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## **Crossrail Act 2008**

Crossrail Limited

### **Bond Street Station**

#### **ENVIRONMENTAL MANAGEMENT PLAN**

City of Westminster

For Information (Ref WES/7/1)

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# 1 General Environmental Management

## 1.1 Introduction

### 1.1.1 Background

The Crossrail project has been the subject of an environmental impact assessment and intensive consultation with a wide range of stakeholders, including members of the public, local authorities affected by the scheme and a range of statutory and non-statutory consultees. The provisions that would provide the powers to construct the railway have been scrutinised in both Houses of Parliament.

The Crossrail Project is subject to a number of strict environmental controls and requirements. As part of the enactment process a rigorous environmental impact assessment was carried out, the results of which are laid down in the Environmental Statement and its associated technical reports. Measures have been developed through the petitioning process in the Houses of Parliament and consultation with statutory bodies, such as Local Planning Authorities. These requirements are documented in the form of the Environmental Minimum Requirements (EMR) which comprise the Construction Code, Planning and Heritage Memorandum, Environmental Memorandum and a Register of Undertakings and Assurances.

Section 2.4 of the Construction Code requires the production of a number of environmental management plans (EMPs) which will set out how the project will deliver the environmental requirements and how environmental issues that arise are handled to ensure compliance with relevant legislation and with the environmental policies of the nominated undertaker. The range of issues to be covered by EMPs is set out in Section 2.4.4 of the Code. In addition to this requirement Section 5 of the Environmental Memorandum identifies particular worksites across the Crossrail route as being environmentally sensitive. The EMPs for works that affect these sites will address the management of these sites under the relevant topic heading. Where appropriate an additional topic management plan has been added (for instance a recreational resources management plan).

The Construction Code requires that EMPs will be discussed with relevant qualifying local planning authorities and that in preparing the EMPs, the nominated undertaker will take into account their observations. In addition, for sensitive sites, the Environmental Memorandum requires that key consultees (as defined in the Environmental Memorandum) will also be consulted.

### 1.1.2 Purpose and Content of the EMP

At Bond Street there are two schemes being designed in parallel under the powers of the Crossrail Act:

- Crossrail Bond Street Station works
- London Underground Congestion Relief Scheme

This document comprises the EMP for the Crossrail Bond Street Station works at the sites of the eastern and western ticket halls. It covers the advanced works and main construction works to be undertaken for construction of the station at these locations. A separate EMP will cover the Crossrail works which comprise the LU Congestion Relief Scheme.

In accordance with the requirements of Section 2.4 of the Construction Code this EMP sets out Cross Rail Ltd (CRL) approach to the management of environmental issues during the construction phase of the Crossrail Project at this site.

This document does not cover issues relating to lorry and traffic management, green travel or community liaison which are dealt with elsewhere.

### 1.1.3 Structure of the EMP

The document comprises two sections. Section 1 describes the general environmental management arrangements that CRL will employ. It outlines the context in which this EMP has been prepared, describes the role and objective of the EMP, the requirements for the content and the relationship with the Crossrail Environmental Management System.

Section 2 describes the processes by which particular environmental topics will be managed on the site.

## 1.2 Environmental Management during Construction

The contracts awarded for Crossrail advanced and construction works will include a requirement on the contractor to comply with this EMP.

### 1.2.1 Supporting Crossrail's Environmental Management System

Crossrail has developed an environmental management system (EMS) which is consistent with the principles of BS EN ISO 14001 for the project.

The main construction contractors will be required to have an EMS which is consistent with the principles of BS EN ISO 14001. The contractors EMS will support and comply with the provisions of CRL's EMS. Where relevant the contractor will refer to CRL's EMS procedures.

### 1.2.2 Management of the Environmental Performance of Contractors

Contractors are required to comply with all relevant environmental legislation and to take account of published standards, accepted industry practice, national guidelines and codes of practice appropriate to Crossrail (see Appendix 1). For the duration of the contract CRL will monitor the environmental performance of the contractor through site inspections and audits.

The contractor will operate an induction scheme to ensure all employees are aware of their environmental responsibilities, to identify training needs for personnel and to provide appropriate training. The training will include toolbox talks for site operatives to maintain an appropriate level of awareness of environmental issues.

## 2 Topic Management Plans

### 2.1 Introduction

This section provides a number of topic management plans. The list of topic management plans has been determined based on the issues identified in Section 2.4.4 of the Construction Code. In addition, in consideration of the potential archaeological resources in the Bond Street area, and the number of listed buildings in the vicinity of the works, an archaeology and built heritage topic management plan has been provided.

### 2.2 Description of the Works

#### 2.2.1 Advanced Works

Preparatory work - known as advanced or "enabling" work - is expected to start in late 2009 with construction beginning in 2010. These works will comprise the following activities, where appropriate:

- demolition of:
  - 65 Davies Street
  - 18 Hanover Square (including 1A Tenterden Street) & 19 Hanover Square
- diversion and/or protection of utilities
- general site clearance
- hoarding installation
- security installation
- construction site setup including welfare and office facilities, lay-down areas etc
- installation of any local traffic management arrangements
- highway diversion works
- temporary power and water supplies to the works
- installation of compensation grout shafts
- temporary relocation of EDF Network substation at eastern ticket hall site (within Dering Yard) before permanent relocation in the new station building;
- two existing substations to be decommissioned and disconnected at Hanover Square (eastern) ticket hall site;

- a temporary access shaft within the footprint of the Hanover Square (eastern) ticket hall site; construction of platform tunnels and passenger and ventilation adits using SCL construction techniques.
- Survey works including structural condition and environmental; and,
- Trial trenches, boreholes and all other advanced and enabling works associated with the ticket halls, the station and the Crossrail running tunnels.

## 2.2.2 Main Construction

On completion of advanced works, main construction works will commence to complete the station and ticket halls. Works will take place from two main worksites, with a third potentially required for sewer diversion works in Davies Street:

- The Davies Street worksite: bounded by Weighhouse Street to the north, St Anselm's Place to the south, Gilbert Street to the west and Davies Street to the east.
- The Hanover Square worksite: comprising 18/19 Hanover Square and the road and footways on the western side of the square.
- The Davies Street Sewer Diversion worksite: will be located in Davies Street to facilitate the sewer strengthening works, if required.

A plan showing the extent of the worksites for both advanced and main works is included in Figure 1 in Appendix 2.

## 2.3 Area Management Plan

### 2.3.1 Working Hours

The project's core working hours are from 0800 to 1800 on weekdays and 0800 to 1300 on Saturday. There are certain exceptions to the core working hours, which are set out in Section 3.2 of the Construction Code. These include:

- A period of one hour before and up to one hour after core working hours may be used for start up and close down activities.
- Specific activities as set out in the Construction Code (paragraph 3.2.6) will normally be undertaken on a 24 hour per day and 7 day per week basis.
- Running of certain items of equipment such as pumps and generators.
- Certain works requiring temporary possession of roads and railways.
- Work required in response to an emergency.

The contractor will obtain consents from City of Westminster under the Control of Pollution Act (COPA) 1974 Section 61, which will further define the hours of working on the site. These arrangements may be varied by agreement with the relevant local authority in accordance with COPA 1974.

### 2.3.2 Site Layout

As far as reasonably practicable and appropriate the site layout and appearance will be designed using the following principles:

- (a) Sites at prominent locations will be screened.
- (b) All sites will be fully secured.
- (c) Existing features will screen the sites where appropriate.
- (d) Storage sites, fixed plant and machinery equipment and temporary offices will be located to limit environmental impacts, as far as reasonably practicable, and having due regard to neighbouring accommodation, as far as allowed by the constraints of each site.
- (e) Site lighting will be located and directed so as not to intrude into occupied residential or business properties, on sensitive areas or constitute a road or rail hazard (see also Section 2.10 on Lighting).
- (f) Security cameras will be sited and directed so that they do not intrude into occupied residential properties.
- (g) Site plant and facilities will be powered from mains electrical sources.

### 2.3.3 Hoardings

As far as reasonably practicable the visual intrusion of construction sites on nearby residents and users of local facilities and amenities will be contained and limited. The detailed arrangements with regards to the site hoardings will be subject to further approval from the City of Westminster Council as part of the Schedule 7 arrangements.

The hoarding will accord with the following principles:

- (a) The standard hoarding will be 2.4 m minimum height, plywood faced, timber framed hoarding suitably painted.
- (b) The hoarding will be increased in height and possibly altered in form to enhance acoustic performance for specific locations (see section 2.11).
- (c) Suitable measures will be used for tree protection (see Section 2.8).
- (d) Where reasonably practicable existing walls, fences, hedges and earth banks will be retained.
- (e) Notices will be displayed on all site boundaries, where appropriate, to warn of hazards on site such as deep excavations, construction access, etc.
- (f) Appropriate sight lines/visibility splays will be maintained to ensure safety of both vehicles and pedestrians is preserved.
- (g) Temporary fences may be used in certain areas, such as for short term occupation of sites.

#### 2.3.4 Site Reinstatement

On the completion of works, reinstatement plans will be agreed with the City of Westminster Council within six months of the completion of the relevant works. (see Information papers IP D5 – Site Reinstatement and IP D13 – Restitution of Open Space).

### 2.4 Contaminated Land

Bond Street Station (including both the Western and the Eastern Ticket Halls) has been identified as a 'Category Two' medium risk site by the Crossrail Route Wide Generic Activities Contaminated Land Report.

Further ground investigation is planned, the results of which will inform the contamination status of the site, the waste characterisation of surplus or unsuitable arisings and the approach to safety management on site. The ground investigation data will also allow a re-assessment of the site's risk status, and CRL will share the results of the ground investigation with the City of Westminster, if required.

Further soil quality tests may be undertaken as works progress for material and waste management purposes.

### 2.5 Emergency Plan

#### 2.5.1 General arrangements

A set of standardised emergency response procedures will govern the management of environmental incidents<sup>1</sup>. Construction contractors will be required to adhere to and implement these procedures and ensure that site operatives are familiar with the emergency arrangements.

The emergency procedure will contain emergency phone numbers and the method of notifying local authorities and statutory authorities. Contact numbers for key will also be included.

#### 2.5.2 Dealing with spills

A site drainage plan will be kept on each of the work sites showing the water interests in the vicinity of the site. This plan will include the location of both foul water drains and surface water drains. Spill kits will be kept on each of the work sites. The precise contents and capacity of the spill kits will depend on the detailed inventory of products that will be stored and handled on the site. The box below provides an overview of the likely content of these spill kits.

oil-absorbent granules	string
floating "booms" or "sausages"	gloves
absorbent mats	knives
drain covers	shovels
polythene sheeting and bags	

The spill kits will be clearly marked and sign-posted, close to the area where materials are stored and handled.

<sup>1</sup> An environmental Incident is defined as "Any occurrence, including near-miss situations, which has the potential to cause or results in environmental damage"



A number of specialist spill contractors will be identified that can be called upon should this be required to manage a major spill.

In the event a spill occurs the following actions will be taken:

- When a spill occurs the site manager will be informed immediately.
- In dealing with the spillage the personal safety of the site-workers and the general public will not be compromised.
- Where required to stop or contain the spillage work will be halted.
- The cause of the spillage will be stopped.
- The spill will be contained. Particularly pathways to any drains and water courses will be blocked as soon as possible.
- The spilled materials will be removed and disposed of in accordance with the waste regulations.

In the event of major or complicated spills, the following additional actions will be taken:

- The site manager will assess the incident and if appropriate request a specialist spill contractor to attend the site.
- A Crossrail representative will verify that all appropriate actions have been taken and if required instruct the contractor to carry out additional works or request the assistance of a specialist spill contractor.

## 2.6 Site Waste Management Plan

### 2.6.1 Objectives

The objectives of the site waste management plan are to:

- Manage the excavated materials and demolition/construction wastes generated at the worksites, so far as reasonably practicable, in accordance with the waste hierarchy and within the relevant regulatory controls and cost restraints.
- Minimise waste from construction activities as far as reasonably practicable.
- Reuse as much demolition waste and as much of the excavated material as is practicable on or near to the sites where it will be generated.

### 2.6.2 Waste Management

In developing solutions for the management of surplus a strategy will be adopted that conforms with the national hierarchy for sustainable waste management. For Crossrail this means that a hierarchy will be adopted as follows:

- minimise the generation of waste

- reuse and/or recycle the materials within the Crossrail project
- reuse and/or recycle the materials for beneficial use on other projects
- dispose of the materials at a suitably licensed site

The project design has sought to minimise the generation of excavated material by keeping to a minimum both the size of tunnels, shafts and stations as well as building demolition without compromising the safety or functioning of the railway.

A well run construction site will minimise waste and its effect, for example, by ensuring the correct amount of construction materials are ordered and by minimising and/or recycling packaging where practicable. Appropriate industry standards will be adhered to in this respect so that construction waste will not have a major impact on the overall disposal requirements.

A Site Waste Management Plan (SWMP) is being produced in accordance with the Site Waste Management Plans Regulations 2008 and with the Non-Statutory Guidance for Site Waste Management Plans prepared by DEFRA in April 2008.

The SWMP will contain as a minimum the following information:

- The location of the site and the estimated cost of the project.
- Details of the client, the principal contractor and the person who drafted the plan.
- Any decision taken before the SWMP was drafted to minimise the quantity of waste produced on site.
- A description of each waste type expected to be produced during the project.
- An estimate of the quantity of waste that will be produced for each waste type.
- The proposed waste management action for each waste type.
- A declaration that all waste produced on the site is dealt with in accordance with the waste duty of care.
- A declaration that materials will be handled efficiently and waste managed appropriately.

The SWMP will be updated at least every six months.

The SWMP will describe the procedures that are in place to ensure that the contractor and all other parties involved with the management of the waste generated from the site comply with the Environmental Protection (Duty of Care) Regulations 1991. To ensure compliance with these regulations the statutory guidance provided in “Waste Management – The Duty of Care, Code of Practice (HMSO 1996)” will be followed.

The SWMP will record the decisions taken to reduce the amount of waste. This will include the steps taken to minimise waste from the construction sites and steps taken to reuse excavated materials or demolition waste on or near to sites

## 2.7 Air Quality and Dust Management Plan

### 2.7.1 Objectives

The objectives of the air quality and dust management plan are to:

- As far as is reasonably practicable, seek to control and limit emissions to the atmosphere in terms of gaseous and particulate pollutants from vehicles and plant used on the site and dust from construction activities.
- Identify potential sources of emissions to the atmosphere and apply appropriate control techniques.
- Implement measures to reduce the impact of dust in a timely manner.

### 2.7.2 Vehicle and Plant Emissions

Adverse impacts of vehicle and plant emissions will be controlled by implementing the following measures where appropriate:

- (a) Engines of all vehicles and plant on site are not left running unnecessarily.
- (b) Using low emission vehicles and plant fitted with catalyts, diesel particulate filters or similar devices.
- (c) Using ultra low sulphur fuels in plant and vehicles.
- (d) Plant will be well maintained, with routine servicing of plant and vehicles to be completed in accordance with the manufacturers recommendations and records maintained for the work undertaken.
- (e) All project vehicle, including off-road vehicles, will hold current MOT certificates, where required due to the age of the vehicle, (or to be tested to an equivalent standard) and that they will comply with exhaust emission regulations for their class.
- (f) Siting haul routes and operate plant away from potential receptors such as houses, schools and hospitals.
- (g) Avoiding the use of diesel or petrol powered generators and using mains electricity or battery powered equipment.
- (h) Maximising energy efficiency (this may include using alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing).
- (i) All commercial road vehicles used in construction must meet the European Emission Standards pursuant to the EC Directive 98/69/EC (commonly known as Euro standards) of Euro 3 during any works.

### 2.7.3 Dust Management

The Bond Street Station worksites have been identified as high risk<sup>2</sup>, and consequently tier 1 and tier 2 dust control procedures (as set out in the tables below) will be implemented to the highest standard.

Where a site has been identified as having a high risk of dust emissions due to the proximity of receptors, the type of activity on site or the duration of operations, and as a result the highest standard of dust control reasonably achievable will be adopted (i.e. Tier 3). In these cases, all the techniques set out below will be employed and will include additional measures to control the high risk. This may include having personnel on site to monitor and manage dust emissions or techniques such as total enclosure of certain operations to protect vulnerable receptors. The measures adopted will be proportionate to the risk and will be site specific.

The dust control procedures will need to take into account undertakings and assurances to mitigate as far as is reasonably practicable the emission of dust and other particulates that would adversely affect the air quality at 27 St Anselm's Place, 17 Hanover Square and in the Hanover Square Area to ensure there is no significant deterioration of current air quality as a result of the works.

**Table 1. Tier 1 measures controlling the emissions from dust from worksites.**

ensure no burning of waste materials takes place on site;
ensure an adequate water supply on the site;
ensure disposal of run-off water from dust suppression activities, in accordance with the appropriate legal requirements;
maintain all dust control equipment in good condition and record maintenance activities;
keep site fencing, barriers and scaffolding clean using wet methods;
provide easily cleaned hardstanding for vehicles;
ensure regular cleaning of hardstandings using wet sweeping methods;
not allow dry sweeping of large areas;
provide and ensure the use of wheel-wash facilities near the site exit wherever there is a potential for carrying dust or mud off the site;
fit wheel-washes with rumble grids to dislodge accumulated dust and mud prior to leaving the site wherever there is a potential for carrying dust or mud off the site and where reasonably practicable;
ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits;
install hard surfaced long term haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned;
inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
record all inspections of haul routes and any subsequent action in a site log book which may be in hard or electronic format;
ensure that un-surfaced haul routes and work areas are regularly damped down in dry conditions;
routinely clean public roads and access routes using wet sweeping methods;
ensure vehicles working on site have exhausts positioned such that the risk of re-suspension of ground dust is minimised (exhausts should preferably point upwards), where reasonably practicable;
impose and signpost maximum speed limits of 5 mph on un-surfaced haul routes and work areas and 10 mph on surfaced haul routes and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of CRL and with the agreement of the local authority, where appropriate);
ensure all vehicles carrying loose or potentially dusty material to or from the site are fully sheeted;
ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
mix large quantities of cement, bentonite, grouts and other similar materials in designated areas which

<sup>2</sup> Crossrail Specialist Technical Report on Air Quality

will be enclosed or shielded;
store materials with the potential to produce dust away from site boundaries where reasonably practicable;
ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out;
minimise the amount of excavated material held on site;
sheet, seal or damp down unavoidable stockpiles of excavated material held on site, where required;
avoid double handling of material wherever reasonably practicable;
ensure water suppression is used during demolition operations;
ensure that any crushing or grinding plant used on the site, which falls within the definition in Section 3.5 Chapter 3 of the Pollution Prevention and Control (England and Wales) Regulations 2000 SI 1973, has an appropriate permit issued and is maintained according to the procedures set out in the Pollution, Prevention and Control Act 1999;
ensure that any plant, identified above, is operated in accordance with the conditions set out in the permit and a copy of the permit is held on site;
use enclosed rubble chutes and conveyors where reasonably practicable or use water to suppress dust emissions from such equipment;
always use enclosed conveyors where crossing roads, other public areas and property which is not in the ownership or control of the CRL;
sheet or otherwise enclose loaded bins and skips;
minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
seal or re-vegetate completed earthworks as soon as reasonably practicable after completion;
use design/prefabrication to reduce the need for grinding, sawing and cutting on site wherever reasonably practicable;
only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction;
carry out site inspections regularly to monitor compliance with dust control procedures set out above and record the results of the inspections, including nil returns, in the log book detailed;
increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; (1mm) record any exceptional incidents causing dust episodes on or off the site and the action taken to resolve the situation in the log book detailed in above.

**Table 2. Tier 2 measures controlling the emissions from dust from worksites.**

strip insides of buildings, as far as reasonably practicable, before demolition;
bag and remove biological debris (such as birds nests and droppings) or damp down such material prior to demolition;
wherever reasonably practicable, retain walls and windows while the rest of the building is demolished to provide a screen against dust;
screen buildings, where dust producing activities are taking place, with debris screens or sheeting;
avoid carrying out earthworks during dry weather if reasonably practicable having regard to programme and contracting arrangements for the relevant works or provide and ensure appropriate use of water sprays to control dust;
seed or seal medium or long term excavated material and soil stockpiles;
ensure slopes on stockpiles are no steeper than the natural angle of repose of the material and maintain a smooth profile;
ensure equipment is readily available on site to clean any spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
ensure mixing of cement, bentonite, grout and other similar materials takes place in enclosed areas remote from site boundaries and potential receptors;
where appropriate use increased hoarding height to protect receptors; and
consider full enclosure of sites or specific operations where there is a high potential for dust production and the site is active for an extensive period.

#### 2.7.4 Dust Monitoring

The Bond Street Station worksites are high risk sites, and consequently a baseline will be established prior to construction. This will be determined, where reasonably practicable, for a twelve month period derived from data sourced from local background PM<sub>10</sub> concentrations measured by the Automatic Urban and Rural Network (AURN) monitoring sites and appropriate local authority automatic monitoring sites. By establishing a baseline the nominated undertaker will ensure, as far as reasonably practicable, that:

- (a) Monitoring data will be readily available for appropriate periods prior to construction.
- (b) Data will be collected as PM<sub>10</sub> µg.m<sup>-3</sup>, the same units as is suggested for the site action level in the London BPG.
- (c) Localised unidentified sources creating a false baseline are avoided (eg local construction activity: local monitoring site operators should note any unusual activity in the vicinity of monitoring sites that may affect monitoring results).

During construction particulate monitoring will be undertaken using appropriate survey instruments such as Osiris, Topaz, DustScan or similar devices. Two instruments will be deployed at each high risk site and will be sited at locations such as site boundaries, potential receptors or in a transect orientated to the prevailing wind, as appropriate to specific site characteristics.

Instruments will be set-up at high risk sites to operate an alarm (PC based or mobile phone) when a predetermined site action level is reached. If the alarm is triggered the following actions will be taken:

- (a) The nominated person or someone delegated by the nominated person will as quickly as reasonably practicable investigate activities on the site to ascertain if any visible dust is emanating from the site or activities are occurring that are not in line with dust control procedures.
- (b) Any identified causes will be rectified where practicable. Actions will be recorded in the site logbook and the relevant local authority notified of the incident and actions by telephone or e-mail as soon as practicable after or during the incident.
- (c) If no source of the incident is identified other Crossrail sites and local authority or AURN monitoring sites will be contacted to establish if there is a wider area increase in particulate concentrations.
- (d) If the cause of the alarm is not related to site operations the outcome of any investigation will be recorded in the site logbook and reported to the relevant local authority at an appropriate time.

A site action level will be established by reference to local authority and AURN PM<sub>10</sub> monitoring data in consultation with the relevant local authority. Subject to consultation, a preliminary site action level of 250µg.m<sup>-3</sup> (15 minute average) will be adopted.

Dust monitoring will be continued until the site has a risk score that assigns it to the low risk category. The cessation of monitoring when a site no longer represents a high or medium risk is subject to consultation with and the agreement of the local authority in whose area the worksite is situated that high or medium risk no longer applies, provided that such agreement is not



unreasonably withheld, and the local authority is a qualifying authority for the purposes of Schedule 7 to the Crossrail Bill.

## **2.8 Archaeology and Built Heritage Management Plan**

### **2.8.1 Objectives**

The objective of this archaeology and built heritage management plan is to ensure that works are carried out in such a way as to avoid or minimise, as far as reasonably practicable, potential damage and disturbance to archaeological sites and deposits, and buildings of historic interest (both listed buildings and important non-listed above ground features and structural elements). These resources will be managed in accordance with the control mechanisms set out below and accepted industry practice guidance and relevant standards.

### **2.8.2 Archaeological Management**

In accordance with the Crossrail Generic Written Scheme of Investigation (WSI), a site specific WSI has been prepared for the Bond Street station worksites. The WSI includes consideration of important non-listed above ground features and structural elements of historical interest. Work will be undertaken in accordance with the requirements set out in the site specific WSI.

### **2.8.3 Listed Buildings and Settlement**

All buildings within the zone that may be affected by settlement have undergone an initial settlement assessment to establish the risk of damage. Further work will be undertaken as part of the detailed design in order to specify the requirements for further survey, protective measures and monitoring as set out in Information Paper D12 (IPD12). The presence of these buildings will be identified and the measures that will be undertaken to protect them from damage will be specified. Consultation will be undertaken with the City of Westminster and English Heritage as set out in the IPD12 and their written approval for “particulars” submitted will be sought in compliance with appendix 2 of the heritage deed between CRL, the City of Westminster and English Heritage.

## **2.9 Ecological Management Plan**

### **2.9.1 Objectives**

The objectives of the ecological management plan are to control and limit disturbance to areas of nature conservation interest and protected species in accordance with relevant legislative requirements and accepted industry practice.

### **2.9.2 Ecological Management**

The works will be undertaken in accordance with the Crossrail General Ecological Management Plan which will set out general procedures for managing ecology on Crossrail worksites, and any site specific measures described in this section.

### **2.9.3 Ecological Resources**

No statutory or non-statutory designated sites lie in or adjacent to the works, and no protected species or habitats were recorded at these locations. Hanover Square supports ornamental planting, amenity grass and mature trees.

#### 2.9.4 Mitigation

The measures applicable to this site as identified by their unique codes (Section 3 of the GEMP) are:

##### Ec04 Tree and Shrub Clearance:

Where required for the works, trees and shrubs will be removed outside of the bird breeding season (1st March to 31st July) wherever practicable. Removal within the bird breeding season will be subject to an Ecological Watching Brief.

##### Ec05 Protection of Trees;

Measures to ensure the protection of trees to be retained will be implemented in accordance with BS5837: 2005 'Trees in relation to construction'.

##### Ec09 Ecological Watching Brief:

A suitably qualified ecologist will conduct a 'watching brief' prior to and during key stages of works, to search for protected species and ensure legal compliance. The searches undertaken where appropriate will be destructive to minimise the likelihood of the return of protected species.

##### Ec10 Unanticipated Discovery:

In the event of a protected species being found during the 'watching brief', works will cease in the immediate area whilst the Nominated Undertaker is informed and, at the request of the Nominated Undertaker, appropriate mitigation measures are agreed with Natural England.

#### 2.9.5 Surveys

All surveys pertinent to this site have been completed.

#### 2.9.6 Reinstatement

Reinstatement will be undertaken as detailed in the relevant Schedule 7 submission.

### 2.10 Lighting Management Plan

#### 2.10.1 Objectives

The objectives of the lighting management plan are to provide adequate lighting on construction sites ensuring a safe and secure worksite but avoiding incorrectly positioned site lighting which may cause nuisance or may unnecessarily interfere with local residents, passing motorist or the navigation lights for air traffic.

#### 2.10.2 Lighting Management

In determining the lighting arrangements for the worksite, consideration will be given to residents and other sensitive receptors that may experience a nuisance by the light. Where appropriate measures will be implemented measures to reduce obtrusive light (including consideration of hours of lighting, provisions for dimming or switching off light, equipment to be used and lighting position).

Where appropriate the following measures will be considered for implementation:



- do not “over” light
- dim or switch off lights
- use specifically designed equipment
- keep glare to a minimum, and
- position lights sensibly.

## 2.11 Noise and Vibration Management Plan

### 2.11.1 Objectives

The objectives of the noise and vibration management plan are to, as far as reasonably practicable, seek to control and limit noise and vibration levels so that affected properties and other sensitive receptors are protected from excessive noise and vibration levels associated with construction activities.

### 2.11.2 Context

There are numerous residential properties round all of the worksites. Other noise sensitive receptors that were identified in the ES include Regent Hall church, Ukrainian Cathedral (King’s Weigh House Church) and users of Hanover Square Gardens.

Listed buildings are potentially more sensitive to vibration than other non-listed buildings. A number of listed buildings have been identified in the vicinity of the Bond Street worksites including the the Grade II listed building at 27 Gilbert Street and the Grade II\* listed building at 20 Hanover Square.

The following Special Cases (under the Crossrail Noise and Vibration Mitigation Scheme) exist in the vicinity of the works for Bond Street Station:

- 11-12 Hanover Square
- 1 Tenterden Street
- 15 Hanover Square
- 14, 14a & 15a Hanover Square
- 293 / 295 Oxford Street
- 3/17 Harewood Place
- 17 Hanover Square
- 20 Hanover Square & Dering Yard
- 21 Hanover Square

- 58 Davies Street

Mitigation will be implemented in order to comply with the special case undertakings.

### 2.11.3 Noise and Vibration Management Plan

Consents under section 61 the Control of Pollution Act 1974 will be obtained for the construction works. The works will be carried out in accordance with the conditions of the consent.

Section 61 consent applications will be made in accordance with the Crossrail Section 61 Guidance Note.

The contractor may agree with the local authority and CRL that for certain activities not anticipated to be noise sensitive such as site investigation and site set up, a Section 61 will not be necessary.

In any event Best Practicable Means (BPM) as defined under Section 72 of the Control of Pollution Act (CoPA) 1974 will be applied to all activities.

### 2.11.4 The Crossrail Noise and Vibration Mitigation Scheme

Where under certain circumstances despite the use of Best Practicable Means, construction noise levels at residential receptors are predicted to be acute, temporary re-housing and/or noise insulation may be provided, or a grant made available for this purpose under the provisions of the Crossrail Noise and Vibration Mitigation Scheme.

A number of properties were identified in the Crossrail ES as being likely to be eligible for temporary re-housing (TRH) and/or noise insulation (NI) under the Crossrail Noise and Vibration Mitigation Scheme.

Actual eligibility for the scheme will be determined once detailed construction planning and construction noise assessments have been carried out.

Details of dwellings found eligible under the scheme will be included the relevant CoPA section 61 consent application.

### 2.11.5 Monitoring

Noise and vibration monitoring will be agreed in advance with the local authority, as part of a section 61 consent application. The results of any noise and vibration monitoring will be made available, as required, to the local authority. Access to the sites will be facilitated at all reasonable times for inspection and/or noise measurements by the local authority environmental health personnel, following appropriate site specific induction and/or health and safety training.

### 2.11.6 Selection and Use of Equipment

Best Practicable Means will be employed on all worksites. In selecting equipment that will be used on the worksite the following documents and principles will be adhered to where practicable:

- Each item of plant used on the worksites will comply with the noise limits quoted in the relevant European Commission Directive 2000/14/EC/United Kingdom Statutory Instrument (SI) 2001/1701.
- The recommendations set out in Annex B of Part 1 of BS 5228 and Sections 7.3 and 9.2 of Part 4 of BS 5228 with regard to noise and vibration mitigation options will be adopted unless agreed in advance with the relevant local authority.
- Plant and equipment liable to create noise and/or vibration whilst in operation will, as far as reasonably practicable, be located away from sensitive receptors.
- The use of barriers to absorb and/or deflect noise away from noise sensitive areas will be employed where required and reasonably practicable.
- All plant, equipment and noise control measures applied to plant and equipment will be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable.
- As far as reasonably practicable, any plant, equipment or items fitted with noise control equipment found to be defective will not be operated until repaired.
- Where reasonably practicable, fixed items of construction plant should be electrically powered in preference to diesel or petrol driven.
- Vehicles and mechanical plant employed for any activity associated with the construction works will, where reasonably practicable, be fitted with effective exhaust silencers and will be maintained in good working order and operated in a manner such that noise emissions are controlled and limited as far as reasonably practicable.
- Machines in intermittent use should be shut down or throttled down to a minimum during periods between work.
- Static noise emitting equipment operating continuously will be housed within suitable acoustic enclosure, where appropriate.

#### 2.11.7 Underground Activities

For underground activities, the following measures will be adopted, where reasonably practicable and appropriate:

##### *Conveyor*

(a) The mounting for conveyors used to remove excavated material from the tunnel face will be designed and installed so as to mitigate the transmission of groundborne noise and vibration to buildings above the tunnel.

(b) A maintenance programme will be implemented to ensure that the noise generation of the conveyor does not deteriorate over time.

(c) Surface conveyor systems will be of a similar standard to underground conveyors and will be acoustically enclosed where they run through or adjacent to noise sensitive areas. They too will

be the subject of a maintenance programme. (Note: the conveyor will be covered throughout its length to prevent material spillage.)

#### *Temporary Tunnel Ventilation*

(a) All tunnel ventilation plant with connections to the atmosphere in any noise-sensitive location will be subject to mitigation measures appropriate to its local environment.

#### 2.11.8 Notifications

Occupiers of nearby properties will be informed in advance of the works taking place, including the duration and likely noise and vibration impacts. In the case of work required in response to an emergency, the local authority and local residents will be advised as soon as reasonably practicable that emergency work is taking place. Potentially affected residents will also be notified of the Helpline number.

#### 2.11.9 Reversing Alarms

As far as reasonably practicable the noise from reversing alarms will be controlled and limited. This will be managed through the following hierarchy of techniques:

(a) The site layout will be designed to limit and where reasonably practicable, avoid the need for the reversing of vehicles. CRL will seek to ensure that drivers are familiar with the worksite layout.

(b) Banksmen will be utilised to avoid, as far as reasonably practicable, the use of reversing alarms.

(c) Reversing alarms incorporating one or more of the features listed below or any other comparable system will be used where reasonably practicable; i) highly directional sounders; ii) use of broadband signals; iii) self adjusting output sounders; and iv) flashing warning lights.

(d) Reversing alarms will be set to the minimum output noise level required for health and safety compliance.

## 2.12 Water Management Plan

### 2.12.1 Objectives

The objectives of the water management plan are to implement working methods to protect surface and groundwater from pollution and other adverse impacts including change to flow volume, water levels and quality.

### 2.12.2 Water Resources

There are no surface watercourses in the vicinity of the Bond Street Station worksites. The geology is London Clay overlain by Made Ground and Terrace Gravels. The running tunnels will be mostly constructed in the London Clay and the diaphragm walls at the western station box may extend into the Upper Mottled Clay of the Lambeth Group. There is one licensed abstraction from the confined Chalk aquifer (licensed to Capital and Counties Property Company Ltd) located approximately 180m from the site, which will not be affected as dewatering of the Chalk is not required and a substantial thickness of Clay separates the deep aquifer from the works.

### 2.12.3 Water Management

Works will be undertaken in accordance with approvals from the Environment Agency where appropriate, as obtained in accordance with the regime set out in Schedule 17 to the Crossrail Act.

### 2.12.4 Site Drainage

Site drainage, including surface runoff and dewatering effluents, will be discharged to sewers where reasonably practicable and relevant permissions will be obtained from the sewerage undertaker (Thames Water Utilities Ltd). Site drainage will meet the requirements for effluent and flood risk standards required by the sewerage undertaker.

The relevant sections of BS6031: Code of Practice for Earthworks for the general control of site drainage will be followed.

### 2.12.5 Protection of Watercourses

There are no surface water courses in the vicinity of the worksites at Bond Street.

### 2.12.6 Control of Pollution of Groundwater

Protection measures to control the risk of pollution to groundwater will be consistent with the Groundwater Regulations 1998. Where reasonably practicable, the use of materials that could pollute groundwater will be avoided. This will include special consideration for the use of substances contained within List I and II of the Groundwater Regulations SI 1998/2746 (Groundwater Directive: 80/68/EEC).

### 2.12.7 Dewatering

The potential presence of a local perched water table within the Lambeth Group will be confirmed through geotechnical investigations. If present, the perched water table may require some passive dewatering wells for Davies Street and Hanover Square worksites. Consent for dewatering activities will be obtained from the Environment Agency if required, in accordance with Section 17 of the Crossrail Act.

## Appendix 1: Legislation, codes of practice and guidance relevant to the EMP

List of references to Crossrail documentation:

- Crossrail Route Wide Generic Activities Land Contamination Report
- Crossrail Specialist Technical Report on Contaminated Land
- Crossrail Information Paper D5 - Site Reinstatement
- Crossrail Information Paper D09 Noise and Vibration Mitigation Scheme
- Crossrail Information Paper D10 Groundborne Noise and Vibration
- Crossrail Information Paper D12 Ground Settlement
- Crossrail Information Paper D13 - Restitution of Open Space)
- Crossrail Information Paper D25 Noise from Fixed Installations
- Crossrail Information Paper D26 Surface Railway Noise and Vibration
- Crossrail General Ecological Management Plan
- Crossrail Archaeology Generic Written Scheme of Investigation
- Crossrail Archaeology Site-Specific Written Scheme of Investigation for Bond Street Station
- Heritage Agreement for City of Westminster
- Crossrail Specialist Technical Report on Air Quality
- Crossrail Noise and Vibration Guidance Note – CoPA 1974 Section 61 Consent Applications (Crossrail Procedure)
- The Crossrail Noise and Vibration Mitigation Scheme (Information Paper D9, Noise and Vibration Mitigation Scheme).

List of references to non-Crossrail documentation

- BS EN ISO14001: 2004 Environmental Management Systems
- BS 5837: 2005 Guide for Trees in Relation to Construction
- BS 5228: Noise control on construction and open sites:
  1. Part 1 (1997) Code of Practice for basic information and procedures for noise control

2. Part 2 (1997) Guide to legislation for noise control applicable to construction and demolition, including road construction and maintenance
  3. Part 4 (1992) Code of Practice for noise and vibration control applicable to piling operations
- BS 6031: Code of Practice for Earthworks
  - BS 6472: 1992 Evaluation of human exposure of vibration in buildings (1Hz to 80 Hz)
  - BS 7385 Evaluation and measurement for vibration in buildings:
    1. Part 1: 1990 Guide for measurements of vibrations and evaluation of their effects on buildings
    2. Part 2: 1993 Guide to damage levels from groundborne vibration
  - BSI (2001) Investigation of Potentially Contaminated Sites. Code of Practice. 10175
  - CIRIA, Control of water pollution from construction sites: Guidance for consultants and contractors (C532)
  - CIRIA/Environment Agency Joint Guidelines: Concrete Bunds for Oil Storage Tanks
  - CIRIA/Environment Agency Joint Guidelines: Masonry Bunds for Oil Storage Tanks
  - CIRIA (1996) A guide to safe working on Contaminated Sites Report 132
  - Guidance Notes for the reduction of obtrusive lighting, 2005 The Institute of Lighting Engineers
  - Lighting in the Countryside: Towards Good Practice (1997) HMSO
  - The control of dust and emissions from construction and demolition" (Mayor of London 2005)
  - DEFRA (2008) Non-Statutory Guidance for Site Waste Management Plans
  - Environment Agency Pollution Prevention Guidance PPG01 General guide to the prevention of water pollution
  - Environment Agency Pollution Prevention Guidance PPG02 Above ground oil storage tanks
  - Environment Agency Pollution Prevention Guidance PPG05 Works near or liable to affect watercourses
  - Environment Agency Pollution Prevention Guidance PPG06 Working at construction or demolition sites
  - Environment Agency Pollution Prevention Guidance PPG21 Pollution incident response planning



- Environment Agency Pollution Prevention Guidance PPG23 Maintenance of structures over water
- Environment Agency Guidance Note: Piling into Contaminated Sites
- Environment Agency Technical Guidance WM2 Interpretation and Classification of Hazardous Waste provides assistance in classifying wastes.
- Waste Management - The Duty of Care, code of Practice (HMSO 1996).
- Buildings Research Establishment. Controlling particles, vapour and noise pollution from construction sites, Parts 1 to 5, 2003.
- Department for the Environment Food and Rural Affairs: Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000.
- Control of Pollution Act 1974
- Salmon and Freshwater Fisheries Act 1975
- Wildlife and Countryside Act 1981, as amended
- Environmental Protection Act 1990
- Water Resources Act 1991
- Protection of Badgers Act 1992
- Land Drainage Act 1991
- Clean Air Act 1993
- Conservation (Natural Habitats &c) Regulations 1994, as amended
- Wild Mammals (Protection) Act 1996
- Pollution, Prevention and Control Act 1999
- Pollution Prevention and Control (England and Wales) Regulations 2000
- Countryside and Rights of Way (CRoW) Act 2000
- Water Act 2003
- SI 1985/1968: The Construction Plant and Equipment (Harmonisation of Noise Emission Standards) Regulations 1985
- SI 1991/2839: Environmental Protection (Duty of Care) Regulations 1991
- SI 1998/2746: The Groundwater Regulations (EC Groundwater Directive: 80/68/EEC) 1998
- SI 2000/227: Contaminated Land (England) Regulations 2000

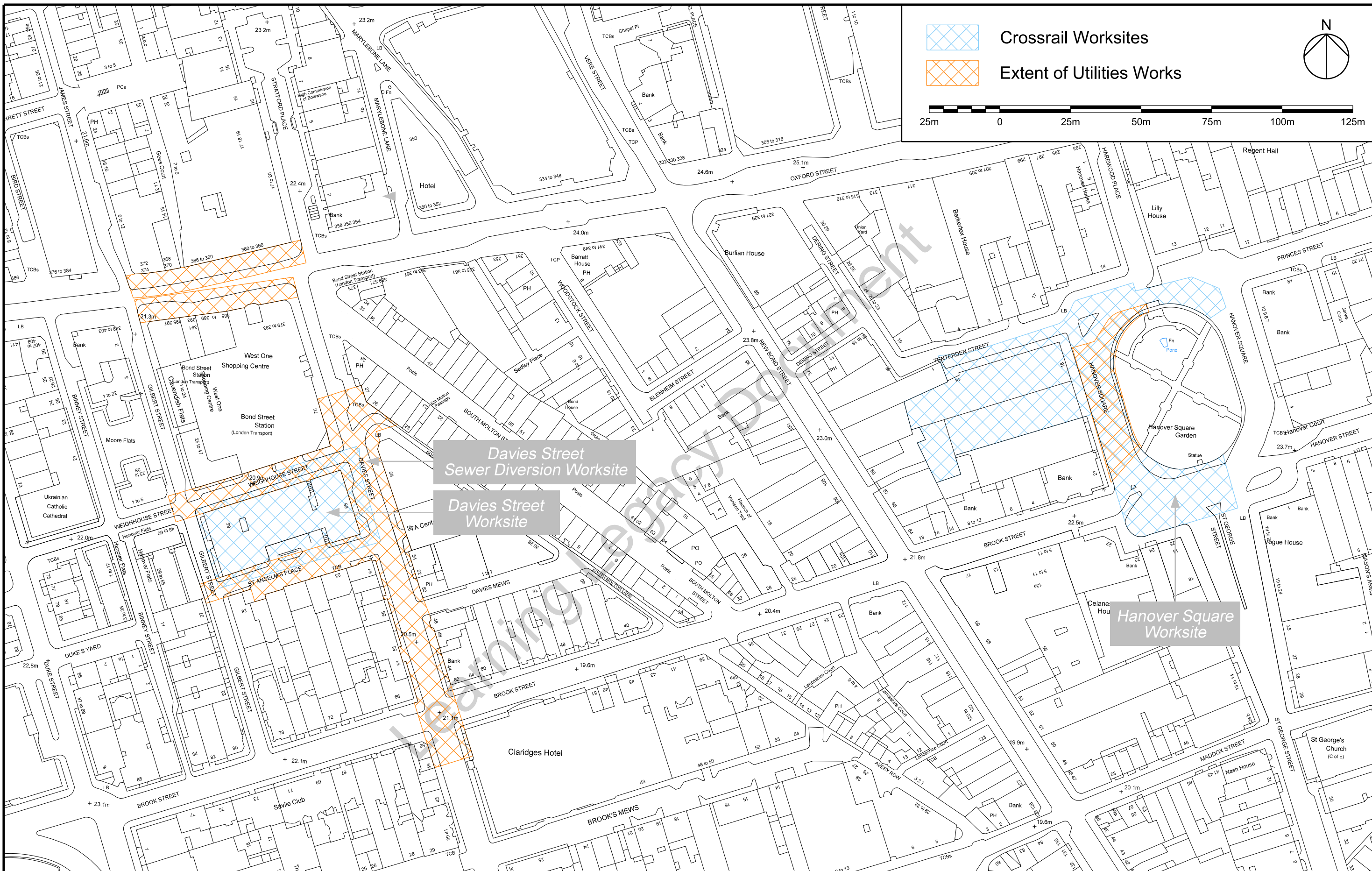


- SI 2001/1701: The Noise Emission in the Environment by Equipment for use Outdoors Regulations 2001 (EC Directive 2000/14/EC)
- SI 2001/2954: Control of Pollution (Oil Storage) Regulations 2001
- SI 2002/1559 Landfill (England and Wales) Regulations 2002
- SI 2002/2677: Control of Substances Hazardous to Health Regulations 2000
- SI 2005/894: Hazardous Waste (England and Wales) Regulations 2005
- SI 2008/314: Site Waste Management Plans Regulations 2008
- Planning Policy Statement 23: Planning and Pollution Control
- Defra/Environment Agency's Model Procedures for the Management of Contamination (CLR11)
- Contractors and Clients -Voluntary Code of Practice (Department of Trade & Industry - July 2004)
- The London Plan, 2004, (Consolidated 2008) published by the Mayor of London

Learning Legacy Document

## Appendix 2: Figures – Site Plan

Learning Legacy Document



Davies Street  
Sewer Diversion Worksite

Davies Street  
Worksite

Hanover Square  
Worksite

REV	DATE	DESCRIPTION	BY	CHKD	APP	CAD	ACC
A	\$\$\$adate	FIRST ISSUE	GS	\$\$\$a	\$\$\$v		



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CROSSRAIL TEAM

TITLE: <b>BOND STREET STATION WORKSITE PLAN</b>	<b>Draft</b>
DRAWING AND CAD FILE No : 110402-C1G00-U00-P-50024	REV : A
SCALE : 1:1500 @ A3	

RESTRICTED