	B

File: 5110309_HW_UT_0029 Rev B.dwg
Date: Apr 29, 2013 - 5:52pm
Plotted by: KELL9073

P:\GBCMA\HandT\TSol\AI\Projects\5110309_Silvertown_FROB3713\20_CAD\01_Drgs\01_Highways\5110309_HW_UT_0029 Rev B.dwg

Appendix G: Preliminary Works Cost Estimate

Preliminary Works Cost Estimate Summary Sheet

SILVERTOWN CROSSING			*BORED TUNNEL*
Section	**Code of Account Headings**		**VALUE**
Level	**1**	**2**	**£**
A	Roadworks	General	13,156,194
		Main carriageways	5,662,821
		Interchanges	
		Signage & Communication	
		Landscaping	
B	Structures - Bridges, Viaducts, etc	Piling	
		Substructure - Cut and cover and open cut section	95,644,965
		Substructure - Main & Approach Spans	
		Superstructure	
		Finishings	
C	Structures - Retaining Walls, Culverts, Subways,etc	Main Construction	
		Finishings	
D	Structures - Tunnels	Special prelims	
		Cut & Cover - Main Construction	
		Bored - Main Construction	187,711,709
		Immersed Tube - Main Construction	
E	Other Works (Inc Utilities)	General	
		Including Utilities	10,527,740
	Base Construction Cost : Sub-Total A		**312,703,429**
	Other Costs - e.g:	**% SAY**	
F	Preliminaries & General Items		60,626,017
G	Design (Assessed as 4% of Base Cost plus prelims and general items)		14,933,178
H	Testing & Commissioning		
J	Consultancy Charges		
K	Training		
L	Spares		
M	Other		
M1	Contractor's OH&P 10%	10% of Sub-Total A plus F	37,332,945
M2	Contractors Risk	10% of M1+F+Sub-Total A	41,066,239
		Sub - Total B	**153,958,378**
		Total Construction Cost C	**466,661,807**
OTHER	**Client Costs**	**% SAY**	
N	Project Management	Not included	
P	Possession / Isolation Management	Not included	
R	Compensation charges	Not included	
S	TWA Charges	Not included	
T	Land / Property Costs	Not included	
U	Escalation on Contractor's cost plus profit(Excludes Atkin's costs) (As per TfL e-mail dated 29052013) -1.00%	371,984,525	-3,719,845
V	Other (State)		
		Client Costs	**-3,719,845**
		Sub - Total D	**462,941,962**
X01	Mean cost from QRA	Not included in budget costing as discussed with TfL	-
	PROJECT BUDGET		**462,941,962**
X02	Plus contingency @	0%	-
	FIXED PRICE (If Applicable)		
X03	QRA @ P80	Not included in budget costing as discussed with TfL	-
	AUTHORITY VALUE		**462,941,962**

Preliminary Works Cost Estimate Build-Up

A	**ROADWORKS**					
A1	**General**					
			Qty	Unit	Rate	Amount
	Series 100: Preliminaries					
	General Items Build up					
	or					
	Percentage					
	Insurances.bonds		1	sum	17,777,593	17,777,593
	Specified requirements		1	sum	1,481,124	1,481,124
	Allowance for structural surveys		1	sum	135,000	135,000
	Allowance for instrumentation installation.		1	sum	1,000,000	1,000,000
	Supervision		1	sum	28,011,600	28,011,600
	ALLOWANCE FOR DIVERTING DRAIN		1	sum	10,000,000	10,000,000
	North					
	Traffic management			item		435,100.00
	South					
	Traffic management			item		1,185,600.00
	Traffic diversion			item		600,000.00
	Total - Carried to Summary					60,626,016.69

A	**ROADWORKS**					
A1	**General**					
			Qty	Unit	Rate	Amount
Series	**Section**					
200.00	**Site Clearance**					
	North					
	Site clearance			item		32,950.00
	South					
	Site clearance			item		51,185.00
	Footbridge Demolition		1	no	531,000.00	531,000.00
300.00	Fencing					
	None					
400.00	**Road Restraint systems**					
	North					
	Safety fencing			item		79,365.00
	Pedestrian guardrail		200	m	238.35	47,670.00
	South					
	Safety fencing			item		118,935.00
	Pedestrian guardrail		200	m	238.35	47,670.00
600.00	Earthworks					
	North					
	Roadway					
	Excavation of unacceptable material		16,834	m3	8.10	136,355.40
	Excavation of contaminated material		33,077	m3	8.10	267,923.70
	Extra over excavation for excavation in hard material		1,874	m3	67.00	125,558.00
	Deposition of fill material		4,695	m3	2.90	13,615.50
	Compaction of fill material		4,695	m3	2.15	10,094.25
	Disposal of unacceptable material off site		12,139	m3	60.00	728,340.00
	Disposal of contaminated material off site		33,077	m3	120.00	3,969,240.00
	South					
	Roadway					
	Excavation of unacceptable material		39,171	m3	8.10	317,285.10
	Excavation of contaminated material		32,915	m3	8.10	266,611.50
	Extra over excavation for excavation in hard material		1,140	m3	67.00	76,380.00
	Deposition of fill material		7,120	m3	2.90	20,648.00
	Compaction of fill material		7,120	m3	2.15	15,308.00
	Disposal of unacceptable material off site		39,171	m3	60.00	2,350,260.00
	Disposal of contaminated material off site		32,915	m3	120.00	3,949,800.00
	Total - Carried to Summary					13,156,194.45

A	**ROADWORKS**					
A2	**Carriageways**					
			Qty	Unit	Rate	Amount
Series	**Section**					
500	**Drainage and Service Ducts**					
	North					
	Drainage			item		343,330.00
	Ducting			item		34,030.00
	Narrow filter drains			item		61,260.00
	Pumping station package			item		11,800.00
	1200 mm Ø pipes for storage, ave 6 m deep		300	m	605.00	181,500.00
	South					
	Drainage			item		581,280.00
	Ducting			item		67,210.00
	Narrow filter drains			item		61,300.00
	Pumping station package			item		11,800.00
	1200 mm Ø pipes for storage, ave 6 m deep		530	m	605.00	320,650.00
700.00	Pavements					
	North					
	Type 1 sub-base, 300 mm thick		2,811	m3	39.10	109,910.10
	Bituminous materials			item		541,776.00
	Cold milling, 100 mm deep		2,530	m2	16.60	41,998.00
	Resin bonded HFS in various colours		2,750	m2	21.20	58,300.00
	Carriageway reinstatement			sum		10,000.00
	South					
	Type 1 sub-base, 300 mm thick		1,590	m3	39.10	62,169.00
	Bituminous materials			item		732,250.00
	Cold milling, 100 mm deep		10,880	m2	16.60	180,608.00
	Carriageway reinstatement			sum		20,000.00
	Reinstatement of Millenium Way / Edmund Halley Way			sum		1,960,000.00
1,100.00	Kerbs, footpaths, edgings					
	North					
	Kerbs and edgings			item		67,700.00
	Footways			item		131,320.00
	South					
	Kerbs			item		72,630.00
	Total - Carried to Summary					5,662,821.10

B	STRUCTURES - BRIDGES, ETC				
B2	Substructure - End Supports				
Series	Section	Qty	Unit	Rate	Amount
	South				
	Two-lane Overbridge (abutment & deck)	1	item	2,079,650.00	2,079,650.00
	Pedestrian footbridge (all-inclusive)	1	item	2,500,000.00	2,500,000.00
	Retaining Walls	See Tunnelling Section			
1,800	Structural Steelwork				
	North				
	Gantry, 20 - 30 m	1	no	325,110.00	325,110.00
	South				
	Gantry, 10 - 20 m	1	no	235,230.00	235,230.00
	Gantry, 20 - 30 m	1	no	325,110.00	325,110.00
	Gantry, 30 - 40 m	2	no	440,155.00	880,310.00
	Cut and Cover section Silvertown	1	sum	20,644,884	20,644,884
	Retained cut section Silvertown	1	sum	11,273,095	11,273,095
	Cut and Cover section Greenwich	1	sum	28,018,057	28,018,057
	Retained cut section Greenwich	1	sum	10,003,518	10,003,518
	Secondary sub-station	1	sum	2,875,000	2,875,000
	Primary sub-station	1	sum	5,625,000	5,625,000
	Fire Tanks and Pump Room	1	sum	5,860,000	5,860,000
	Vent Station Greenwich	1	sum	2,500,000	2,500,000
	Vent Station Silvertown	1	sum	2,500,000	2,500,000
	Total - Carried to Summary				95,644,965

D	STRUCTURES - TUNNELS					
D2	Bored - Main Construction					
Series	Section		Qty	Unit	Rate	Amount
6000	**TBM Provision**		1	sum	30,387,500	30,387,500
	Crane mat and hardstanding for TBM construction.		1	sum	250,000	250,000
6100	**TBM Driving Costs**					
	METHOD RELATED CHARGES		1	sum	22,492,850	22,492,850
	TBM Driving costs		1	sum	51,607,556	51,607,556
6200	**Tunnel Launch & Reception Chambers**					
	Secant Pile Launch Chamber		1	sum	6,836,415	6,836,415
	TBM Reception Centre		1	sum	7,336,415	7,336,415
	Earthworks					
	Drainage					
	Concrete work					
	Steelwork					
	Miscellaneous - Retaining Walls			sum		755,000
6300	**Tunnel Portal & Head Costs**		1	sum	1,482,471	1,482,471
	Earthworks					
	Drainage					
	Concrete work					
	Steelwork					
	Miscellaneous					
6400	**Cross Passages**		1	sum	5,688,132	5,688,132
	Earthworks					
	Drainage					
	Concrete work					
	Steelwork					
	Miscellaneous sump in cross passage		1	sum	250,000	250,000
6500	**Mechanical & Electrical Services**		1	sum	49,164,015	49,164,015
	Tunnel infill and road construction		1	sum	12,781,783	12,781,783
	Savings for in-situ concrete walls in lieu of VE panels		1	sum	-1,320,429	-1,320,429
	Total - Carried to Summary					187,711,709

E	OTHER WORKS (INCL UTILITIES)					
Series	Section		Qty	Unit	Rate	Amount
1200	Traffic Signs & Road Markings					
	North					
	Traffic signs and road markings			item		48,255.00
	Toucan crossing		4	no	30,030.00	120,120.00
	Traffic signal installation; 3-way with ped phase		2	no	63,700.00	127,400.00
	South					
	Traffic signs and road markings			item		54,585.00
1300	Street Lighting					
	North					
	10 m high non-passive lighting column		46	no	2,310.00	106,260.00
	South					
	10 m high non-passive lighting column		31	no	2,520.00	78,120.00
3000	Landscaping					
	North					
	Lump sum					45,000.00
	South					
	Lump sum					45,000.00
	Utility diversions					
	North					
	Lump sum					2,367,000.00
	South					
	Lump sum					6,651,000.00
	Allowance for Accomodation & Facilitation Works					
	Lump sum					885,000.00
	Total - Carried to Summary					**10,527,740.00**

Appendix H: Designer's Risk Assessment

Atkins H&T - Scheme Health & Safety Risk Register - for use by Designers on Schemes where Atkins is the Lead Designer

Project:	Silvertown Crossing - Highways		**Author(s):**	Neil Handly	
Design Stage:	Conceptial Design	◄ e.g. Strategy/ Concept or Scheme or Detailed PLUS Prelim. or Final	**Date of this Revision of Risk Register:**	15/04/2013	
Spec Series or Element:	Whole Project	◄ or say "whole project"	**Revision No.**	B	
Option Ref. (if relevant)		◄ when undertaking option appraisal of alternative solutions			

designoutrisk: RED AMBER & GREEN

ATKINS

	Hazard Identification			Hazard Elimination or Risk Reduction by Control - CDM 2007 Regulation 11(4) - Duties of designers				Communication of Residual Risk only if Significant			Notes
A	B	C	D	E	F		G	H	I	J	K	L
Ref.	**Structure Element and/ or Location**	**Record Hazardous Activity and separately the Hazard**	**Stage Affected** (from dropdown) (End Use ONLY if designed as a workplace)	**Risk Reduction to be tackled as a Hierarchy - either 1. Record that Hazard has been/ will be eliminated (designed out) and how this has been/ will be achieved, Or if not then: 2. Record Design Assumptions and/ or Control Measures to reduce risk**	**Green RAG list item** employed to significantly reduce risk (if any)		**Record Means of Assuring that either: 1. Elimination has been/ will be achieved. Or if not then: 2. Design Assumptions are valid/ Control Measures will be in place**	**Designer Initials here to verify commitments in Column G**	**Significance of Residual Risk (Select from RAG List or classify as equivalent)**		**Means of Communicating Significant Residual Risk** (RED/ AMBER Construction will go in PCI)	**Designer Initials here to verify commitments in Column J**	**Commentary if required/ Project Director sign off of any Red Items**
1	Installation and removal of Traffic Management	The setting out and the removal of the Traffic Management on the main carriageway and associated slip roads - potential risk of TM personnel being struck by passing vehicles and potential of injury due to bending and lifting operations.	Construction	Control measures to reduce the risk are: ▪ Appropriate methods used for TM setting out and removal in accordance with TSM Chapter 8 Part 2: Operations. ▪ A temporary speed limit on the main carriageway is be enforced in the vicinity of where the TM is to be installed. ▪ TM to be installed and removed by competent trained personnel only. ▪ PPE to be worn at all times.			The Traffic Management design will be completed in accordance with the TSM Chapter 8 Part 1: Design The setting out and removal of the Traffic Management will be in accordance with the approved methods stated in TSM Chapter 8 Part 2: Operations. All Traffic Management designs will be checked by the TSO prior to the works commencing and the effectiveness of the design reviewed post implimentation through regular on site checks. The design should be reviewed with a view to minimising or removing the risk.		Not Significant		Contract Drawings, Specification, Method Satements, TM designs and Staff briefing	MJC	
2	Slip Road / Lane Closures on the main carriageway.	Works on the A102 - potential for traffic delays during peak hours increasing the risk of accidents occurring. Potential risk for accidents to occur due to vehicles entering the works areas via the closures.	Construction	Control measures to reduce the risk are: ▪ TM to be set out and removed during off peak hours where traffic flows are considerably reduced. ▪ All closure points are to be controlled / managed by competent personnel at all times when the TM is in operation.	Green	G24	The Traffic Management design will be completed in accordance with the TSM Chapter 8 Part 1: Design. The Traffic Management will only be implemented during the agreed times. The design should be reviewed with a view to minimising or removing the risk.		Not Significant		Contract Drawings, Specification, Method Satements and TM designs	MJC	
3	Working adjacent or in close proximity to Live Traffic	Works being undertaken where live traffic is in close proximity to the works area - potential for personnel to be struck moving vehicles.	Construction	Control measures to reduce the risk are: ▪ Appropriate TM layout to be designed and installed in relation to the works being undertaken and in accordance with TSM Chapter 8 Part 1: Design. ▪ A temporary speed limit on the main carriageway is be enforced in the vicinity of where the works are being undertaken. ▪ PPE to be worn at all times.	Green	G17	The Traffic Management design will be completed in accordance with the TSM Chapter 8 Part 1: Design The setting out and removal of the Traffic Management will be in accordance with the approved methods stated in TSM Chapter 8 Part 2: Operations. All Traffic Management designs will be checked by the TSO prior to the works commencing and on site checks will also be undertaken. The design should be reviewed with a view to minimising the risk.		Not Significant		Contract Drawings, Specification, Method Satements and TM designs	MJC	

	Hazard Identification			Hazard Elimination or Risk Reduction by Control - CDM 2007 Regulation 11(4) - Duties of designers				Communication of Residual Risk only if Significant				Notes
A	B	C	D	E	F		G	H	I		J	K	L
Ref.	Structure Element and/ or Location	Record Hazardous Activity and separately the Hazard	Stage Affected (from dropdown) (End Use ONLY if designed as a workplace)	Risk Reduction to be tackled as a Hierarchy - either 1. Record that Hazard has been/ will be eliminated (designed out) and how this has been/ will be achieved, Or if not then: 2. Record Design Assumptions and/ or Control Measures to reduce risk	Green RAG list item employed to significantly reduce risk (if any)		Record Means of Assuring that either: 1. Elimination has been/ will be achieved. Or if not then: 2. Design Assumptions are valid/ Control Measures will be in place	Designer Initials here to verify commitments in Column G	Significance of Residual Risk (Select from RAG List or classify as equivalent)		Means of Communicating Significant Residual Risk (RED/ AMBER Construction will go in PCI)	Designer Initials here to verify commitments in Column J	Commentary if required/ Project Director sign off of any Red Items
4	Significant Services above or below or adjacent to the works area	Works being undertaken where Statutory Undertakers Apparatus and Overhead Services are located within the vicinity - potential for Overhead Services or Statutory Undertakers Apparatus to be struck during site vehicle movements or excavations.	Construction	Control measures to reduce the risk are: ■ STATS searches are to be undertaken prior to the works taking place to identify the locations of the apparatus within the vicinity. ■ Prior to the works taking place trial holes are to be undertaken to establish the exact location of the apparatus. ■ A Permit to Work / Dig must be in place before any excavations take place. ■ Prior to any excavations taking place CAT scans are to undertaken by competent personnel. ■ All vehicle movements within close proximity of Overhead Services are to be completed under guidance of a competent banksman.	-	-	The design is to be reviewed once C2 STATS searches have been returned to highlight any potential clashes prior to the works. All STATS information collated is to be issued to the Contractor. Designs should be reviewed with a view to minimising or removing the risk of clashes with services.		Amber - Significant		Contract Drawings, Stats Returns and Specification	MJC	
5	Vibrating Plant and Equipment	Works operations being undertaken using vibrating plant and equipment - potential for injury due to being exposed to long operating periods and being within close proximity to the plant and equipment.	Construction	Control measures to reduce the risk are: ■ Appropriate equipment, plant and techniques are to be considered and implemented for the operations being undertaken. ■ The contractor is to implement a Safe System of Work for site operation with consideration given to the reduction of exposure times. ■ All works undertaken are to be in accordance with Manual Handling Operations Regulations. ■ PPE to be worn at all times.	-	-	A HAVS assessment to be carried out prior to the works. The contractor will submit a Method Statement and a Safe System of Work outlining how this will be minimised. The design should be reviewed with a view to minimising or removing the risk.		Not Significant		Contract Drawings, Specification, Method Satements and Staff briefing	MJC	
6	Noise Intensity	Personnel working in close proximity to loud works operations and passing vehicles on the main carriageway - potential for injury due exposure constant intense noise.	Construction	Control measures to reduce the risk are: ■ Appropriate equipment, plant and techniques are to be considered and implemented for the operations being undertaken with suitable systems to reduce noise where possible. ■ The contractor is to implement a Safe System of Work for site operation with consideration given to the reduction of exposure times. ■ An increased Safety Zone / Lateral Clearance is to be implemented where feasible. ■ A temporary speed limit on the main carriageway is be enforced in the vicinity of where the works are being undertaken. ■ PPE to be worn at all times.	-	-	The contractor is to submit a Method Statement and a Safe System of Work outlining how this will be minimised. The design should be reviewed with a view to minimising or removing the risk.		Not Significant		Contract Drawings, Specification, Method Satements and Staff briefing	MJC	
7	Site Delivery routes and areas	Vehicles entering and exiting the works areas and movements within the works area - potential for delivery vehicles to cause a collusion with passing traffic and striking personnel in the works area.	Construction	Control measures to reduce the risk are: ■ The design and installation of the TM is to allow for both a safe entry and exit from the Works Area as in accordance with TSM Chapter 8 Part 1: Design and Part 2: Operations ■ The Contractor is to provide competent banksman to be present at all times to assist with all site vehicles arriving and passing through the works area. ■ The contractor is to implement a Safe System of Work. ■ PPE to be worn at all times.	Green	G1	The Traffic Management will be completed in accordance with the TSM Chapter 8 The Traffic Management will be checked by the TSO prior to the works commencing.		Not Significant		Contract Drawings, Specification, Method Satements and Staff briefing	MJC	

	Hazard Identification			Hazard Elimination or Risk Reduction by Control - CDM 2007 Regulation 11(4) - Duties of designers				Communication of Residual Risk only if Significant			Notes
A	B	C	D	E	F	G	H	I	J	K	L
Ref.	Structure Element and/ or Location	Record Hazardous Activity and separately the Hazard	Stage Affected (from dropdown) (End Use ONLY if designed as a workplace)	Risk Reduction to be tackled as a Hierarchy - either 1. Record that Hazard has been/ will be eliminated (designed out) and how this has been/ will be achieved, Or if not then: 2. Record Design Assumptions and/ or Control Measures to reduce risk	Green RAG list item employed to significantly reduce risk (if any)	Record Means of Assuring that either: 1. Elimination has been/ will be achieved. Or if not then: 2. Design Assumptions are valid/ Control Measures will be in place	Designer Initials here to verify commitments in Column G	Significance of Residual Risk (Select from RAG List or classify as equivalent)	Means of Communicating Significant Residual Risk (RED/ AMBER Construction will go in PCI)	Designer Initials here to verify commitments in Column J	Commentary if required/ Project Director sign off of any Red Items
8	Manual handling	Personnel moving site equipment and site materials - potential for injury to personnel during lifting and bending operations.	Construction	Control measures to reduce the risk are: ■ The Contractor is to implement a Safe System of Work for site operations. ■ All works undertaken are to be in accordance with Manual Handling Operations Regulations. ■ PPE to be worn at all times.	Green G12	The contractor is to submit a Method Statement and a Safe System of Work outlining how this will be minimised. All kerb lifting to be undertaken mechanically Kerbs are to be specified for this urban highway improvement. At detailed design, alternative kerbing materials should be investigated and/or shorter kerb		Not Significant	Contract Drawings, Specification, Method Satements and Staff briefing	MJC	
9	Environmental Issues	Working in close proximity to surface water drainage systems and soft verges, air pollution - potential for contamination from pollutants leaking from plant and equipment and materials used during construction.	Construction	Control measures to reduce the risk are: ■ Spill kits and dip trays for plant and equipment. ■ Approved areas for plant to be parked during operations and preparation areas - away from surface water drainage and soft verges. ■ Provisions for preventing debris from spreading to the surrounding roads, wheel washing facilities and the containment of soiled water ■ Appropriately trained personnel on site to deal and implement procedures. ■ Elimination of unnecessary running of plant and equipment when not in use. ■ Method Statement from the Contractor stating how any waste products / materials will be deposed of.	- -	Environmental checklist will be put in place for the Contractor to follow with appropriately trained personnel to be present to ensure control measures and procedures are implemented.		Not Significant	Environmental Checklist/ Environmental Management Plan		
10	COSHH Materials	Site materials and operations such as cold milling of the existing pavement and the removal of existing road markings - potential for injury due to exposure to harmful substances such as dust from the cold milling process and the presence of lead in the existing road markings.	Construction	Control measures to reduce the risk are: ■ All operations are to be carried out by competent personnel. ■ All handling of the materials is to be undertaken in accordance with the Contractors Safe System of Works and the Method Statements. ■ Dust suppression techniques are to be utilised whenever possible during carraigeway cutting using road saws and cold milling operations. ■ Survey to be undertaken and As Built information to be obtained to confirm if lead is present in existing road markings. ■ PPE to be worn at all times.	- -	The Contractor is to produce a Method Statement and a Safe System describing how the works are to be undertaken. The detailed design should consider relevant survey and existing 'As Built' information and modify the design if possible to reduce risk.		Not Significant	Contract Drawings, Specification, Method Satements and Staff briefing	MJC	
11	Asbestos Exposure	Excavation and/or Cold Milling of the existing carriageway construction - potential for injury due to exposure to materials containing Asbestos fibres.	Construction	Control measures to reduce the risk are: ■ As Built information to be obtained and checked. ■ Asbestos Checklist to be completed if required.	- -	The Contractor is to produce a Method Statement and a Safe System of for how the works are to be undertaken. The detailed design should consider relevant survey and existing 'As Built' information and modify the design if possible to reduce risk.		Not Significant	Contract Drawings, Specification, Method Satements and Staff briefing	MJC	
12	Working above members of the public and operatives	Risk to operatives and members of the public due to falling objects during lifting operations or whilst working at height	Construction	Control measures to reduce the risk are: ■ Ensure all lifting operations are covered by an adequate method statement and personnel are aware of all lifting operations. ■ Ensure adequate drop zone is cordoned off during works at height ■ Hard hats to be worn by those working at low level	- -	The contractor is to submit a Method Statement and a Safe System of Work outlining how this will be minimised. The detailed design should take into account the risks associated with working above members of the public and operatives and, if possible, modify the design to reduce said risk		Not Significant	Contract Drawings, Specification, Method Statements and Staff briefing		

	Hazard Identification			Hazard Elimination or Risk Reduction by Control - CDM 2007 Regulation 11(4) - Duties of designers				Communication of Residual Risk only if Significant			Notes
A	B	C	D	E	F	G	H	I	J	K	L
Ref.	Structure Element and/ or Location	Record Hazardous Activity and separately the Hazard	Stage Affected (from dropdown) (End Use ONLY if designed as a workplace)	Risk Reduction to be tackled as a Hierarchy - either 1. Record that Hazard has been/ will be eliminated (designed out) and how this has been/ will be achieved, Or if not then: 2. Record Design Assumptions and/ or Control Measures to reduce risk	Green RAG list item employed to significantly reduce risk (if any)	Record Means of Assuring that either: 1. Elimination has been/ will be achieved. Or if not then: 2. Design Assumptions are valid/ Control Measures will be in place	Designer Initials here to verify commitments in Column G	Significance of Residual Risk (Select from RAG List or classify as equivalent)	Means of Communicating Significant Residual Risk (RED/ AMBER Construction will go in PCI)	Designer Initials here to verify commitments in Column J	Commentary if required/ Project Director sign off of any Red Items
13	Excavations	Personnel working in close proximity to areas of excavation - potential for injury due to slip, trips and falls.	Construction	Control measures to reduce the risk are: ■ All exposed excavations must be protected by an appropriate method and clearly visible to all site personnel. ■ PPE to be worn at all times.	Green	G6	The contractor is to submit a Method Statement and a Safe System of Work outlining how this will be minimised.	Not Significant	Contract Drawings & Appendices		
14	Working at Height	Risk to operatives due to falls whilst working from height.	Construction	Control measures to reduce the risk are: ■ Ensure all operatives working at height have relevant training. ■ Ensure the correct equipment is used to work at height. ■ Ensure all equipment used is in a safe working condition.	-	-	The contractor is to submit a Method Statement and a Safe System of Work outlining how this will be minimised. The detailed design should take into account the risks associated with working at height and, if possible, modify the design to reduce said risk.	Not Significant	Contract Drawings, Specification, Method Statements and Staff briefing	MJC	

Notes:

1. This Design Risk Register does not use conventional risk scoring. In its place is a requirement to determine whether any residual risk is "Significant" as ACOP 131-134.
2. This Risk Register should be used in conjunction with the RAG List dated November 2008, adopted by Atkins, Arup, Halcrow and Mott MacDonald.
3. The provision of the items on the Red and Amber Lists does not remove from the Designer, an obligation to identify and asses hazards and risks specific to the project
4. Refer also to Guidance Worksheet

Owner	B.Swan+M.Reynolds	Issue Date	18/02/2011	Reference: HS Form 34
Revision	13	Review Date	05/04/2012	

Appendix I: Greenwich Peninsula Spatial Analysis (Previous Case Study)

Case Study
Greenwich Peninsula Masterplan

Client: Meridian Delta Limited

Start Date: May 2002

Duration: 4 months

Context

Atkins was commissioned by Meridian Delta Limited to evaluate the Terry Farrell Masterplan and to advise on pedestrian movement issues. The Greenwich Peninsula was one of the largest regeneration opportunities in the UK, covering 200 acres of proposed residential and mixed-use commercial development on a brownfield site. The site also included the Millennium Dome.

Objectives

To understand pedestrian movement issues on the Greenwich Peninsula including pedestrian desire lines and public transport accessibility.

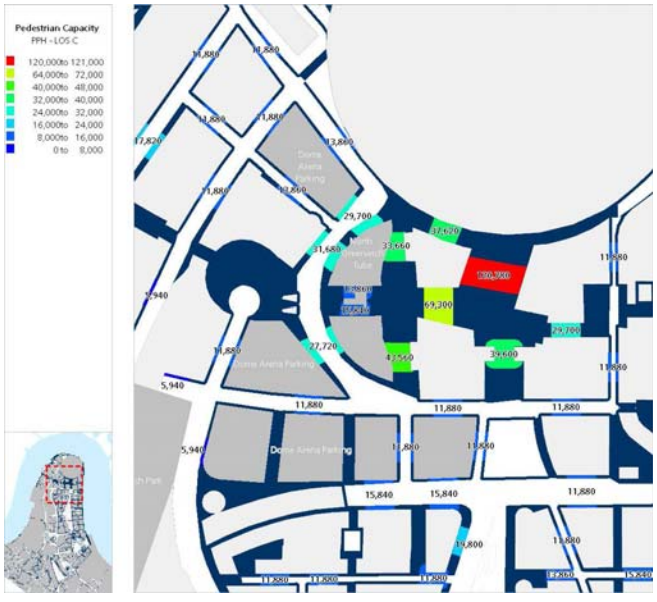
Services Provided

- Visibility and accessibility analysis
- Pedestrian capacity analysis

Key Benefits / Success Factors

- Applying a series of Key Performance Indices to the Masterplan allowed analysis at an early stage and informed design development
- Whilst pedestrian circulation routes were generally well integrated and would function effectively for normal wayfinding and movement purposes, Atkins pinpointed areas for improvement including a secluded park and realignment of pedestrian routes servicing the QEII pier
- The design of the masterplan was enhanced by the research and Greenwich Council resolved to grant planning consent in April 2003

Visibility analysis



Pedestrian capacity

ATKINS

Peter Metcalf
Project Manager
Highways & Transportation

Threadneedle House
9-10 Market Road, Chelmsford, Essex, CM1 1XA England

Email: Peter.Metcalf@atkinsglobal.com
Telephone: +44 (0) 1245 24 5230
Mobile: +44 (0) 7803 25 8620
Fax: +44 (0) 1245 34 5010

www.atkinsglobal.com

© Atkins Ltd except where stated otherwise.

The Atkins logo, 'Carbon Critical Design' and the strapline 'Plan Design Enable' are trademarks of Atkins Ltd.