

A8.2 – Outline Construction Logistics Plan

Bank Station Capacity Upgrade

TWAO Submission

Outline Construction Logistics Plan

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List of Abbreviations

3D	Three dimensional
BSCU	Bank Station Capacity Upgrade
BT	British Telecommunications
CLP	Construction Logistics Plan
CoCP	Code of Construction Practice
DVLA	Driver and Vehicle Licensing Agency
ES	Environmental Statement
FORS	Fleet Operator Recognition Scheme
HGV	Heavy Goods Vehicle
ISO	International Standards Organization
LEZ	Low Emission Zone
LUL	London Underground Limited
m	metre
MEP	Mechanical and Electrical Plant
MWRR	Managing Work Related Risk
RC	Reinforced Concrete
SUD	Safe Urban Driving
TfL	Transport for London
UKPN	United Kingdom Power Networks

1.0 Introduction

1.1 Project Overview

This Outline Construction Logistics Plan (CLP) has been prepared on behalf of London Underground Limited (LUL) and the project design and build contractor, Dragados.

The Bank Station Capacity Upgrade (BSCU) Project involves a major upgrade of the Bank Monument Station Complex to provide greatly improved passenger access, circulation and interchange. It will also improve emergency fire and evacuation protection measures. It includes provision of a new passenger entrance with lifts and escalator connections; a new Northern Line passenger concourse using the existing southbound platform tunnel; a new Northern Line southbound running and platform tunnel; and new internal passenger connections between the Northern Line, the Docklands Light Railway (DLR) and the Central Line.

The BSCU will be constructed from two main work sites. The first work site will be at the site bounded by King William Street, Nicholas Lane, Cannon Street and Abchurch Lane (the Whole Block Site, note that this is referred to as the Cannon Street Work Site in consultation material). The Whole Block Site will be used to construct the escalators, cross passages and new Northern Line passenger concourse. A second smaller work site will be located on Arthur Street. A shaft will be sunk at Arthur Street and used to excavate the new Northern Line southbound running tunnel. The disused King William Street underground station located beneath the junction of King William Street and Arthur Street will be used for logistics purposes during construction. Other work sites will also be used to carry out enabling works, the diversion of utilities and protective works where required.

Additional detail on the BSCU and programme is provided in Chapter 3.

1.2 Outline Construction Logistics Plan

This Outline CLP has been prepared to describe the anticipated construction logistics relating to the BSCU, based on the current design stage. It recognises the requirements of the City of London Corporation's *Code of Practice for Deconstruction and Construction Sites* (May 2013) together with the draft Code of Construction Practice (CoCP) (Appendix A4.1 of the Environmental Statement (ES)) and has been prepared in accordance with Transport for London's (TfL) *Construction Logistics Plan Guidance for Developers* (April 2013).

The aims of the CLP are to minimise disruption at and around the BSCU Work Sites and to inform the City of London Corporation and the local community of the likely logistics activities during the construction phase. This CLP is based on minimising the impact of the BSCU upon the surrounding area by making the BSCU Work Sites as self-sufficient within their boundaries as possible.

TfL's guidance document identifies two types of CLP:

- an Outline CLP, which usually accompanies applications to Local Authorities or, the Secretary of State and provides an overview of the expected logistic activities. This is then revised once planning permission (or deemed planning permission) has been granted; or
- a Detailed CLP, which is usually produced after planning permission (or deemed planning permission) has been granted when the full details of the construction phase are known.

This Outline CLP is submitted as part of the Transport and Works Act Order (TWAO) application and will be updated to a Detailed CLP prior to construction, when further details are finalised.

1.3 Considerate Contractors

Dragados will at all times carry out works in a safe and considerate manner with due regard to the public, adjoining properties, businesses and road users. The project will be registered under the Considerate Contractors Scheme.

Dragados is accredited to the ISO 14001 Environmental Management Standard and will implement their environmental management system throughout the Project.

A CoCP has been developed for the project and will be implemented during the construction of the works. Dragados and all subcontractors will be required to work to the requirements of the CoCP.

The CoCP sets out measures to avoid or reduce impacts (and monitoring to be undertaken by the Contractor. It also describes the approach to communication with people living and working nearby. Reference should therefore be made to the CoCP for details of these matters.

2.0 Site Information

The BSCU will be undertaken from two main ground level sites: the Whole Block Site and the Arthur Street Work Site. The locations of these work sites, and the underground works, are shown on Figure 2.1. Other work sites will also be used to carry out enabling works, the diversion of utilities and protective works where required.

2.1 The Whole Block Site

The main work site at the Whole Block Site is currently comprised of six buildings. The majority of these buildings will be demolished to enable the construction of the new Station Entrance Hall and escalators on the eastern part of the site. The rear extension of 20 Abchurch Lane will be demolished and the rear of the main building made good. The main building and associated façade will be retained and used for project offices and site welfare facilities during construction works.

Although not part of the BSCU, it is expected that construction of an OSD is likely to be undertaken between 2021/22 and 2023/25 (commencement within one year of completion of the BSCU, however, assessments have also considered a potential overlap in works of up to one year). Demolition of the remainder of 20 Abchurch Lane, including dismantling of its façade will be undertaken as part of OSD construction works. Planning permission for such a development was granted by the City of London Corporation in June 2014. Demolition of the remainder of 20 Abchurch Lane, including dismantling of its façade would be undertaken as part of OSD construction works.

Key Issues and Challenges

The construction period is in excess of five years, and as such the impact of construction on the local communities, residents and businesses needs to be minimised. The key issues and challenges are:

- interface with the existing Bank Underground Station;
- site logistics interfaces with adjoining roads;
- pedestrian and cyclists, traffic management and vehicular access into the site; and
- the continuous trading of neighbouring businesses.

The location of the site in the heart of the City of London and within the Bank Conservation Area provides a number of factors that have been carefully considered in the design and construction planning of the development. Site specific influences include:

- King William Street, along the northern Whole Block Site boundary, is a busy local distributor road and provides a key route for buses. It also forms part of the London Cycle Network;
- Cannon Street, along the southern Whole Block Site boundary, is a wider street with a retail presence at ground floor level. It also provides bus routes and is part of the Strategic Road Network;
- small lanes to the east and west of the Whole Block Site, Nicholas Lane and Abchurch Lane respectively, both have restricted access for HGVs;
- Abchurch Lane itself is historically and architecturally sensitive. In particular the Grade I Listed St. Mary Abchurch lies on the western side of the narrow lane; and
- close residential properties, lying approximately 25m to the west of the site on Abchurch Yard and 70m to the south-east of the site on Martin Lane and Laurence Pountney Lane.

Furthermore, construction logistics will need to take into account other specific factors, including:

- the servicing requirements for Phoenix House on Nicholas Lane, who ‘trolley’ their servicing and consumables from Nicholas Lane; and
- the local mainline railway station, Cannon Street, is very busy during morning and evening rush hours. Large numbers of pedestrians use Cannon Street and Abchurch Lane in particular as they move to and from the station entrance.

2.2 The Arthur Street Work Site

The Arthur Street Work Site is primarily a construction shaft that enables the Contractor to commence tunnelling concurrently with the demolition of the Whole Block Site. It is anticipated that approximately 70 per cent of the excavated material from below ground operations will be removed through the Arthur Street Work Site.

The Arthur Street Work Site will contain an office and welfare space. There will also be a gantry crane, plant and equipment to supply the shaft and tunnel with fresh air, access, equipment, concreting materials, compressed air, power and water.

The Arthur Street Work Site will occupy the majority of the road carriageway between Upper Thames Street and King William Street. It will require closure of Arthur Street for the duration of the construction works. Proposals are described later in this document to limit as far as possible the impacts on public and commercial access on the road and to surrounding buildings.

Key Issues and Challenges

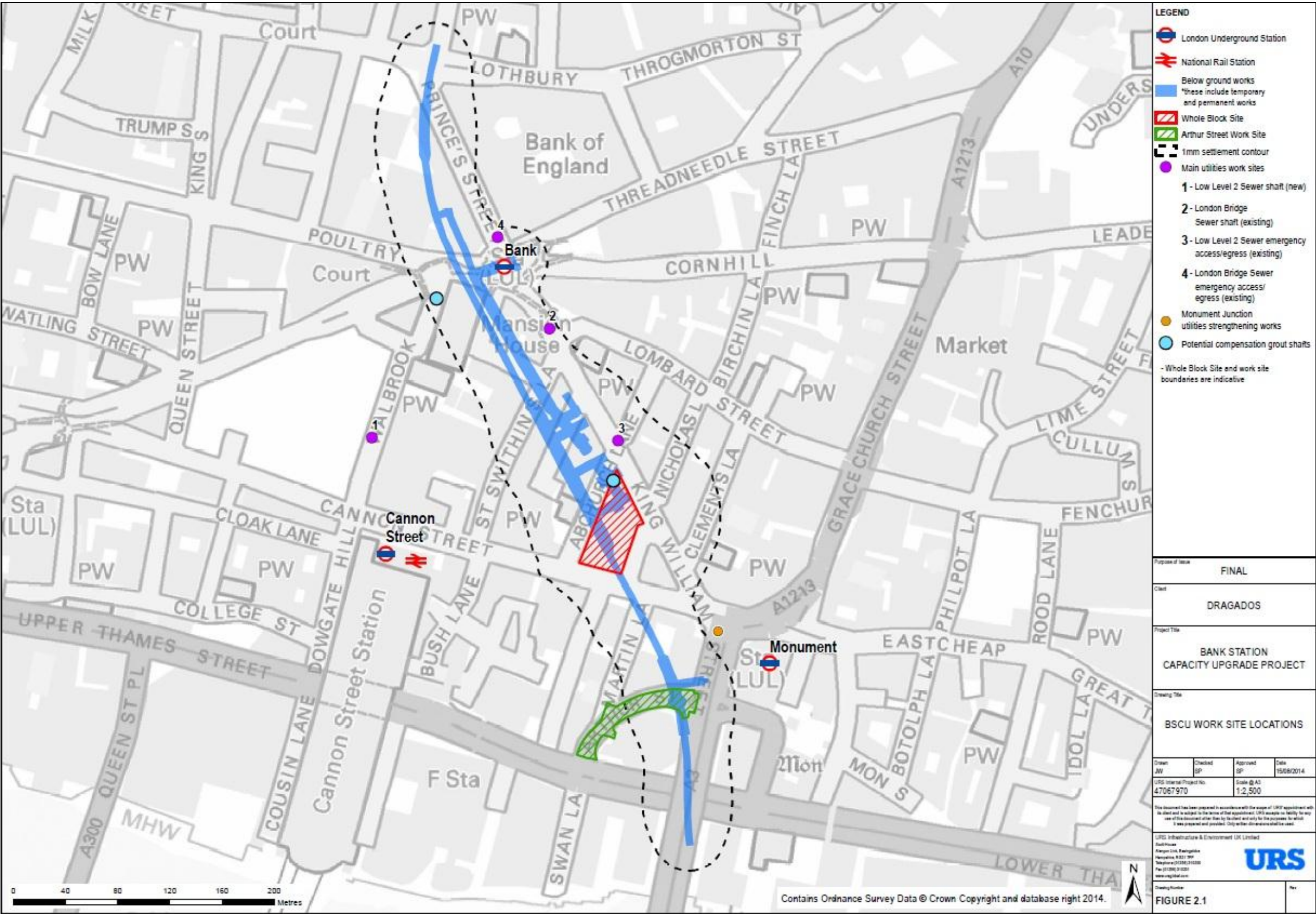
There are a number of factors that have been carefully considered in the design and construction planning of the Arthur Street works, in particular:

- the need to efficiently remove excavated material from the underground works;
- site logistics interfaces with adjoining roads;
- pedestrian and cyclists, traffic management and vehicular access into the site;
- the neighbouring buildings that will be directly affected by the works, in relation to access to road frontage, namely: 33 King William Street; 12, 10 and 6 Arthur Street; and 24-28 King William Street;
- nearby residential properties;
- pedestrian access to buildings to be maintained;
- service vehicles seeking access to the two active service yards contained under 33 King William Street and 28 King William Street;
- creation of a revised access for 12 Arthur Street's basement garages;
- the access that Arthur Street provides between the lower levels of the City of London and the upper levels needs to be maintained on other routes, particularly for public transport and the emergency services; and
- the Arthur Street Work Site also has interfaces with the local London bus network.

Furthermore, construction logistics need to take into account other specific factors, including:

- utilities and the networked services provided to the project's neighbours are not to be compromised;
- the disused King William Street Station, is located directly under Arthur Street; and
- a number of listed structures and scheduled monuments in proximity to the site.

Figure 2.1 BSCU Work Site Locations



3.0 Construction Overview

3.1 Indicative Works Programme

The construction programme will span approximately five and a half years.

- Enabling Works would be undertaken at commencement of construction (2016) for a duration likely to be between nine and fourteen months;

Whole Block Site

- Demolition of the buildings on the Whole Block Site are expected to commence in Year 1 for a duration of approximately nine months;
- Escalator box piling is expected to commence in Year 1 for a duration of approximately four months;
- Escalator box excavation and structure is expected to commence in Year 2 for a duration of approximately 13 months;
- Station Works from the Whole Block Site are expected to commence in Year 3 for a duration of approximately 24 months;
- Construction of a new station entrance is expected to commence in Year 5 for a duration of approximately 12 months;

Arthur Street Work Site

- Arthur Street Site setup and construction of the Arthur Street Shaft is expected to commence in Year 1 for a duration of approximately eight months;
- Tunnelling and station works from Arthur Street are expected to commence in Year 1 for a duration of approximately 43 months;

- The Blockade is expected to commence in Year 5 for a duration of approximately four months;
- Key below ground interchanges are expected to be brought in to use in Year 5;
- Completion of all works is expected in Year 6 (2021).

3.2 Overview of Construction Stages

Synopsis

In summary, the BSCU will include the following:

- demolition of buildings currently occupying the Whole Block Site;
- preparatory works, escalator box excavation and structure at the Whole Block Site and shaft construction at the Arthur Street Work Site;
- excavation and construction of new Northern Line southbound running and platform tunnel;
- excavation and construction of various platform, cross passage, moving walkway and escalator tunnels; and
- construction of a new Station Entrance on Cannon Street.

Further information on aspects of the BSCU is provided below.

General Site Management

All activities on the BSCU Work Sites will be subject to pre-planned method statements approved in accordance with the *Construction Design and Management Regulations 2007* and the *Management of Health and Safety at Work Regulations 1999*.

A strict system of delivery bookings will be put in place.

Hoardings will provide acoustic screening of the site from road level as well as protecting the safety of pedestrians and vehicles from site activities, and provide security to the site. Site access points will be protected with secure gates and security staff will be deployed.

Site Establishment

Whole Block Site

The Whole Block Site is currently comprised of six buildings. Full demolition will include: 135-141 Cannon Street, 10 King William Street, 12 Nicholas Lane, 14 Nicholas Lane and 143-149 Cannon Street. This will enable the construction of the new Station Entrance Hall and escalator on the eastern part of the site. The rear extension of 20 Abchurch Lane will also be demolished but the main building and associated façade will be retained and used for project offices and site welfare facilities.

During demolition, site hoarding and gates will be erected along Nicholas Lane. A partial road closure will be required to ensure site vehicles can manoeuvre the narrow existing highway widths. The hoarding will then be realigned following the completion of the superstructure demolition to the boundary of the Whole Block Site (see Figure 3.1).

Section 9.3 gives further detail on transport arrangements around the Whole Block Site during demolition.

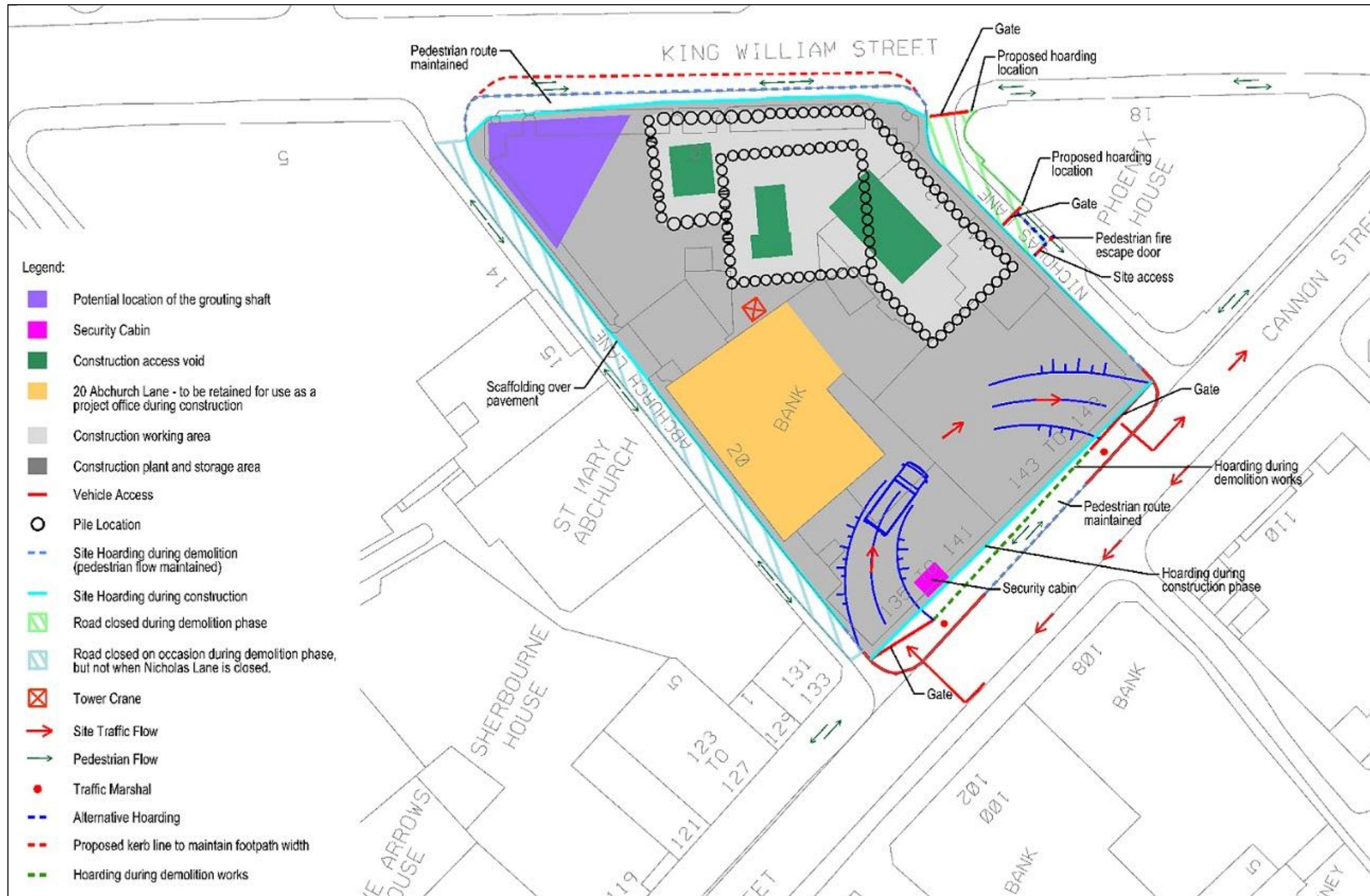
An illustration of the Whole Block Site following demolition is provided in Figure 3.1.

Mains power supply will be sought, and power distribution around the site will be completed. Construction plant, workshops and lighting will be installed.

The station 'box' will be constructed by initially deconstructing down to basement level in most areas. Once complete, the basement structure will be backfilled to create a piling mat from which to install a secant piled wall. Top down construction will be used to construct the escalator box structure. In the north-west corner, provision is made for a grout shaft to be sunk.

A tower crane will be installed from the existing basement level to move heavy items around the site.

Figure 3.1: Indicative Construction Layout of the Whole Block Site



Arthur Street Work Site

Indicative illustrations of the Arthur Street Work Site are provided in Figures 3.2a (plan) and 3.2b (3D-view). A three-level welfare building will be installed on a gantry at the northern end of the site to maintain a minimum of 2.8m wide pedestrian access along King William Street.

Power supplies will be sought from the mains and power distribution around the site will be completed. Construction plant, workshops and lighting will be installed. Sheet piles will be sunk around the shaft perimeter. Deep foundations (such as micropiles) will be installed to locally support temporary structures if the detailed design requires it (such as at the welfare cabin columns and gantry crane footings).

Figure 3.2a: Indicative Arthur Street Work Site Plan

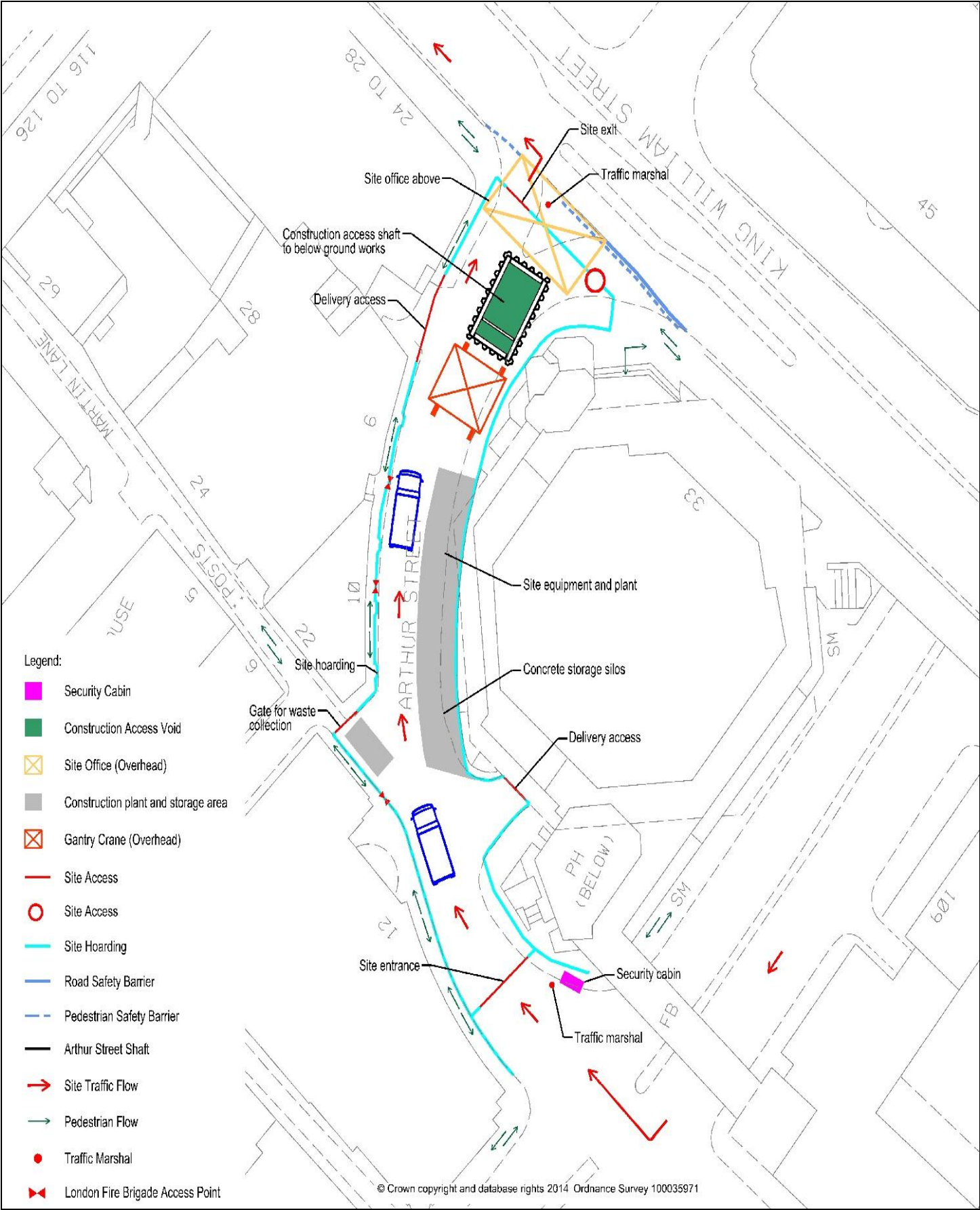
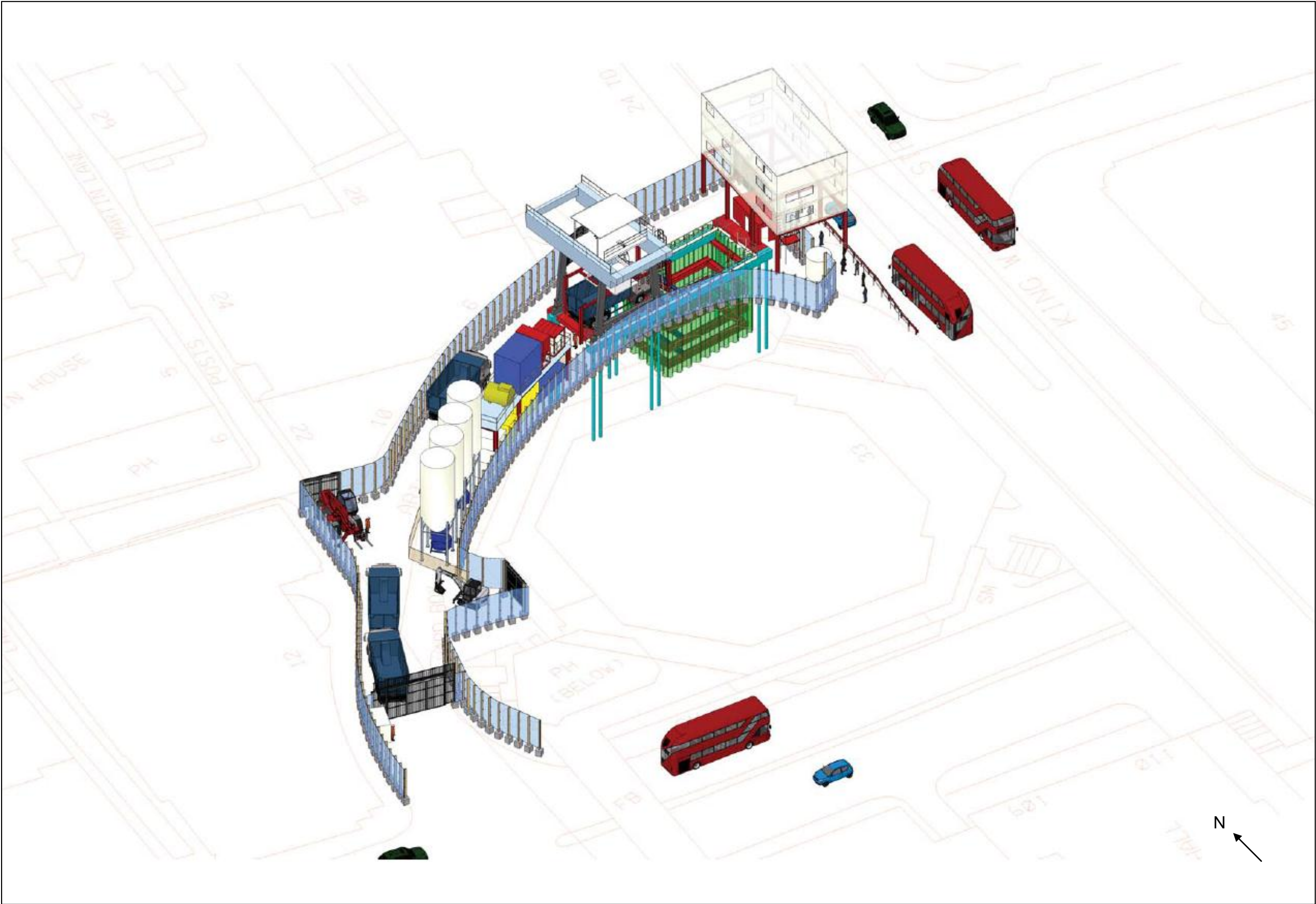


Figure 3.2b: Indicative Arthur Street Work Site 3D View



Shaft Construction and Tunnelling*Whole Block Site*

Construction of the escalator box and escalator barrel will commence in order to open up a new tunnelling front, from which the tunnelling team can support the team starting in Arthur Street to accelerate the tunnelling works. Some excavated material will be extracted through this site but the majority will be exported from the Arthur Street Work Site.

Arthur Street Work Site

Once the sheet pile perimeter has been completed, excavation of the access shaft can commence. A gantry crane will be installed.

Station Box*Whole Block Site*

The station box will be sequentially excavated and the substructure constructed. The sequence is illustrated in the series of 3D renderings presented in Figure 3.3.

Supply of Materials

The shafts at both of the BSCU Work Sites will be used to deliver permanent plant and equipment, as well as materials, products and services for the formation and fit out of the works. Lower floors, escalators and lifts will have materials delivered through both of the BSCU Work Sites.

Moving walkways and escalator delivery and installation will occur through construction access holes left in floors. Primary Mechanical Electrical Plant (MEP) equipment will also be installed through these access holes.

The new Station Entrance area will have its fit out materials supplied through the Whole Block Site. The majority of new station platform (and associated walkway) materials will be delivered through the Arthur Street Work Site.

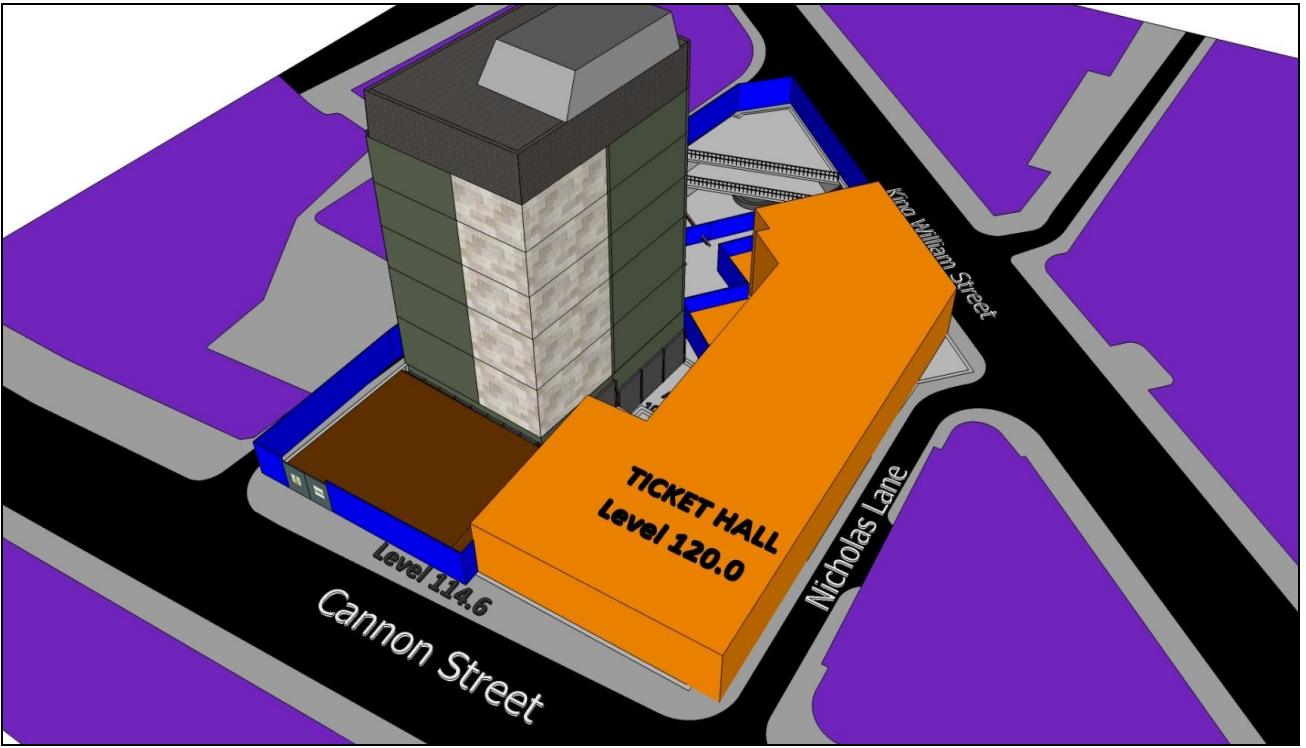
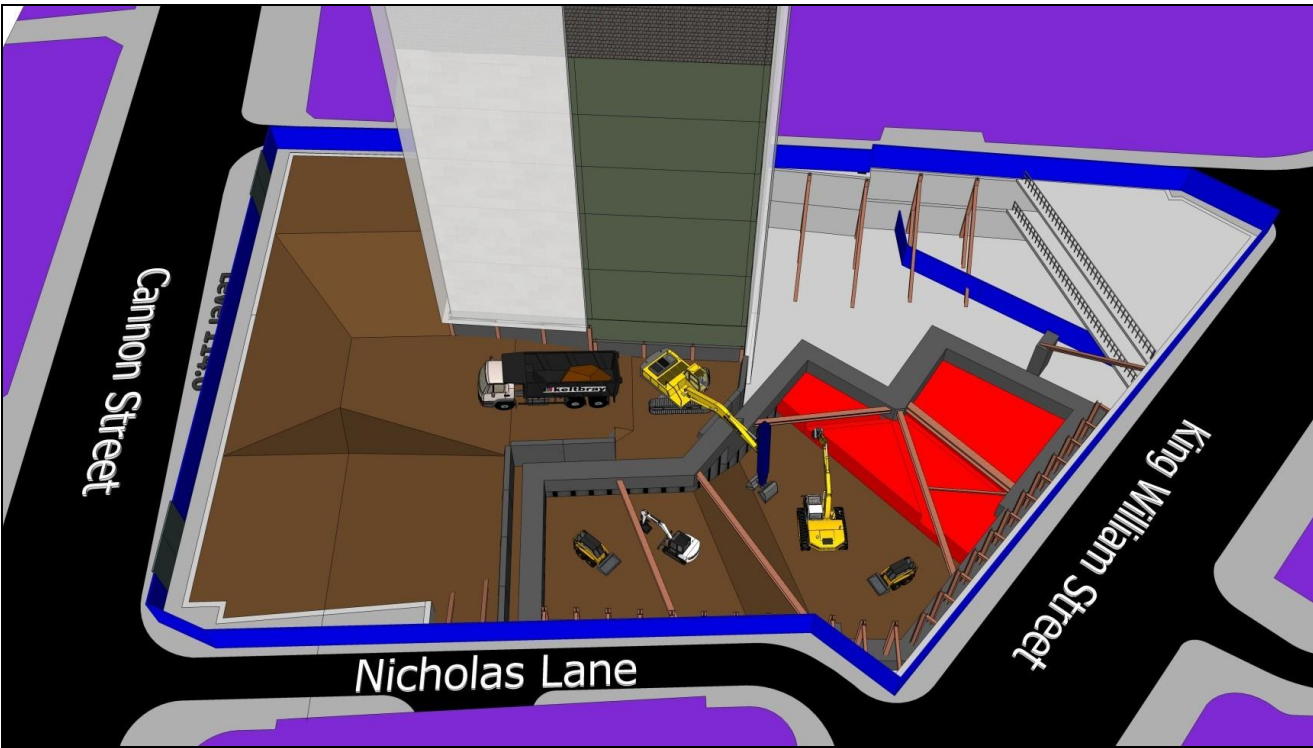
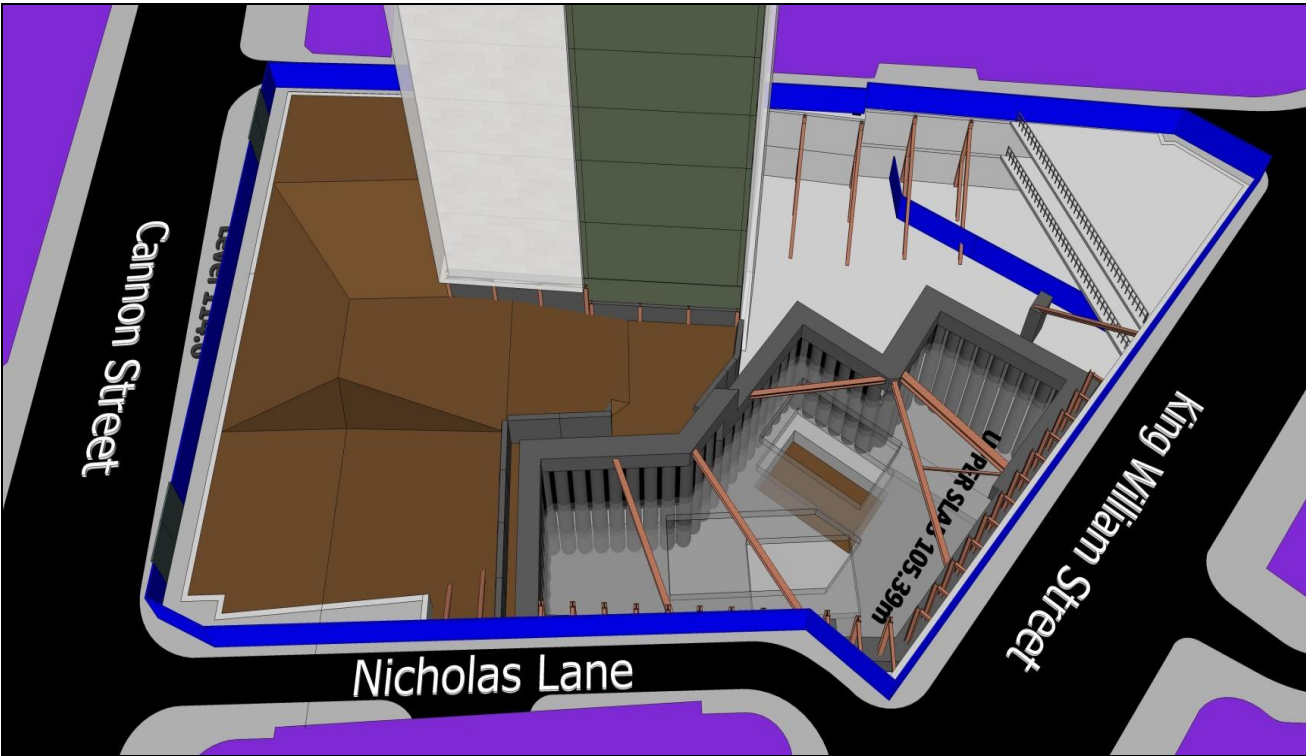
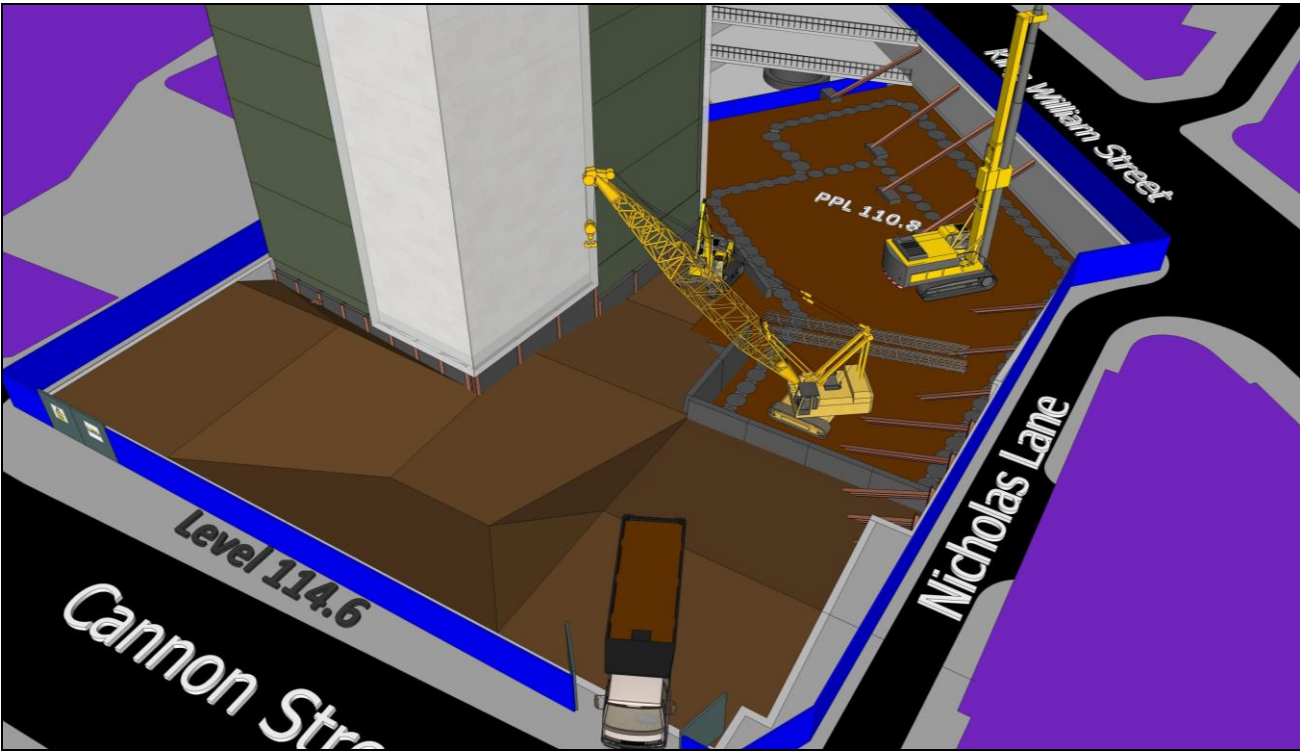
Fit Out and Commissioning

Installation of the shell and core of the station will then take place, including primary MEP services, fit out of the station and commissioning.

External Works

Finally, external works including public realm and landscaping will be completed. External works will commence as soon as areas are available and the not at risk of being damaged by on-going construction operations.

Figure 3.3: Selected Whole Block Site 3D Renderings of the Substructure Creation of the Station Box



3.3 Labour

Estimated workforce numbers are provided in Figure 3.4, with the peak number of construction workers, 146, in year 5, month 1.

3.4 Working Hours

Details of working hours can be found in the draft CoCP.

3.5 Utilities and Protective Works

The main project works will necessitate both direct physical diversions and indirect protection measures to existing utility infrastructure. It is the aim of the project to have most known utilities works completed prior to main works commencing.

The main utilities works for the BSCU comprise:

- diversion of utilities and protective works to the Low Level 2 Sewer, which is a West East running sewer, 2.4m internal diameter of circular segmental cast iron construction with a brick lining; and to the London Bridge Sewer, which is a North South running sewer under King William Street, diameter varies (2.2- 2.5m internal) and is of circular brick construction with a concrete lining;
- diversion of utilities at Arthur Street to allow construction of the shaft; and
- other protective works to utilities to ensure there are no impacts from settlement.

A general description of the activities associated with the diversion of utilities is provided below.

Trenching and Excavation

The breaking out of the highway surface and excavation of the subsurface to the required depth using mechanical plant such as pneumatic drills, mechanical excavators and breakers.

Duct Laying

There will be installation in the excavated trenches of ducts to enable the future pulling of electricity and telecom cables.

Pipe Laying

Pipe laying is the installation of gas and water mains or sewers in excavated trenches. The pipes and surround will be installed using mechanical plant such as mechanical excavators. The pipes will be jointed on-site and the type of joint will depend upon the pipe material and working pressures but will typically be either welded, push fit or bolted joints.

Thrust Blocks

Concrete blocks may be constructed at changes in pipe directions to resist the thrust forces generated.

Chamber Construction

Chambers and manholes will be constructed on the electricity, telecoms, gas, water and sewer diversions at various locations. It will involve excavation, formwork, fixing of reinforcement concreting and installation of precast covers.

Cable Pulling and Jointing

Telecoms and electricity cables will be inserted into ducts that have already been installed. This involves the lifting of chamber covers at either end of a duct route so that the cables can be pulled through the ducts.

Testing, Commissioning and Connecting

The water, gas and sewers will be tested on-site to ensure that they are constructed in accordance with the specification. All the mains will be connected to the existing networks. To do this, specific sections of the existing network will need to be isolated so that a short length can be removed and the new pipe connected. This operation may occur outside normal working hours so that the disruption to the utility service is kept to a minimum.

In the case of electric power cables, it will be necessary for power outages to be in place before jointing and commissioning takes place.

Reinstatement

On completion of the works the trenches and excavations will be reinstated and the road surface re-laid.

Low Level 2 and London Bridge Sewer Works

These sewers run close to new tunnelling works are consequently are likely to require structural and/or leak linings to be installed to ensure their integrity. The existing small diameter access chambers to these sewers are unlikely to be suitable for safe works access. Sewer site access shafts will need to be built within the highway of King William Street, Walbrook and St Swithin's Lane to allow these lining works.

These works would include the following activities: site set up; utilities diversions; shaft excavation (following archaeological investigation); sewer works; and shaft refill and site reinstatement. The Low Level 2 Sewer Works are anticipated to last for approximately 13 months and the London Bridge Sewer Works for approximately 6 months.

Arthur Street

The Arthur Street utility works will require the diversion of water and gas mains, electrical cables and the breaking open of the Arthur Street sewer. These works will require the closure of Arthur Street in both directions for approximately six months in advance of the main construction period. Works will be undertaken during core hours only.

During these works, vehicle and pedestrian access will be maintained to those buildings serviced from Arthur Street.

These works would include the following activities: site set up; excavation of trenches; duct/pipe laying, chamber construction, pulling and jointing cables; and connections commissioning and site reinstatement.

Other Protective Works to Utilities

Other protective works to utilities in the area will include the following activities: site set up; excavation of trenches; duct/pipe laying, chamber construction, pulling and jointing cables; connections commissioning and reinstatement.

Protective Works to Buildings and Roads

Protective works to, and other mitigation of, buildings (including listed buildings) and roads will be carried out where the ground movements and analysis indicates this is required. Although not expected to be necessary, this may include grouting works carried out via excavated shafts. If required, grouting will be undertaken from the new or existing tunnels or via shafts within the Whole Block Site and outside Mansion House on Walbrook (see Figure 2.1). The shafts would be 6m in diameter and up to 14m deep in order to inject the grout via small-diameter sleeved port pipes. The shafts would be constructed and in use for the duration of the project.

The Walbrook Grout Shaft is expected to have 2.4m solid hoarding and be lit in the hours of darkness for safety and security. There are expected to be up to six construction vehicles per day during normal operations. A single lane of traffic past the work site will be facilitated where possible. During the grouting works and shaft reinstatement the work site footprint will be reduced in size to reduce the impact upon the movement of vehicles and pedestrians.

Protective or Remedial Works to Other Assets

Substations

Up to twenty UK Power Network (UKPN) substations could potentially be affected by ground movement from the tunnelling works. Monitoring will be required for these assets, and in addition further protective measures may need to be undertaken – requiring access to the buildings.

Utility Site Protection Works

In some instances it may be necessary for additional temporary protection to be provided to pipes. This may be necessary when large loads are likely to be positioned above the pipe (e.g. concrete silo, or crane outriggers) or where the existing cover to the pipes is less than required by the utility companies. In either case, additional protection is be provided in the form of steel, concrete or timber bridge spanning over the pipe in order to distribute the load away from the pipe.

Building Service Connections

Where there is significant differential ground movement caused by the tunnelling process there could be a risk of failure of the lateral building utility supplies. In this instance, intrusive investigation surveys such as trial holes and CCTV may be undertaken, both internally and externally of the building. This will enable design of mitigation works which could involve replacement of the laterals or opening up the service entries to provide flexibility.

Stakeholder Liaison

The utilities works will be actively coordinated and managed, which will be achieved via:

- detailed and continuous liaison with statutory undertakers, the Corporation of London and Transport for London highway authority;
- pre-construction utility surveys to identify existing assets, proposed diversion routes and reduced risk of unforeseen obstructions; and

- promotion of combined utility trenches and single contractor installation where possible.

Upon TWAO approval, a freeze notice will be issued under *Section 85(2)(a)* of the *New Roads & Street Works Act 1991* in relation to streets in the TWAO limits. This notice will apply to public highways within the limits and have the effect of requiring statutory undertakers to consult with the nominated undertaker for BSCU prior to installing new apparatus in the highway. Whilst this notice does not grant the nominated undertaker the power to stop a statutory undertaker from installing their apparatus, they can ensure that it does not conflict with the proposals, or if it does, require it to be removed at the statutory undertakers own expense. This notice will help to ensure that diversions for BSCU of apparatus in streets are coordinated with other utility works within the BSCU limits.

3.6 Enabling Works

The main project works will necessitate several enabling works in the existing infrastructure. It is the aim of the project to have these enabling works completed prior to main works commencing.

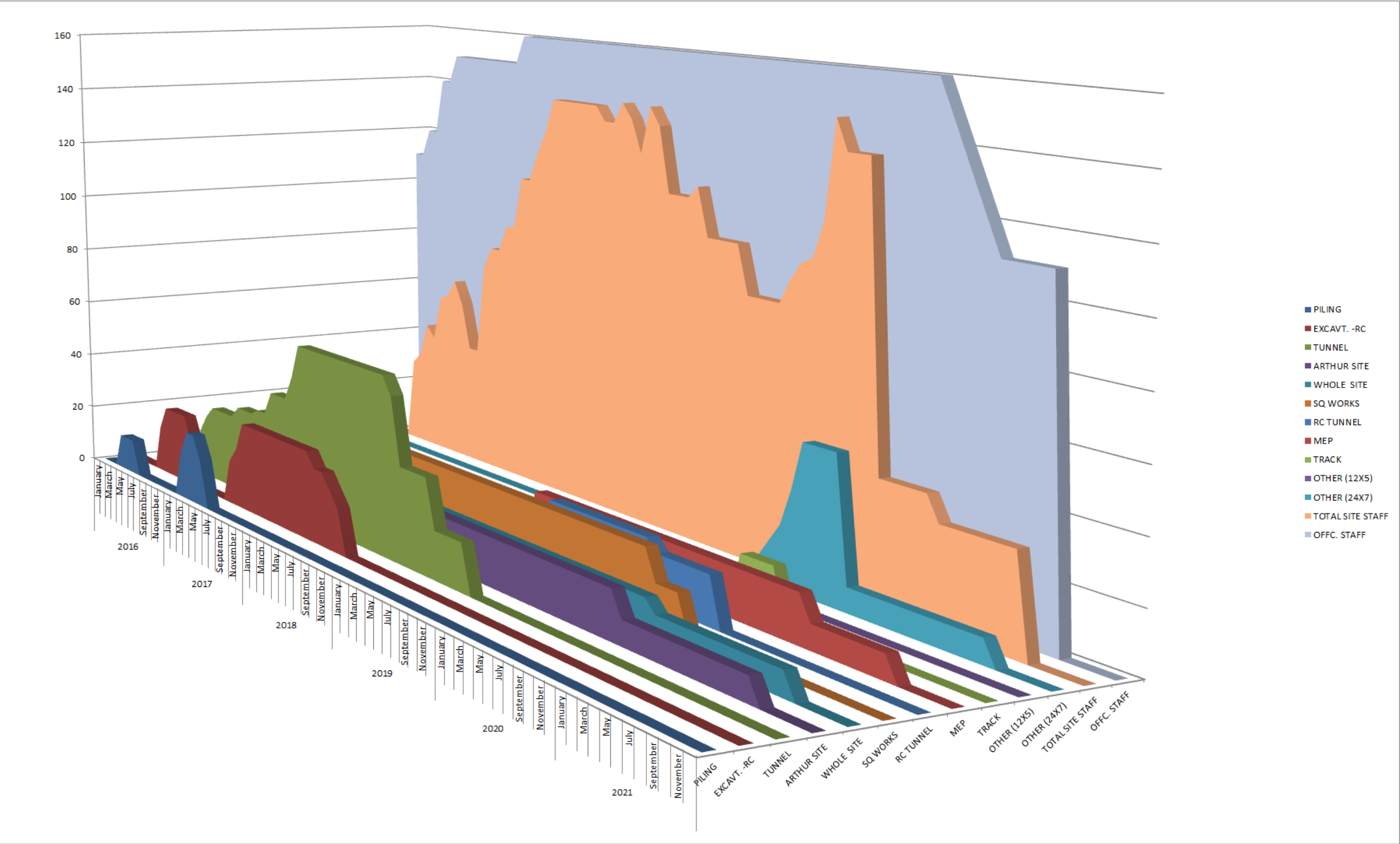
These works include street works on:

- Suffolk Lane (removal of bollards, dropped kerb works, relocation of the current motorcycle parking, signalling, installation of CCTV equipment, etc).
- Arthur Street Site (at King William Street at the junction with Arthur Street – potential reconfiguration of the northbound reservation to allow the Arthur Street gantry welfare office to be constructed, removal of the “no right turn” restriction along Lower Thames Street at the junction of Arthur Street, etc).

- Monument Junction (the BT Chambers on both sides of the Monument Station Subway underneath King William Street may need to be strengthened to lift the current 18 Tonne restriction on the Junction).
- Access entry and exit points will also need to be created from Nicholas Lane for demolition works and from Cannon Street for construction works

Figure 3.4: Indicative Labour Histogram

Definitions: Excavation RC = Excavation Reinforced Concrete; SQ Works = Square Works; RC Tunnel = Reinforced Concrete Tunnel; MEP = Mechanical, Electrical, Plumbing; Offc. Staff = Office Staff



4.0 Materials and Waste Management

4.1 Materials Inputs

Major materials inputs to the construction process are:

- concrete;
- steel; and
- fit out materials (including escalators, track, etc.).

Approximately 36,000m³ of concrete will be required to build the works. This will need to go underground through the BSCU Work Sites. Approximately 80 per cent will be delivered as a dry mix and mixed on site, the remaining 20 per cent will be delivered ready mixed. Figure 5.1b, which predominantly illustrates heavy goods vehicle movements, also shows concrete volumes.

Further details on material inputs, quantities and sources are not currently available. It would be reasonable to assume that concrete will come from a depot(s) in East London or the Thames Gateway. This will be determined at a later date.

4.2 Waste Outputs

Major sources of waste from the construction process are:

- excavated material from tunnelling excavations – made ground, London Clay;
- waste concrete from the tunnelling process;
- packaging – plastics, pallets, expanded foams, etc.;
- new cross passages cast iron lining segments, temporary structures spoil (concrete and steel); and
- dirty water (for example from site run-off containing silt or pumped from the tunnels).

As the tunnelling work is completed, excavated material will be removed from the BSCU Work Sites. The excavated material will ‘bulk’ following its removal and the volume will increase to approximately over 110,000m³ as it exits through the BSCU Work Sites. It is anticipated that approximately 70 per cent of the excavated material will be removed through

the Arthur Street Work Site. Figure 5.1b gives an indication of the excavated material volumes.

Information on measures to reduce potential impacts from waste can be found in the draft CoCP.

5.0 Traffic

5.1 Heavy Goods Vehicle Movements

The heavy goods vehicle (HGV) movements for excavated material disposal, concrete delivery, MEP and fit out supplies across the works programme are shown in the tables/graph presented in Figure 5.1a and 5.1b, overleaf. Figure 5.1b also shows excavated material and concrete volumes.

The average weekly HGV movements over the full construction programme is 168 HGVs per week. On the basis of there being 55 operational hours per week this figure can be converted to vehicles per hour as follows: $168 / 55 = 3 \text{ HGVs per hour}$ on average.

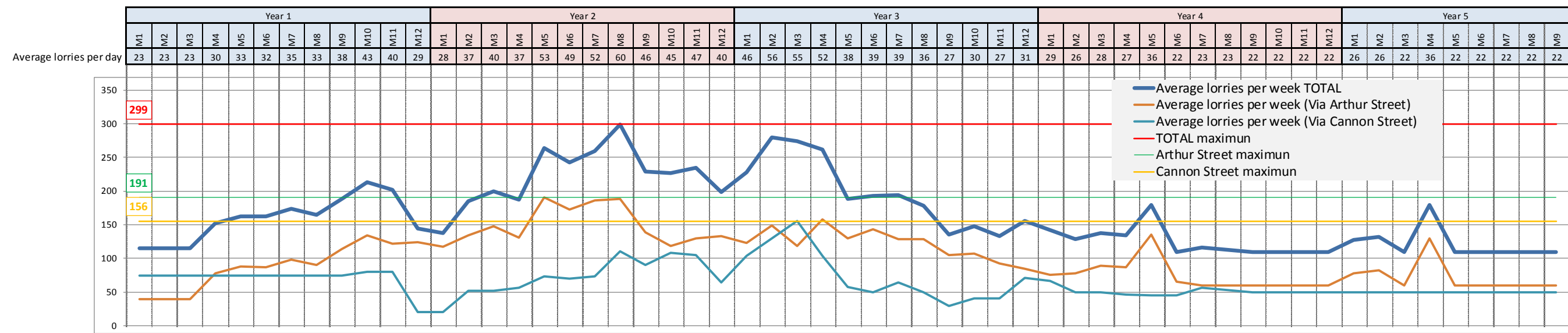
The peak excavation occurs in Year 2, Months 5 to 7, when two tunnel crews will be working simultaneously and the excavation of the ticket hall box will have commenced. Added to the other lorry movements at this time, there will be a total peak of 299 HGV movements per week. On the basis of there being 55 operational hours per week this figure can be converted to vehicles per hour as follows: $299 / 55 = 5.4 \text{ HGVs per hour}$ on average.

However there will be some lorry movements at night removing excavated material from the Arthur Street Work Site. The final row at the bottom of Figure 5.1b shows the excavated material (or 'muck') transport as a percentage of the total HGV movements. The average hourly and weekly HGV movements described in the preceding paragraphs are based for simplicity on day time working hours. It is therefore the case that day time movements will actually be lower than the aforementioned averages due to removal of excavated material from the Arthur Street Work Site at night.

5.2 Maximum Vehicles Sizes

Delivery vehicle types will vary through the lifetime of the project. Typically with the groundwork phases the majority of vehicles accessing and egressing the BSCU Work Sites will be in the form of 11m to 12m long flatbed and muck-away vehicles, predominantly removing excavated material. For concrete works, smaller concrete wagons approximately 9m in length will access the BSCU Work Sites. Steel reinforcement will be brought in on rigid vehicles no more than 12m in length. For early works, and works where access to the Whole Block Site is by Abchurch Lane and Nicholas Lane, vehicles that can safely get down these two lanes will be required. Where beneficial, suppliers will be encouraged to use smaller vehicles. All vehicles will be marshalled into the work sites.

Figure 5.1a: HGV Movements



Note that this programme has been condensed by approximately 6 months for assessing transport impacts as a reasonable worst case scenario.

Figure 5.1b: Indicative Material Volumes and HGV Movements

[illegible]

6.0 Route Planning

6.1 Introduction

Delivery routes have been selected to minimise disruption to other road users. Vehicles making deliveries to the BSCU Work Sites or removing excavated material will travel via designated routes which will be agreed with the City of London Corporation, TfL and the City of London Police as required. Routes will be included within the contracts of the suppliers to the project. Once the delivery team for each supplier starts on site, this will be included in their mandatory requirements by the Dragados team. A delivery management system will be utilised to monitor compliance.

6.2 Strategic Access Routes

Towards Central London

Delivery routes to the centre of London will all be from the east, using the main orbital routes around the City of London, as shown in Figure 6.1.

Into Central London

The strategic routes for construction traffic have been developed to ensure disruption to the road network in the City of London Corporation jurisdiction and surrounding areas is kept to a minimum. Figure 6.2 shows the strategic routes for inbound and outbound traffic to both BSCU Work Sites.

6.3 Local Access Routes

Proposed construction traffic routes and layouts showing the coordination of logistics throughout the course of the project are described and illustrated within this section.

The access and egress of construction traffic will be carefully managed to minimise its impact upon the surrounding highway and local road users. Access and egress for construction vehicles will vary according to the particular stage of construction. All vehicles will travel via the Arthur Street Work Site. This will enable the regulation of construction traffic to the Whole Block Site.

Arthur Street Work Site

The Arthur Street Work Site will be accessed via Upper Thames Street, heading west. All vehicles will turn right at the junction with Arthur Street. The traffic light system and localised signage and information will be altered to enable this. Vehicles will travel through the site and exit onto King William Street.

If the vehicle has made its drop off / collection at the Arthur Street Work Site it will turn right at the Monument junction, down Eastcheap and Great Tower Street, and out of the City of London via the route shown in Figure 6.2.

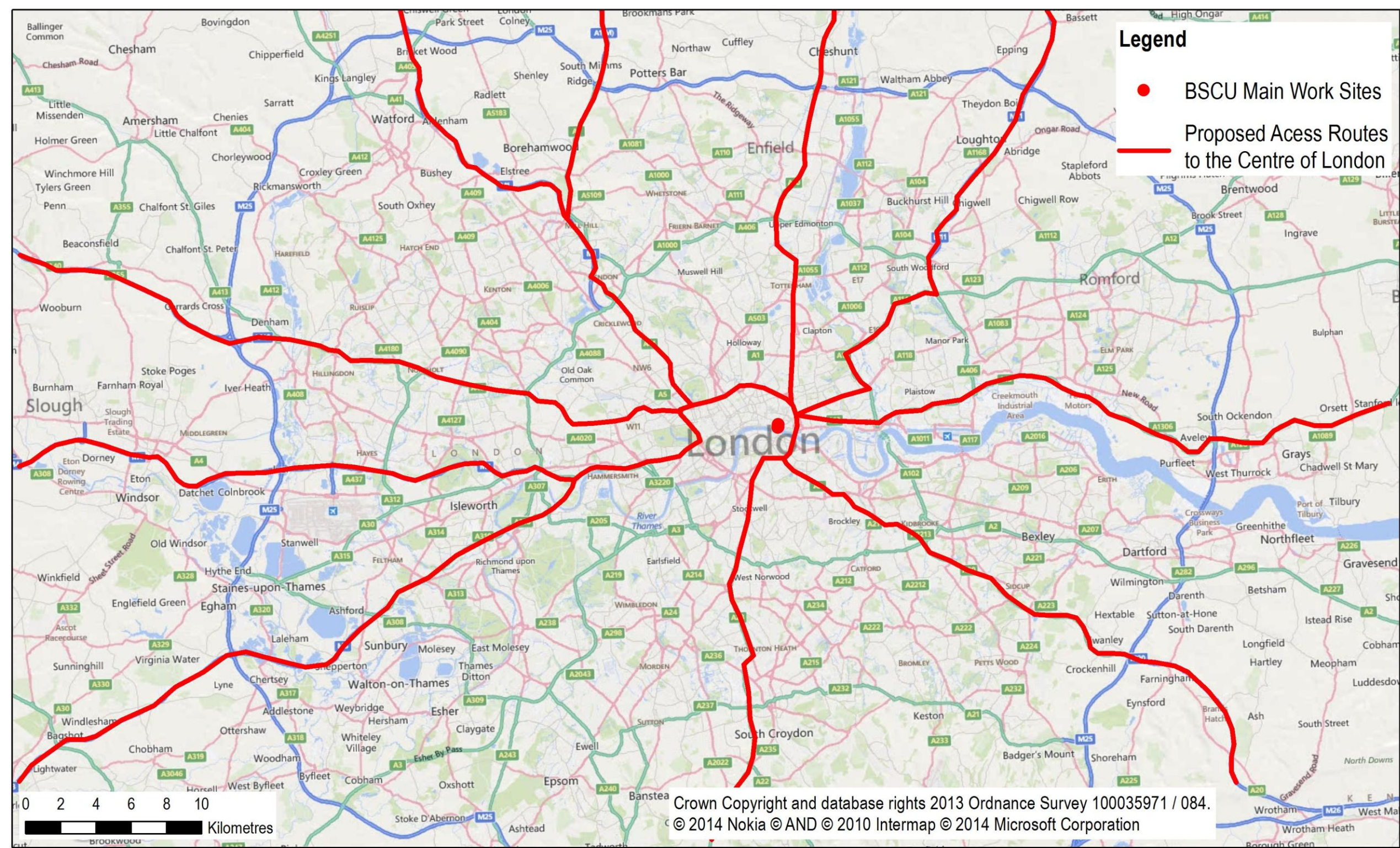
If the vehicle has been called forward to make its drop off / collection at the Whole Block Site then it will turn left at the Monument Junction, travel 100m west along Cannon Street to the clearly marked site entrance gate, where the Whole Block Site traffic management team will be expecting it and it can be safely marshalled into the site.

Whole Block Site

Vehicles will access the Whole Block Site turning right on Cannon Street. Flashing lights on the gates will be activated by the traffic marshal who will open the gates outward, providing a barrier to pedestrians. After the vehicle has entered the site, the traffic marshal will close the gate and re-direct pedestrians along the pavement as normal. The same procedure will be followed for vehicles to exit the site. The traffic marshal will also assist the driver to turn left on Cannon Street.

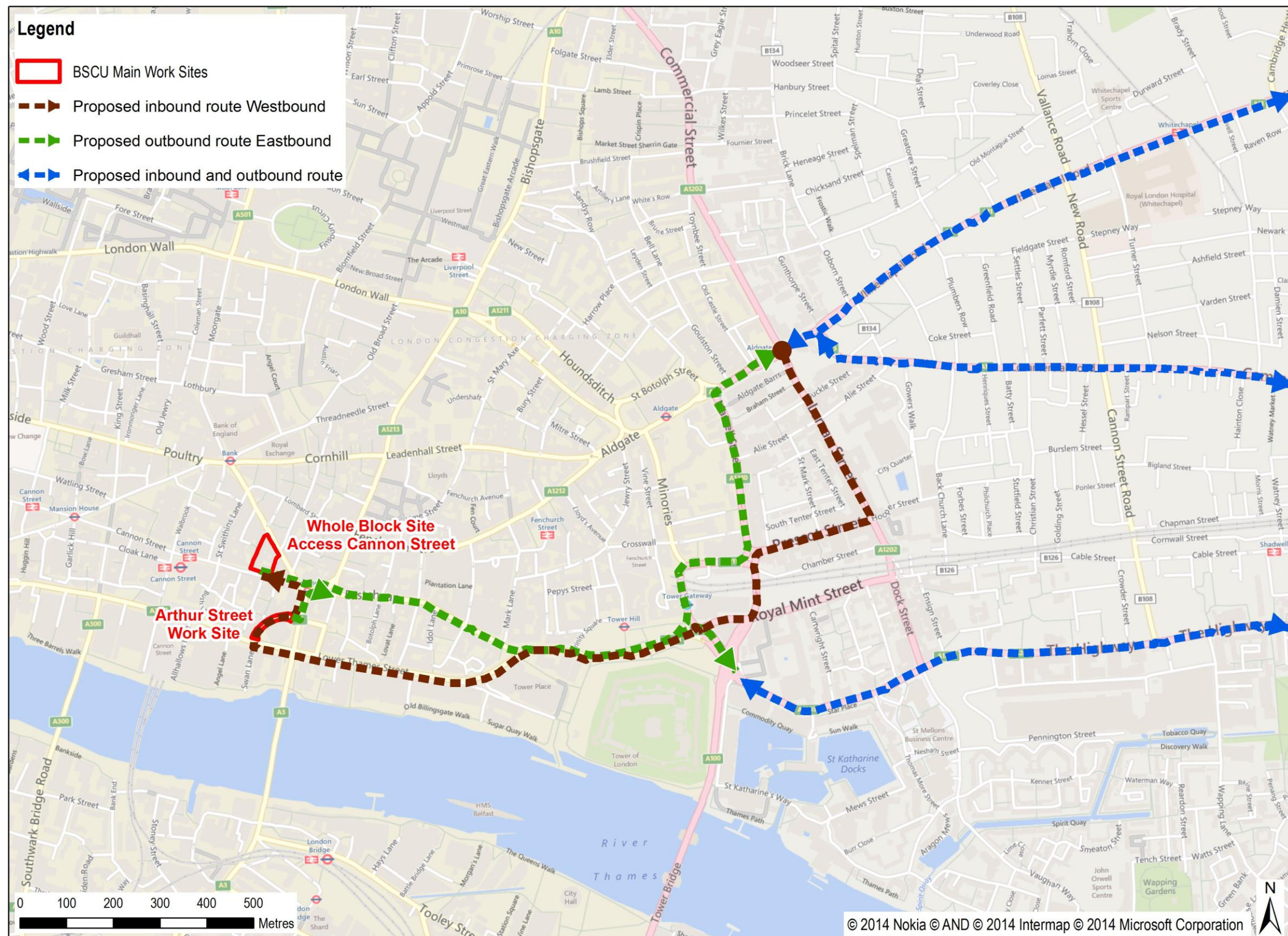
More detail on traffic management is provided in Section 6.5.

Figure 6.1: Proposed Access Routes to the Centre of London.



Note that all access into the City of London is from the East. Vehicles entering Greater London will travel around to the East on the main orbital routes around and then travel in on the following local access routes.

Figure 6.2: Strategic Routes



6.4 Diversions

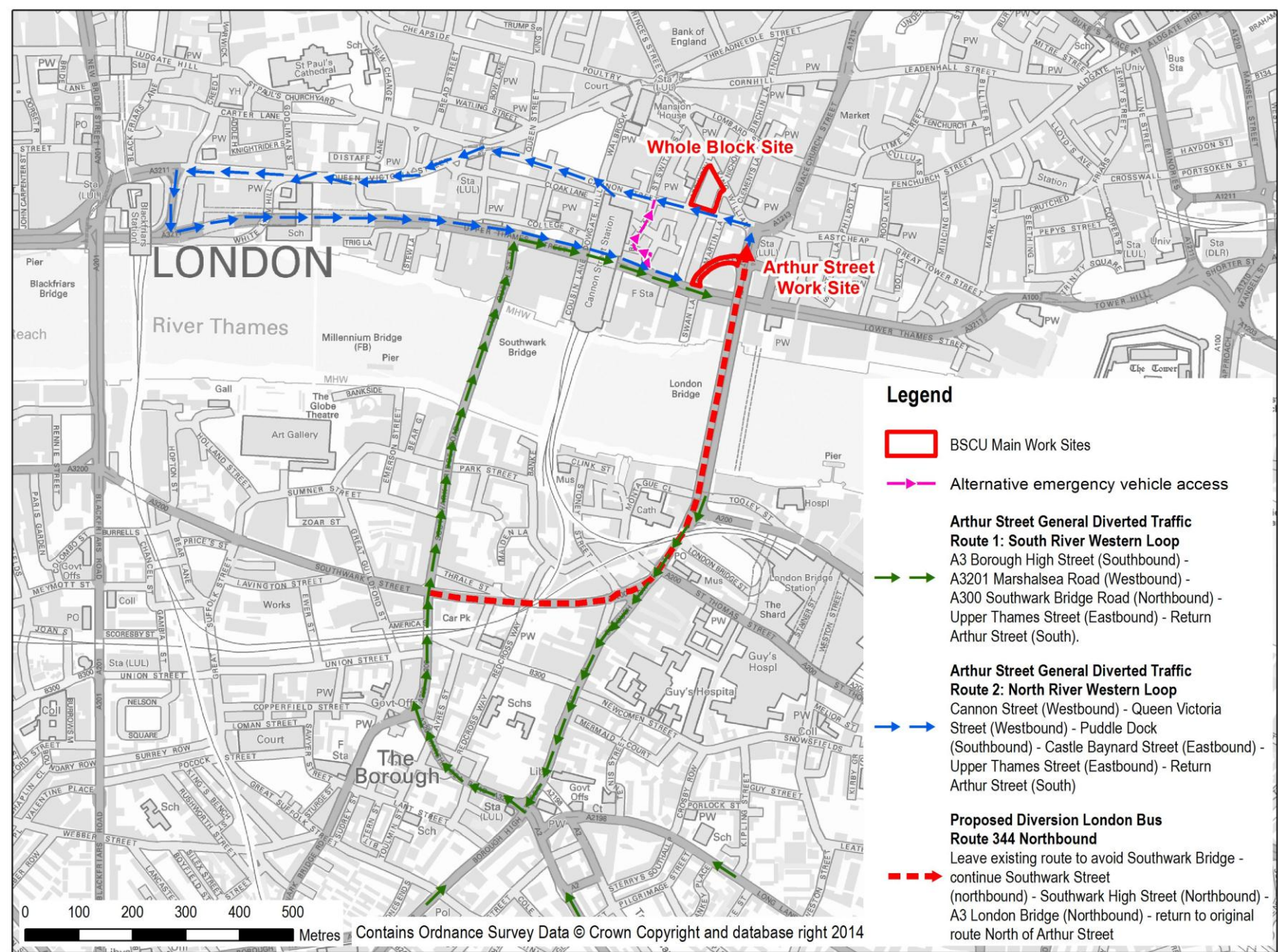
The closure of Arthur Street places a requirement that roads and other transport modes need to be redirected, as shown in Figure 6.3.

Road users that previously used Arthur Street to gain access from King William Street (heading North) down to Lower Thames Street (heading East) will be redirected as shown in Figure 6.3, with two routes.

The 344 bus, heading north, will be redirected away from its current route across Southwark Bridge and up Arthur Street so that its new route will travel straight across London Bridge and continue as its current route. The Arthur Street bus stop will be altered as per Transport for London, Bus Directorate requirements. Southbound services will not be affected.

In addition, Arthur Street is used by the London Bus Route 15 (Heritage) if the bus gate at Great Tower Street / Lower Thames Street fails. Arrangements with Transport for London, Bus Directorate have also been made for a revised alternative route for this service.

Figure 6.3: Traffic Diversions



6.5 Traffic Management

Deliveries will be phased and controlled on a 'just in time' basis, this will minimise transport disruption. All transportation to, from and on the BSCU Work Sites will be on rubber tyre vehicles.

All vehicles will be booked in using a delivery management tool. The site gate is set back 17m from Upper Thames Street to allow vehicles to wait clear of the main road before entry. Should an unscheduled vehicle arrive at the site, the supplier providing the delivery will be contacted by the Site Agents and arrangements will be made to send their deliveries to site at a newly agreed time.

Arthur Street Work Site

Figure 3.2a shows the route the site vehicles will take to access and egress the Arthur Street Work Site. There will be a 17m space at the south western end of Arthur Street before the site gates to ensure that vehicles attempting to gain access to the work site can be safely clear of Upper Thames Street in order to be security checked, and be checked against the booking in procedure, prior to gaining access. The work site includes a regulating area to facilitate the operation of the work sites whilst maintaining an uncongested and safe one way system. This area will enable the control and management of the excavated material trucks and other material deliveries on occasions where the previous truck has not completed its loading/unloading operation. The Whole Block Site vehicle route is as described on section 6.3. Vehicles will exit the work site into King William Street, turning left. The interface with traffic, pedestrians and other vulnerable road users will be managed at this point by traffic marshals.

Figure 6.4a: Arthur Street Swept Path Analysis for Muck Wagon Accessing Arthur Street

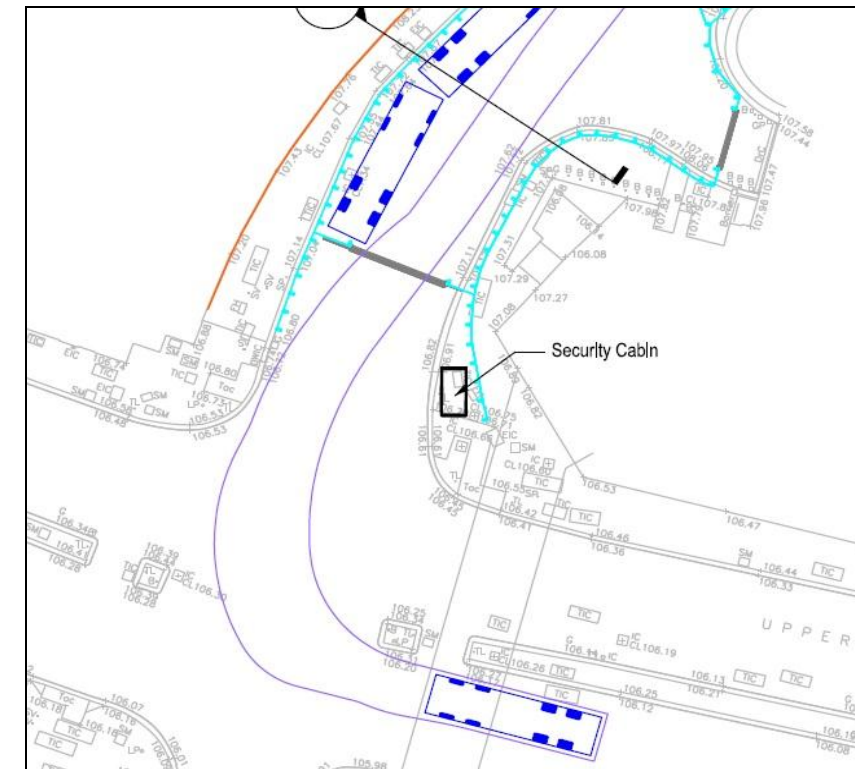
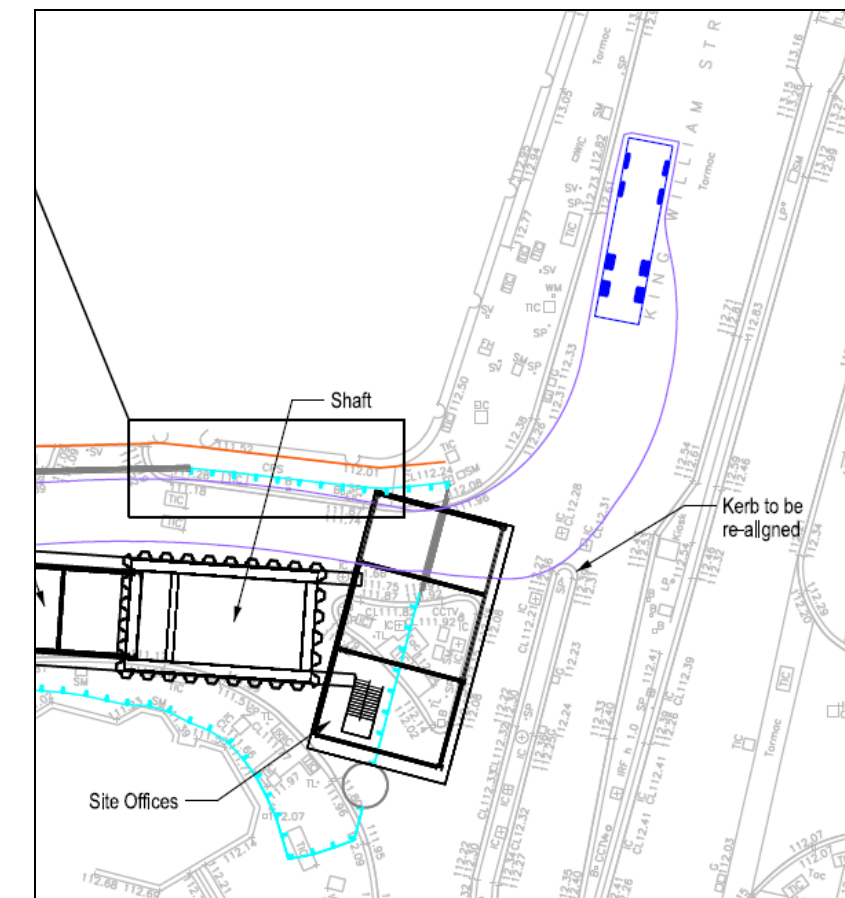


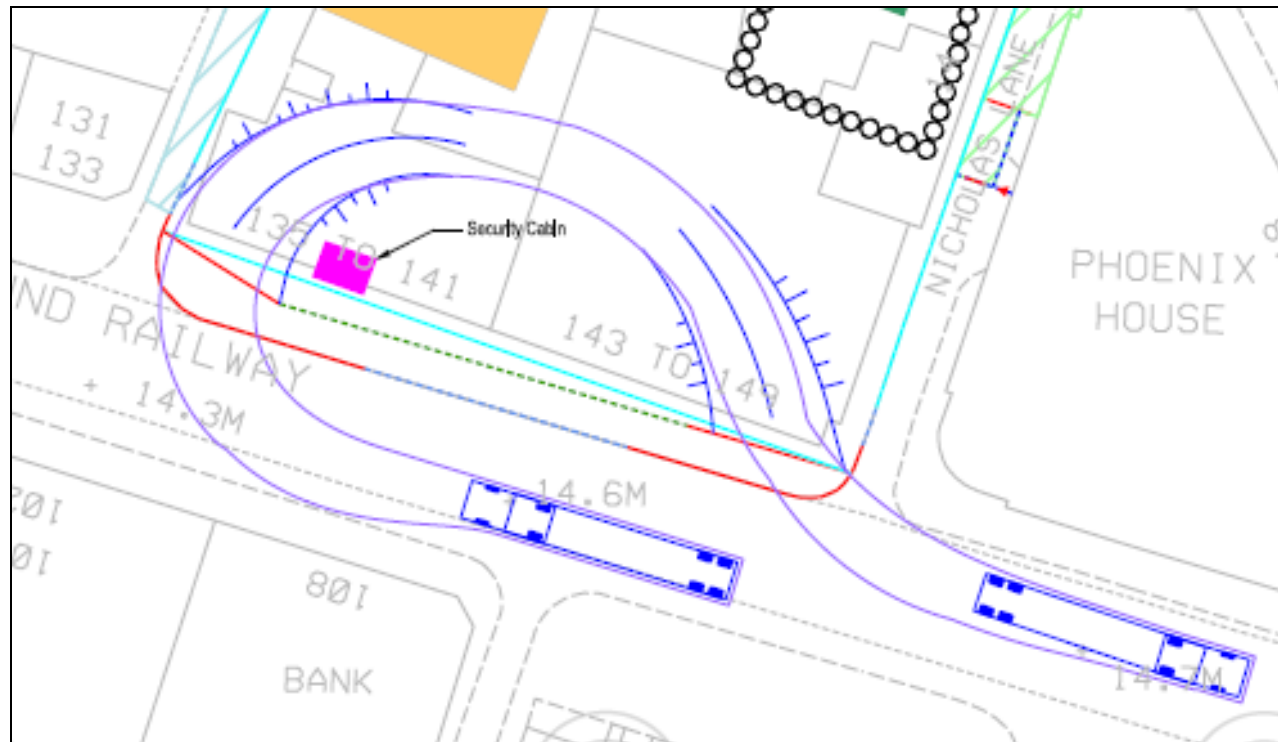
Figure 6.4b: Arthur Street Swept Path Analysis for Muck Wagon Egressing Arthur Street



Whole Block Site

Figure 3.1 shows the passage vehicles will take to access and egress the Whole Block Site to/from Cannon Street. Vehicles will only be called to the Whole Block Site once there is space for the vehicle within the site. This will ensure no vehicles are waiting on the highway. Figure 6.5 shows the swept path analysis for a trailer accessing and egressing the Whole Block Site.

Figure 6.5: Cannon Street Swept Path Analysis for Trailer Accessing and Egressing



Managing Deliveries Between The BSCU Work Sites

Traffic marshals at Arthur Street will control the vehicles around both work sites. Radio communication and a Delivery Management System will be used to control the vehicle logistics around the two sites. When Cannon Street has sufficient capacity to take more vehicles its traffic marshal will inform the Arthur Street traffic co-ordinator via radio.

When the traffic co-ordinator has completed their checks on vehicles they will talk to the Whole Block Site team and agree to call the next vehicle bound for the Whole Block Site forward. Vehicles will exit Arthur Street and turn left at the Monument Junction, heading west along Cannon Street. Approximately 100m on the right the Cannon Street traffic marshals will be waiting to accept the vehicle. This manoeuvre is likely to take between 45 seconds and 180 seconds, depending on traffic light sequencing at the Monument Junction.

7.0 Managing Site Deliveries

7.1 Loading and Unloading

Depending on the stage of the project and the size / type of material to be distributed, materials at the Whole Block Site will be offloaded directly from the unloading area by the tower crane or to the goods hoists.

7.2 Cranes and Equipment

Figure 3.1 shows the position of the tower crane. When strictly required due by heavy lifts operations, an auxiliary crane will be located (generally) on the Cannon Street side of the work site. The tower crane will be founded on a designed base at lower ground floor level.

7.3 Delivery Schedule

Working hours are specified in the draft CoCP.

Delivery Management System

Dragados will operate a Delivery Management System that fully meets Transport for London's requirements to control deliveries to the BSCU Work Sites, as well as to record vehicle movements to and around the BSCU Work Sites.

7.4 Vehicle Safety

Dragados will ensure measures are taken to reduce the risks of construction traffic collisions with the workforce and the public. The Contractor will become a Bronze member of the Fleet Operator Recognition Scheme (FORS), and ensure compliance to the Standard for construction logistics: Managing Work Related Road Risk (WRRR).

Dragados will implement the following measures:

Vehicle Safety Measures

- lorries¹ will have side guards fitted, unless it can be demonstrated that the Lorry will not perform the function for which it was built if side guards are fitted.
- lorries will have a close proximity warning system fitted comprising: a front-mounted, rear-facing CCTV camera with in-cab live feed from the camera or a Fresnel Lens where the Fresnel Lens provides a reliable alternative to the CCTV camera; and a Close Proximity Sensor.
- lorries will be equipped with enhanced audible means to warn other road users of a vehicle's left manoeuvre.
- lorries will have front, side and rear blind-spots completely eliminated or minimised as far as is practical and possible through a combination of fully operational direct and indirect vision aids and driver audible alerts (for example a Class VI Mirror).
- lorries associated with the project will have clear project branding so lorries working on the project can be easily identified.
- lorries and vans² will bear prominent signage on the rear of the vehicle to warn other road users not to get too close to the vehicle; in particular to warn cyclists of the dangers of passing the vehicle on the inside.

¹ Lorry means a vehicle with an maximum authorised mass exceeding 3.5 tonnes. Maximum authorised mass means the maximum load that can be carried safely while used on the road.

² Van means a vehicle with a maximum authorised mass not exceeding 3.5 tonnes kilograms including a van, a car-derived van or other vehicle designed for carrying freight (excludes passenger cars, motorcycles, mopeds and bicycles).

Transport Collision Reporting

- all collisions shall be reported to Dragados.
- there will be a system in place to capture, investigate and analyse road traffic collision information that results in injury or damage to vehicles and property.

Driving License

- each driver who works on the project will have a driving licence check with the DVLA to ensure all drivers hold a valid licence for the category of vehicle they are tasked to drive.
- a system will be in place to ensure licences are rechecked on a regular basis; and any risks associated with endorsements or restriction codes are effectively managed.

Driver Training

- each driver will undertake the Safe Urban Driving (SUD) Approved Driver Training course within 60 days of the Contract Date unless they have undertaken such SUD training in the last three years. This includes the on-cycle hazard awareness training.
- all drivers (including those exempt or not in scope of Driver Certificate of Professional Competence) will undergo approved progressive training and continued professional development specifically covering the safety of vulnerable road users. As a minimum this shall be satisfactory completion of a FORS e-learning Work Related Road Safety module (or an approved equivalent safety module) at least every 12 months.

7.5 Vehicle Emissions

Construction vehicles shall meet the emissions criteria and other requirements in relation to reducing emissions, as described in the draft CoCP. This will include meeting criteria for the London Low Emission Zone (LEZ).

8.0 Parking, Loading and Servicing Arrangements

8.1 Arthur Street Work Site

There are three properties that have service yards, or vehicle garages, accessed from Arthur Street – 12 Arthur Street, 24-28 King William Street and 33 King William Street. Consultation is on-going to reach an agreement with the owners and users of these properties to develop acceptable methods for maintaining access.

8.2 Whole Block Site

It is envisaged that on-going consultation with local businesses will be needed in order to coordinate deliveries to properties on Abchurch Lane and Nicholas Lane through roads.

9.0 Worker Access and Pedestrian Management

9.1 Worker Access and Travel

Access

The strict control of access is paramount for safety and security on site. Manned security points will be located at the personnel entry points (with a biometric entry system) located off the Cannon Street entrance for the Whole Block Site and King William Street for the Arthur Street Work Site. These access points will be separate from vehicular / plant access gates.

All personnel commencing work at site will be required to undergo a site induction safety course, following which, a security pass will be issued permitting access to the site.

Travel

Dragados anticipates that nearly all personnel (operatives and management) will travel to the BSCU Work Sites via public transport. Due to its Central London location the BSCU Work Sites can be accessed easily from national rail, tube and bus stations. Site parking will not be permitted and the use of public transport will be promoted together with a cycle to work scheme; secure cycle parking will be provided. Further information will be provided in a Construction Worker Travel Plan. This will be communicated to all construction staff at induction and at various toolbox talks during their employment. Signage in welfare areas on site will also provide further information, advice and encouragement. Sub-contractors will be provided with the Plan, and required to adhere to it.

9.2 Public Access

Where possible, the busiest times for foot traffic will be avoided on the delivery schedule. All vehicles will be guided in and out of the BSCU Work Sites at all times. The site hoarding will provide segregation between the public and the site operations.

Access for pedestrians around the Whole Block Site is shown with green arrows on Figure 3.1. Access around the Arthur Street Work Site outside the hoarded area will be maintained as shown on Figures 9.1 and 9.2. Further details on pedestrian safety can be found in Section 9.3.

Figure 9.1: Arthur Street Work Site – Key routes for pedestrians transiting across the site in an East-West direction once work site is in place

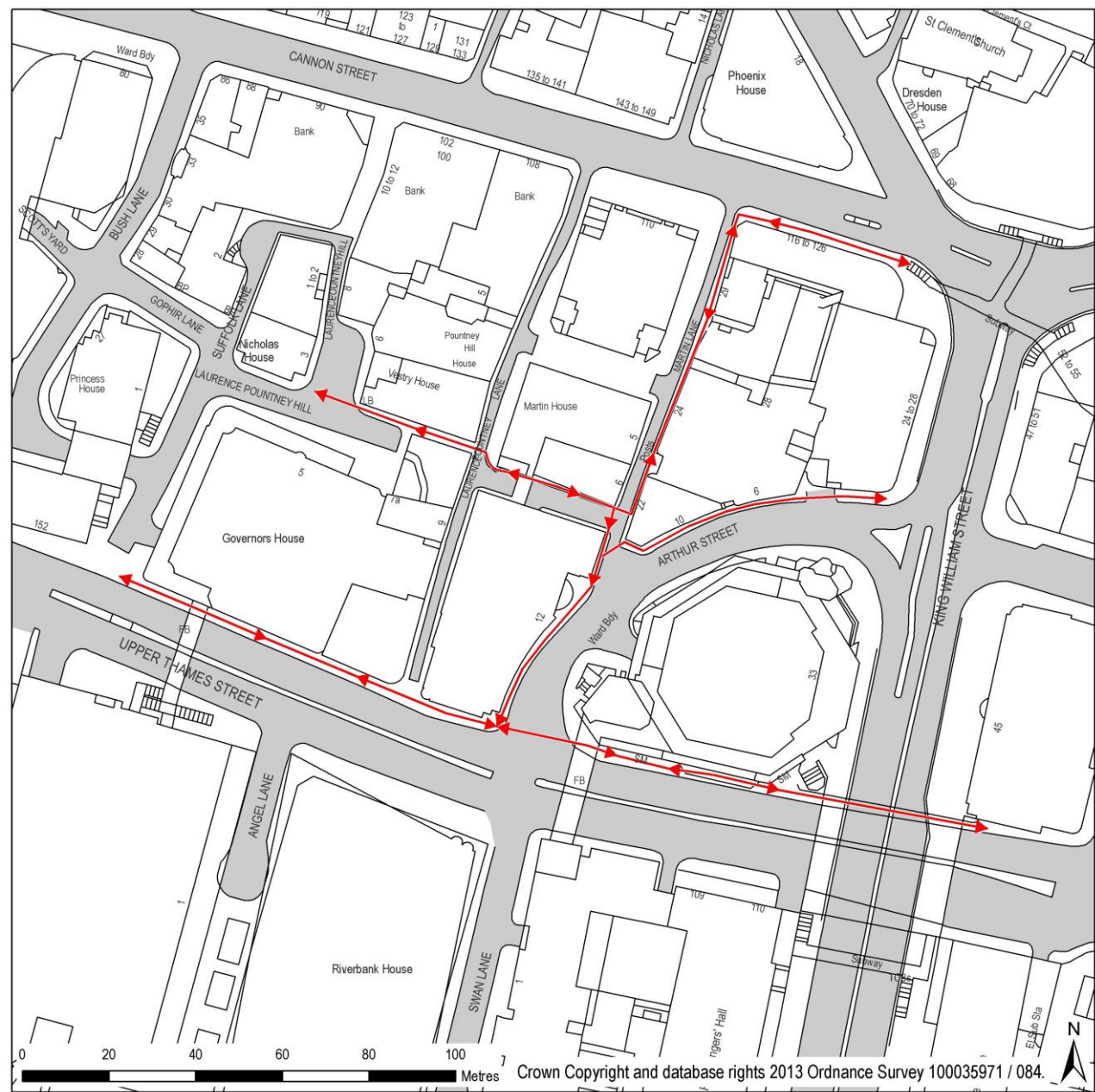
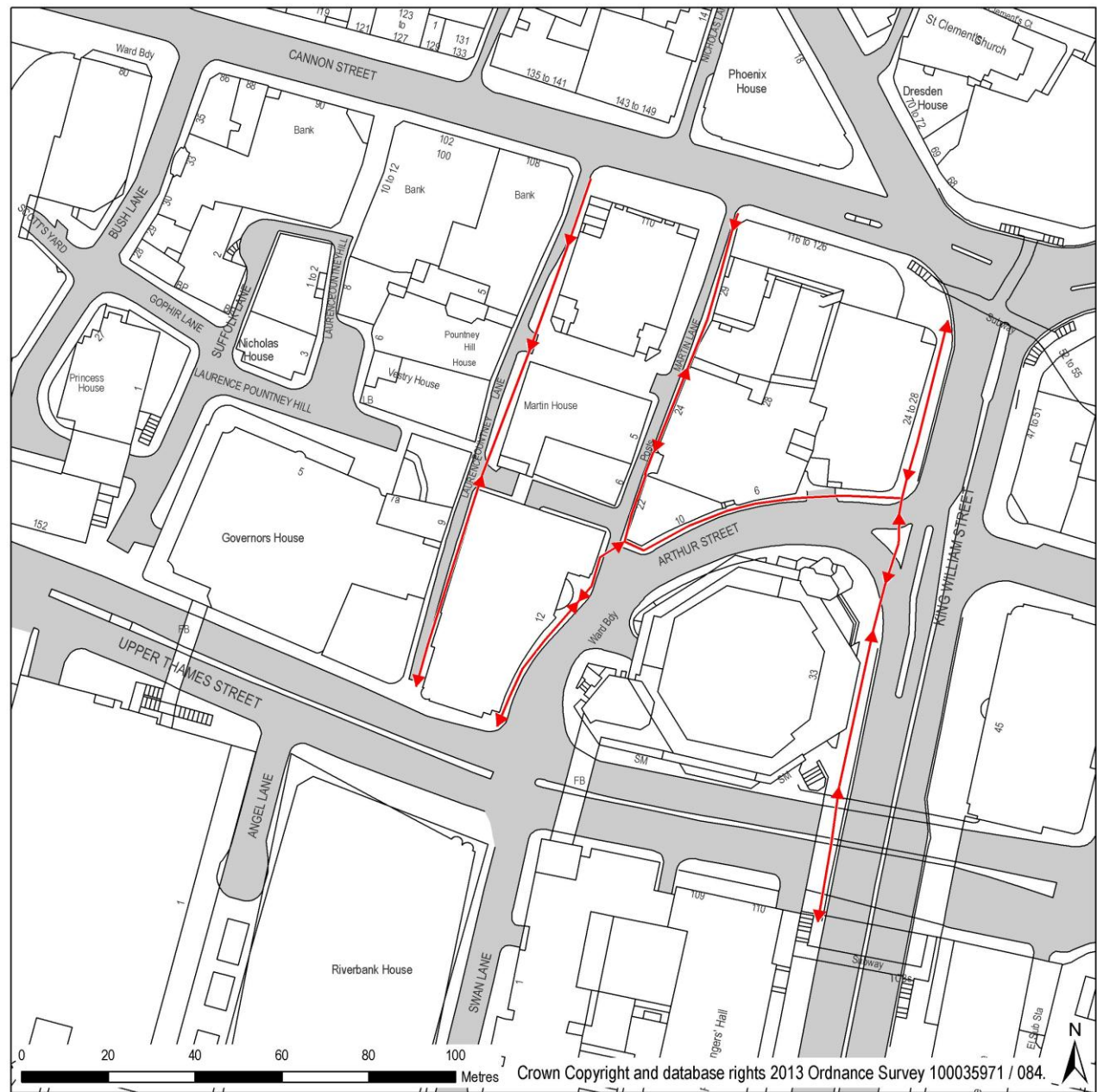


Figure 9.2: Arthur Street Work Site – Key routes for pedestrians transiting across the site in a North-South direction once work site is in place



9.3 Pedestrian Safety

In agreement with the City of London Corporation, the site hoarding / scaffolding to the work site perimeters will be as follows. Hoardings shall generally be 3.6 metres high and in all cases shall be a minimum 2.4 metres high, unless otherwise agreed with the City of London Corporation.

Whole Block Site

King William Street

King William Street is a main highway with a relatively wide pavement.

Pedestrian protection tunnel scaffold gantries will be formed along King William Street and Cannon Street, clad in hoarding with soffit protection as necessary, during the demolition of the Whole Block Site. They will extend to the edge of the kerb line along the length of these roads where they border the Whole Block Site. A minimum footway width of 2.0m, or the existing width where this is narrower, will be provided.

The construction area will be segregated from the pedestrian walkway by the site hoarding.

Nicholas Lane

Nicholas Lane is a narrow highway with narrow pavements.

Some short term intermittent closures of Nicholas Lane during normal working hours may be needed during the piling phase of construction.

Hoarding will be erected on the back edge of the kerb and fixed to the demolition scaffolding. The pavement within this zone will be closed with appropriate signage directing pedestrians to use the footpath on the other side of the road.

Abchurch Lane

Abchurch Lane is a narrow highway with narrow pavements.

During the demolition of building 10 King William Street it is envisaged to install a scaffold structure on the east pavement of Abchurch Lane to prevent small debris and material projection. Abchurch Lane will remain open to traffic and the west pavement will remain open to pedestrians. However, during specific stages of the roof demolition, traffic may need to be restricted during periods of 48 hours, in three or four episodes maximum. A proposal will be prepared and submitted in advance to the City of London Corporation for its review and acceptance.

Hoarding will be erected on the back edge of the kerb and fixed to the demolition scaffolding.

Cannon Street

Cannon Street is a main highway with a relatively wide pavement.

The City of London Corporation Highways Department has confirmed that the pavement can be taken back to a 2m wide pavement, providing sufficient room for the works along this elevation.

Pedestrians will be stopped by the traffic marshal during vehicle access and egress.

Two temporary crossovers will be installed to change the site entrance for the following on works (by the end of demolition at latest). These temporary vehicle crossovers will enable safe access into the site area, therefore loading and unloading will be controlled within the site boundary.

Arthur Street Work Site

Arthur Street

Arthur Street is a main highway with a relatively wide pavement on its western / northern side. Hoarding will be erected either on the back edge of the kerb or on the pavement (leaving a minimum of a 1.2 metre footway for pedestrians). The option of integrating clear Perspex windows in a section of hoarding is being explored.

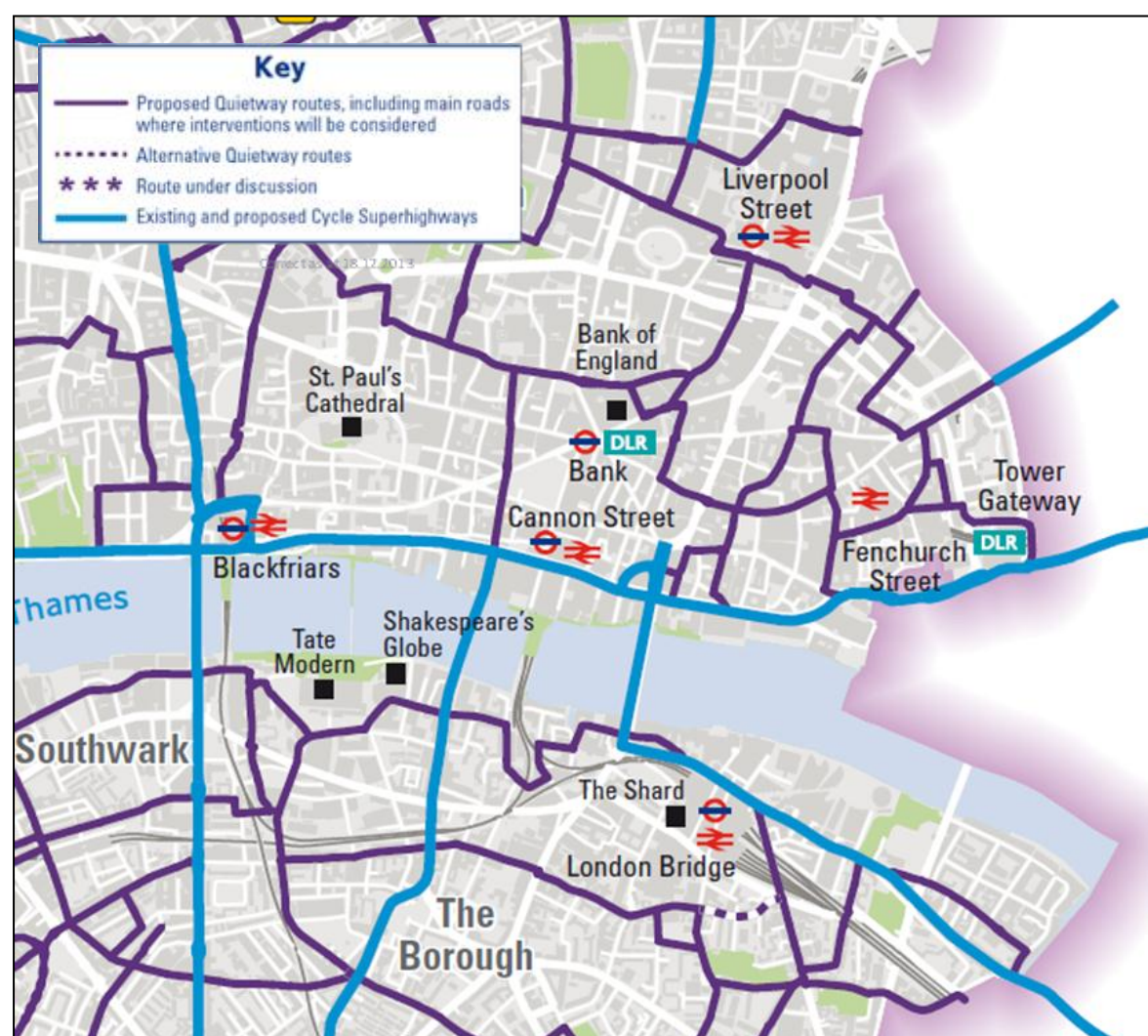
King William Street

King William Street is a main highway with a relatively wide pavement on its western side in the vicinity of Arthur Street. A pedestrian protection tunnel scaffold gantry will be formed, clad in hoarding.

10.0 Barclay's Cycle Superhighway

There is a potential interface with the TfL Cycle Superhighway, proposed by the Mayor of London to link East and West London. The East West route is proposed to be a 14km route through the heart of London, from the western suburbs to Tower Hill, connecting to the existing Cycle Superhighway 3 (CS3). Current proposals introduce a segregated cycle track through the City following Upper and Lower Thames Street and passing through the Arthur Street/Upper Thames Street/Swan Lane junction.

Figure 10.1: Planned Route of the Proposed Cycle Superhighway
(Note: the current plan includes the route going along the north-side of Upper / Lower Thames Street)



Source: Transport for London

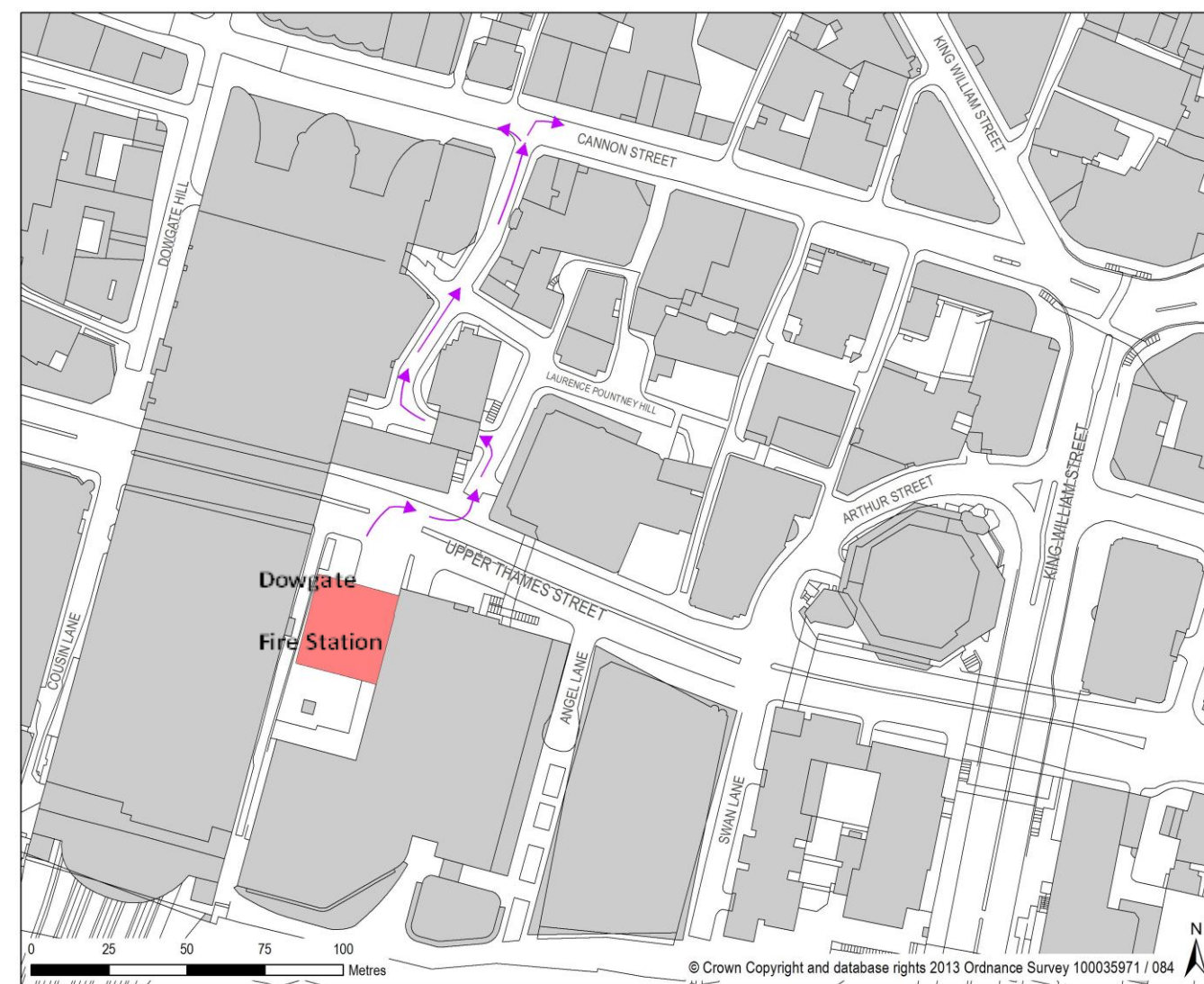
11.0 Emergency Vehicles

The only London Fire Brigade Station situated within the City of London is located at 94-95 Upper Thames Street, EC4R 3UE, and is known as Dowgate Fire Station (shown in Figure 11.1).

Arthur Street is currently used by Fire Appliances and other emergency service vehicles for access to the city centre; an alternative route is therefore essential. Both The City of London Corporation and the City of London Police support a route using Suffolk Lane, shown in Figure 11.1, which will re-open the connection between the lane and Upper Thames Street for emergency service vehicle access only. Legal Orders and the use of camera enforcement will be in place to restrict access to only these authorised vehicles. Works to provide this alternative access will require the removal of the security bollards along Suffolk Lane/Upper Thames Street which form part of the City of London's security and surveillance cordon (commonly referred to as the ring of steel).

The route will be available to London Fire Brigade and other emergency service vehicles in advance of the work on BSCU.

Figure 11.1: Alternative Emergency Vehicle Route via Suffolk Lane



12.0 Managing the CLP

12.1 CLP Co-ordinator

Implementation of the CLP will be the responsibility of the Dragados CLP Co-ordinator. The CLP Co-ordinator will help the development run smoothly by making sure each construction phase complies with the CLP. It will also be the CLP Co-ordinator's job to oversee the effectiveness of the CLP, and prepare regular updates to the local authority when required.

When the Detailed CLP is produced, the CLP Co-ordinator's name and contact details will be stated. Dragados will inform the City of London Corporation, London Underground Limited and Transport for London if the CLP Co-ordinator is replaced.

12.2 Publicising the CLP

The Dragados CLP Co-ordinator will be responsible for disseminating and enforcing the CLP within the supply chain.

The CLP Co-ordinator will respond to questions or queries about the development and put in place any mitigation measures needed to resolve traffic issues connected with the construction work. For example, the CLP Co-ordinator may need to:

- remind contractors and subcontractors about designated routes to and from the BSCU Work Sites;
- check vehicles arriving at the BSCU Work Sites to make sure they meet the Dragados' safety requirements; and/or
- manage the delivery booking and scheduling tool that records deliveries.

12.3 Contractors' Handbook

Dragados will produce, and where necessary provide updates to, a handbook that will support supervisors and managers in making sure the requirements of the CLP are met by everyone working at the BSCU Work Sites. The handbook will:

- communicate the CLP aims and objectives;
- clearly explain all site-specific CLP agreements and methods of working; and

- set out the Contractor's general practices and standards.

The handbook will also include:

- work site maps;
- working hours;
- Delivery Management System and delivery hours;
- health and safety information;
- information on the Construction Worker Travel Plan; and
- main contact details.

13.0 Monitoring the CLP

It will be the CLP Co-ordinator's responsibility to collect data relating to the CLP. The data that needs to be collected will be in line with the requirements which will need to be agreed between Dragados and the City of London Corporation. It will be the City of London Corporation's responsibility to monitor implementation of the CLP. This information will help highlight actual impacts of deliveries against predictions, and help set targets for future impact assessments. Targets for the CLP will be specific, measureable, achievable, realistic, timely and easily collected and interpreted.