Phase two consultation documentation

General
- Your guide to phase two consultation
- Why does London need the Thames Tunnel?
- Feedback form
- Equalities form
- Customer overview leaflet

Technical documents
- Air management plan
- Book of plans
- **Code of construction practice**
  - Part A: General requirements
- Consultation strategy and statement of community consultation
- Design development report
- Draft waste strategy
- Interim engagement report
- Needs Report
- Phase two scheme development report
- Preliminary environmental information report
- Report on phase one consultation
- Site selection background technical paper
- Site selection methodology paper

Project information papers
- Build
- Changes
- Consultation
- Design
- Environment
- Funding
- Managing construction
- Odour
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- Regulatory framework
- Route and tunnel alignment
- Route to consent
- Settlement
- Site selection
- Timing
- Transport

Site information papers
- Abbey Mills Pumping Station
- Acton Storm Tanks
- Albert Embankment Foreshore
- Barn Elms
- Beckton Sewage Treatment Works
- Bekesbourne Street
- Blackfriars Bridge Foreshore
- Carnworth Road Riverside
- Chambers Wharf
- Chelsea Embankment Foreshore
- Cremorne Wharf Depot
- Deptford Church Street
- Dormay Street
- Earl Pumping Station
- Falconbrook Pumping Station
- Greenwich Pumping Station
- Hammersmith Pumping Station
- Heathwall Pumping Station
- Jews Row
- King Edward Memorial Park Forehore
- King George’s Park
- Kirtling Street
- Other works
- Putney Bridge Foreshore
- Shad Thames Pumping Station
- Victoria Embankment Foreshore
Thames Tunnel

Code of construction practice
Part A: General requirements

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<td>Association of British Insurers</td>
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<tr>
<td>AURN</td>
<td>Automatic Urban and Rural Network</td>
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<tr>
<td>BPG</td>
<td>Best practice guidance</td>
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<td>BPM</td>
<td>Best practicable means</td>
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<td>BTS</td>
<td>British Tunnelling Society</td>
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<td>CCS</td>
<td>Considerate Constructors Scheme</td>
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<td>CDM</td>
<td>Construction (Design and Management) Regulations 2007</td>
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<tr>
<td>CEMP(s)</td>
<td>Construction environmental management plan(s)</td>
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<td>CIRIA</td>
<td>Construction Industry Research and Information Association</td>
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<td>CoPA</td>
<td>Control of Pollution Act 1974</td>
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<td>CoCP</td>
<td>Code of construction practice</td>
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<td>CSO(s)</td>
<td>Combined sewer overflow(s)</td>
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<td>DCO</td>
<td>Development consent order</td>
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<td>DDA</td>
<td>Disability Discrimination Act</td>
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<td>DLR</td>
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<td>EA</td>
<td>Environment Agency</td>
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<td>EH</td>
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<td>Environmental Management System</td>
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<td>EPP(s)</td>
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<td>ES</td>
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<td>EWC</td>
<td>Consolidated European Waste Catalogue</td>
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<td>FRA</td>
<td>Flood risk assessment</td>
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<td>GLA</td>
<td>Greater London Authority</td>
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<td>GPR</td>
<td>Ground penetrating radar</td>
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<td>GWSI</td>
<td>Generic written scheme of investigation</td>
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<td>HMP</td>
<td>Heritage management plan</td>
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<td>HMSO</td>
<td>Her Majesty’s Stationery Office</td>
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<td>Health and Safety Executive</td>
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<td>HSP</td>
<td>Health and safety plan</td>
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<td>KPI(s)</td>
<td>Key performance indicator(s)</td>
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<td>LPA</td>
<td>Local planning authority</td>
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<td>LU</td>
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<td>MCA</td>
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<td>PPE</td>
<td>Personal protective equipment</td>
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<td>River Transport Management Plan</td>
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<tr>
<td>SEE</td>
<td>Site environmental engineer</td>
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<td>SI</td>
<td>Statutory Instrument</td>
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<td>SPZ</td>
<td>Source protection zone</td>
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<tr>
<td>SRN</td>
<td>Strategic Road Network</td>
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<tr>
<td>SSWSI(s)</td>
<td>Site specific written scheme of investigation(s)</td>
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<tr>
<td>STW</td>
<td>Sewage treatment works</td>
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<tr>
<td>SUDS</td>
<td>Sustainable urban drainage system</td>
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<td>SWMP(s)</td>
<td>Site waste management plan(s)</td>
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<td>TBM(s)</td>
<td>Tunnel boring machine(s)</td>
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<td>TfL</td>
<td>Transport for London</td>
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<tr>
<td>TLRN</td>
<td>Transport for London Road Network</td>
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<td>TMP</td>
<td>Traffic management plan</td>
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<td>TPO</td>
<td>Tree preservation order</td>
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<td>TTP</td>
<td>Thames Tunnel project</td>
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<td>TW</td>
<td>Thames Water</td>
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<td>WMP</td>
<td>Waste management plan</td>
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1 Introduction

1.1 General

1.1.1 This Code of construction practice (CoCP) will support the development consent order (DCO) application for the Thames Tunnel project (TTP).

1.1.2 Where CoCPs have been produced by the local authorities (LAs) across the TTP, these have been taken into consideration while preparing the TTP CoCP.

1.1.3 The term ‘construction’ in the CoCP includes all works associated with the TTP (but is not limited to) utility diversions, site preparation, demolition, material delivery, excavated material disposal, waste removal tunnelling and shaft construction, interception of existing combined sewer overflows (CSOs), installation of equipment, commissioning, and all related engineering and construction activities as defined in the DCO application. Other associated works are covered within the CoCP Part B.

1.1.4 The CoCP will comprise two main parts:

a. Part A: General requirements. These measures will be applicable project wide.

b. Part B: Site specific requirements. This will document site specific requirements.

A draft of Part B of the CoCP will be prepared in consultation with the relevant consultees, and submitted as part of the DCO application.

1.1.5 The CoCP sets out a series of objectives and measures to be applied throughout the construction period to:

a. set out the standards and procedures for managing and mitigating the impact of site activities during the construction of the Thames Tunnel

b. maintain satisfactory levels of environmental protection

c. limit disturbance from construction activities and to assure all stakeholders that all construction impacts will be managed appropriately.

1.1.6 The measures include arrangements for the management and construction of the TTP to minimise/reduce any significant effects of construction insofar as it may affect the natural environment and the environment, amenity and safety of local residents, businesses and the public, in the vicinity of the works.

1.1.7 Revisions to this CoCP may be undertaken in response to issues raised during the Environmental Impact Assessment (EIA) process and in response to consultation. Any changes will be incorporated within a finalised version. The CoCP will be included within the DCO application, and within the contract documents for the construction of the TTP. The contractor will have a contractual obligation to comply with the requirements set out in the CoCP.

1.1.8 Thames Water (TW) will ensure compliance with this CoCP through the construction contracts.
1.1.9 As the TTP extends across 14 LAs, the CoCP will ensure a consistent approach to the management of construction impacts across LA boundaries.
2 Compliance with the environmental statement and appropriate assessments

2.1 Environmental impact assessment

2.1.1 An EIA is being undertaken for the TTP and an environmental statement (ES) will be prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, as amended. In line with the requirements of these regulations, the ES includes assessments of the potential significant impacts on the environment that may be caused during the construction of the TTP and describes proposed mitigation measures. Where this mitigation is relevant to the scope of the CoCP (e.g., mitigation of construction impacts), it will be fully integrated into Part A of the CoCP which will be submitted alongside the DCO application. Any site specific mitigations identified by the EIA process will be included in the CoCP Part B, which will be developed in consultation with the relevant consultees (a draft/outline of which will be included with the DCO application). Additional details of the mitigation measures proposed will be described in the ES.

2.1.2 TW will commit to employ reasonably practicable means to ensure that the residual environmental impacts of the construction and operation of the TTP are in line with those described in the ES. In line with this commitment, the contractor will have to provide the mitigation measures described in the ES, or any other appropriate or equivalent mitigation measures, such that the residual environmental impacts during construction and operation of the TTP are in line with those described in the ES.

2.1.3 The TTP Environmental Policy is included in Appendix A.

2.2 Environmental management system

2.2.1 The contractor will be required to operate a quality system, part of which will be an environmental management system (EMS) complying with BS EN ISO 14001: Environmental Management. This will be in compliance with the TTP EMS, and will set out:

a. the contractor’s environmental policy

b. the procedures to be implemented to monitor compliance with environmental legislation

c. the procedures to be implemented to monitor compliance with the environmental provisions in this CoCP.

2.2.2 The contractor’s EMS shall be capable of demonstrating that all the environmental requirements of the contract and all relevant standards, regulations and consents are being met. These may be detailed further in CoCP Part B.

2.3 Construction environmental management plan

2.3.1 The appointed contractors for each work package will be required to produce site specific construction environmental management plans (CEMPs) for each site, in full accordance with the CoCP. The CEMP will
demonstrate how the CoCP will be implemented by the appointed contractors through management, monitoring, auditing and training, and so complying with the EMS. The CEMP will be submitted to TW for review.

2.3.2 The CEMP will include specific management plans including, but not limited to, the following:

a. CEMP (see Section 4 of this CoCP) – this will be an overarching site management plan covering general site operations and overall management of the construction works. It will include, but is not limited to, details of the controls with regard to general site layout and operations, working hours, site lighting, security, emergency planning and response, fire prevention and control, utility works, and worker access and welfare.

b. Pollution incident response plan (see Section 4 of this CoCP) – to include details of controls to be adopted to manage the risk of pollution incidents and procedures to be followed in the event of any pollution incidents.

c. Emergency planning and response plan (EPRP) (see Section 4 of this CoCP) – this will include procedures to deal with hazards and incidents, and will take into account the security requirements. The London Fire and Emergency Planning Authority (LFEPA) will be consulted. The EPRP should be in compliance with the Construction (Design and Management) Regulations 2007.

d. Traffic management plan (TMP) (see Section 5 of this CoCP) – to include details of traffic (and lorry) control measures, site access points, access for non-motorised users (eg, cyclists and pedestrians), public roads that will be used during construction and control of construction traffic, together with advertising and notification procedures regarding planned roadworks. Highway and public right of way reinstatement will also be included. River transport management will include river transport and navigational controls.

e. Noise and vibration management plan (see Section 6 of this CoCP) – to include details of measures to control and mitigate noise and vibration during construction, Section 61 consent applications, together with details regarding monitoring systems to be employed during the construction works.

f. Air quality management plan (see Section 7 of this CoCP) – to include details of dust and air pollution control measures, vehicle and plant emissions, and odour.

g. Water management plan (see Section 8 of this CoCP) – to include details of site drainage, protection of watercourses, controls to prevent contamination of surface water and groundwater resources, flooding, dewatering, dredging, and together with monitoring systems to be employed during the construction works.
2. Compliance with the environmental statement and appropriate assessments

h. Land quality (see Section 9 of this CoCP) – although not a management plan, this will include details of site assessment and remedial practices.

i. Site waste management plan (SWMP) (see sections 10 of this CoCP) – to include details for the handling, storage, transfer and removal of waste materials and contaminated materials, as well as measures to be implemented for the reuse or recycling of waste material.

j. Ecological management plan (and biodiversity action plan) (see Section 11 of this CoCP) – to include details of procedures to be followed to mitigate environmental impacts on ecological resources, protection of trees, and reinstatement of grassed areas.

k. Heritage management plan (HMP) (see Section 12 of this CoCP) – to include details of measures for protecting listed structures and archaeological finds, as well as controls to be put in place to protect heritage resources adjacent to the construction works.

l. Community liaison plan (see Section 3 of this CoCP) – to include community engagement, helpline/website information, as well as LA and other stakeholder engagement. A mechanism for dealing with complaints will also be detailed.

2.3.3 The CEMP, its subsidiary plans and other management plans, will be live documents that are subject to updating and refinement by the contractor as required in response to the changing needs of the works during construction.

2.3.4 The CEMP will set out the contractor’s arrangements to provide supervisory and site personnel with adequate training relevant to their roles prior to being employed on the construction site, including specific environmental project inductions.

2.3.5 The CEMP will include details of those responsible for the effective implementation of the plan and will also set out the procedures to be implemented to monitor compliance with the plan during construction.

2.3.6 Contractors will also be required to produce a health and safety plan (HSP) defining how their work and associated risks will be managed. They should also note the requirements in the HSSE Standard for Contractors.

2.3.7 Contractors should manage sites and achieve formal certification under the Considerate Constructors Scheme (CCS), operated by the Construction Federation (see Section 4.3).

2.3.8 Tunnelling contractors shall be required to follow the Association of British Insurers (ABI)/British Tunnelling Society (BTS), Code of Practice for Risk Management in Tunnelling.

2.3.9 Contractors will be required to report against key performance indicators (KPIs) to demonstrate compliance with the TTP draft Sustainability strategy report.
2.4 **Construction arrangements**

2.4.1 The construction arrangements will adhere to the following objectives and requirements:

a. to meet the requirements of all relevant statutory legislation, codes of practice, guidance and standards

b. to limit adverse impacts upon local communities, businesses and the environment so far as reasonably practicable

c. to carry out the planning and delivery of the project in a sustainable, efficient and cost-effective manner

d. to implement a community liaison plan including a complaints helpline

e. to produce construction logistics plans to manage all traffic movements to and from the construction sites

f. to co-operate with adjacent projects as far as practicable to reduce the combined impacts.

2.5 **Enforcement**

2.5.1 This CoCP will be enforceable through the construction contract. An EMS will set out the arrangements and responsibilities for implementing, auditing and enforcing the environmental mitigation set out in this CoCP.

2.5.2 Each contractor’s project manager will be responsible for ensuring that the work is planned and managed so that it is undertaken in a manner consistent with environmental requirements of this CoCP. Each contractor’s project manager will require their environment manager (EM) to undertake a programme of monitoring and auditing to confirm compliance.

2.5.3 Site inspections will be carried out by TW to determine the compliance with the CoCP. Regulating authorities may also attend site inspections to confirm compliance with relevant permits and consents.

2.5.4 The provisions of this CoCP will be incorporated into all construction contracts. The contractor will be required to comply with the terms of the CoCP.
3 Communications and community liaison

3.1.1 The contractor will provide community relations personnel, who will be focussed on engaging with the community to provide appropriate information and be the first line of response to resolve issues of concern. The contractor will take reasonable steps to engage with nearby residents, including those who may be detrimentally affected by construction impacts. The contractor will ensure that occupiers of nearby properties are informed in advance of works taking place, including the type and duration of the activity. In the case of work required in response to an emergency, the LA and local residents shall be advised as soon as reasonably practicable that short notice work is taking place. This will follow the HSSE communication procedure (HSSE Standard, Appendix 7).

3.1.2 The contractor will develop a ‘community liaison plan’ with TW, which will include the following:

a. Monitoring of contractor and subcontractor compliance with undertakings and performance against relevant commitments, local agreements and specific community requirements throughout the TTP. (These will be defined in the TT Sustainability strategy and in the TTP EMP).

b. Maintenance of regular communication with the community, other stakeholders and affected parties to ensure they are all kept informed of the scope of works being undertaken, and the progress of the works and programme. The contractors will be required to produce information sheets of the works to be carried out, detailing expected disruptions and the measures being taken to minimise or mitigate adverse impacts of these works, as far as is reasonably practicable, at least two weeks prior to construction activity taking place. A liaison plan will be issued in advance to TW and appropriate LAs, detailing the information to be supplied, for acceptance.

c. For tunnel boring, a website will be established (by TW) that will provide information on the forecast and actual passage of the tunnel boring machines (TBMs). The contractor will be required to distribute leaflets along the route of the tunnel drives, giving notice of the forecast passage of the TBMs as the work progresses.

d. Fast response to emergencies, complaints (logged on a database) or other contacts made via a helpline (this will be managed by TW) or any other recognised means.

e. Close liaison with the emergency services, LA officers and other agencies (based on established contacts) who may be involved in incidents or emergency situations.

f. Liaison with appropriate local community projects, employment and educational initiatives.

g. Provision of a point of contact for a small claims procedure, relating to claims of physical damage to property, or minor injuries. The contractor will assist in enabling any claims to be progressed promptly in co-ordination with TW and insurer.
h. Co-ordination of preconstruction defect surveys in properties which have been identified. Liaison, in conjunction with TW, with the building surveyor employed to carry out the surveys, and also to maintain a dialogue with the relevant property owners throughout the duration of the works.

3.1.3 Appropriate meetings will be held with residents (or their representatives) and other local occupiers to keep them informed about the works, and to provide a forum for them to express their views. The relevant LA will be invited to participate.

3.1.4 TW will maintain a telephone helpline service during the programme construction period to handle enquiries and concerns from the general public. It will also act as a first point of contact for information in the case of any emergency. All calls will be logged, together with a record of the responses and action taken. Appropriate contacts and response times will be the subject of a detailed procedure to be agreed prior to the commencement of construction. Potentially affected occupiers will be notified of the helpline number and it will be widely advertised.

3.1.5 A complaints register will be maintained and a copy will be provided to the relevant LA each month (or such other interval as is agreed with the LA).

3.1.6 Onsite communications will be used to advise the site workforce of health, safety, environmental, and community matters. This will include information obtained from community liaison on items such as noise generation and access issues, together with constraints detailed in the contracts (eg working hours). Further information can be found in the health and safety documentation. Toolbox talks will be used as a means to disseminate information to the workforce for areas surrounding sensitive issues.
4 General site operations

4.1 Construction process

4.1.1 The construction of the Thames Tunnel will extend across central London and require a number of major construction sites as well as smaller construction sites.

4.1.2 The TTP is a major construction project and will involve many different types of construction activities. These activities will include, but are not limited to: Demolition; site clearance; site investigation; utility diversions; remediation; shaft sinking; tunnelling; piling; excavation; services diversion and new installations; sewer network works; highway works; river works; below ground and surface building works; new, and alteration of, existing river walls; mechanical and electrical works; fit out; provision of new control and ventilation structures; and commissioning.

4.2 Working hours

General

4.2.1 The generic requirements which will be applicable to the whole construction project are detailed within this section, whereas Part B of the CoCP will provide site specific requirements.

4.2.2 The activities at the worksites are varied and include construction of major shafts, tunnels and other activities that, for practicality and safety reasons, require to be constructed over extended periods of time and can include working on a continuous 24-hour, seven days a week basis.

4.2.3 There will be variations in the hours of working between sites which will be dependent on the ability to mitigate the potential effects of 'working hours'. The specific land uses and potential receptors surrounding the sites will influence the working hours, which will also be subject to consultation and agreement with the relevant local authorities.

4.2.4 The contractor will obtain prior consent for appropriate construction works from the local authority under the Control of Pollution Act 1974, Section 61 process. This will include noise and vibration limits and associated mitigation, as appropriate and agreed with the local authority. Measures to be considered in implementing best practicable means will be consistent with the recommendations of BS5228 (2009): Code of practice for noise and vibration control on construction and open sites.

4.2.5 The section provides an expectation of the likely working hours, as well as the flexibility to enable detailed discussion of the works between the contractors and local authorities, to ensure that the construction activities are mitigated to the satisfaction of the local authority in order to protect local sensitive receptors.

Classification of working hours

4.2.6 The working hours at the worksites will depend on the construction activities. The following table classifies the types of working hours that will be applied.
### Table 4.1 Classification of different types of working hours

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard (core) working hours</strong></td>
<td>These hours consist of:</td>
</tr>
<tr>
<td>08.00 to 1800 Weekdays</td>
<td>• standard working hours</td>
</tr>
<tr>
<td>08.00 to 13.00 Saturday</td>
<td>• mobilisation period</td>
</tr>
<tr>
<td>(Plus up to 1 hour before and after for mobilisation)</td>
<td>• maintenance and support period.</td>
</tr>
<tr>
<td></td>
<td>These are the standard hours that will apply to the majority of worksites and construction activities.</td>
</tr>
<tr>
<td></td>
<td>These hours are those that are defined by most local authorities.</td>
</tr>
<tr>
<td></td>
<td><strong>Mobilisation period:</strong> Mobilisation activities may include: Arrival and departure of workforce and staff at site and movement to and from place of work (if parked up, engines to be turned off, staff to remain considerate of neighbours, no loud music or raised voices); general refuelling (from jerrycans only, use of fuel tractors/bowsers to be limited to standard working hours); site inspections and safety checks prior to commencing work; site meetings (briefings and silent inspections/walkovers); site clean-up (good site housekeeping that does not require the use of plant); site maintenance; and low key maintenance and safety checking of plant and machinery (provided this causes no hammering, banging, etc).</td>
</tr>
<tr>
<td></td>
<td><strong>Maintenance period:</strong> The activities allowed in this period are limited, with no significant noise and vibration allowed. Maintenance activities will be limited and includes general mechanical maintenance to construction machinery such as excavators, and maintenance to plant such as compressors, grouting equipment and dewatering equipment such as pumps. Where possible, maintenance works on Sundays would be avoided.</td>
</tr>
<tr>
<td><strong>Extended standard working hours</strong></td>
<td>These are intermittent and are required to cover certain construction activities that require more than the standard working hours to be completed.</td>
</tr>
<tr>
<td>18.00 to 22.00 Weekdays</td>
<td>These activities include, but are not limited to, major concrete pours and piling/diaphragm wall works.</td>
</tr>
<tr>
<td>Classification</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Continuous working hours</td>
<td>For the tunnelling construction activities, the underground work will be undertaken on a continuous 24-hour, seven days a week basis.</td>
</tr>
<tr>
<td>Out of hours/possession working</td>
<td>It is beneficial to undertake a number of activities outside of the standard working hours. These are required: • for utilisation of periods of low traffic flows for items such as abnormal loads/construction plant delivery; works within the highway or footpaths; works affecting operational railways • for utilisation of periods with low demand or flows for utility diversions and works on the existing sewer system • to ensure minimum disruption to third parties who may have ongoing operations during the day. This will be agreed on a case-by-case basis with the relevant local authority, and included as appropriate in CoCP Part B.</td>
</tr>
<tr>
<td>Tidal working</td>
<td>A number of the works are located in the foreshore and certain construction activities, such as new structures and infill, will be required to be undertaken at high or low tides.</td>
</tr>
<tr>
<td>River and rail transport hours</td>
<td>Main tunnel construction sites have the opportunity for excavated material to be removed by barge or train. When this is the case, it will be necessary to have barge and/or trains, loading and transfer in operation on a continuous 24-hour, seven days a week basis. The movement of barges from construction site locations is linked to high tides and will be undertaken when the tide is suitable for barge access. Small CSO sites using the river will be dealt with on a site-by-site basis in Part B of the <em>Code of construction practice</em>.</td>
</tr>
</tbody>
</table>
4  General site operations

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short notice working</td>
<td>On a major project such as the Thames Tunnel, there is the potential for works that need to be completed or undertaken to secure and make safe construction operations that will be outside the standard working hours. Arrangements for advising and agreeing these works with the local authorities will be agreed in advance.</td>
</tr>
</tbody>
</table>

4.2.7 Key support activities are required for safeguarding the works and are required to be in operation and maintained on a continuous 24-hour, seven days a week basis. This includes items such as site security, pumps, ventilation fans, cranes and compressors. Such equipment will be shielded to provide noise attenuation, as appropriate (see Section 6, *Noise and vibration*).

4.2.8 Suitably qualified staff will be required to undertake monitoring and collect data and samples outside the standard hours, both within the worksite and in the surrounding areas.

**Abnormal deliveries**

4.2.9 Deliveries will be arranged to minimise impacts on the road system, so far as reasonably practicable. Abnormal and special loads may be delivered outside standard working hours, subject to the requirements and approval of the local authorities and the transport police.

**Exceptions**

4.2.10 Deliveries by lorry at night may be considered in agreement with local authorities on a site specific basis (this will be detailed in Part B of the CoCP); for example, in areas away from sensitive noise receptors.

4.2.11 Consideration will be given to the Lane Rental Scheme in London, with appropriate adjustments made in due course.

**Description of site types and associated working hours**

**Main tunnel construction sites**

4.2.12 The main Thames Tunnel will be constructed from a number of worksites. The construction phases undertaken on each worksite will include enabling works, site establishment, shaft construction, tunnel construction, shaft and tunnel lining, surface works and commissioning.

4.2.13 The tunnel construction phase will be undertaken on a ‘continuous working hour’ basis. The other construction phases will be undertaken within the ‘standard working hours’ unless otherwise agreed with the local authority.

4.2.14 There are practicality considerations that necessitate the construction of diaphragm walls, and for other major concrete pours for the main shaft to
be undertaken over ‘extended standard working hours’, and these will be agreed on a site specific basis with the local authorities.

**CSO interception shaft sites**

4.2.15 The construction phases, activities and durations for the CSO interception works and shafts will vary depending on the location; the working hours will depend on the construction phase.

4.2.16 The majority of the construction phases and activities will be completed within the ‘standard working hours’.

4.2.17 Certain activities will be unable to be completed within the ‘standard working hours’ and will require ‘extended standard hours’. These activities include major concrete pours and piling/diaphragm wall works during shaft construction. These works will be notified and agreed with the local authority.

4.2.18 A number of the construction sites will operate as connection tunnel drive sites, where the tunnelling works will be undertaken on a ‘continuous basis’. This applies to both short and long connection tunnels.

**CSO interception works**

4.2.19 A number of construction sites require connections to existing sewers and outfalls outside of the shaft construction sites. These works include requirements for traffic management (where works require temporary closure of the carriageway) and may be appropriate to be undertaken outside the ‘standard working hours’.

**Enabling and advance works**

4.2.20 Enabling and advance works are required, including traffic management and utility diversions. The working hours for these activities will be reviewed and agreed with the local authority to minimise disruption to traffic and the local environment. Certain work, such as works within existing highways, may be appropriate to be undertaken in out of hours/possession working hours.

**4.3 Main site layout**

4.3.1 The contractor will ensure, as far as is reasonably practicable, that the site layout and appearance will be designed using the following principles:

a. All sites will be fully secured with appropriate hoardings or fences, as defined in the project specification

b. Noise generating activities will be sited away from sensitive receptors where practicable, and screened so as not to exceed allowable levels

c. Storage sites, fixed plant and machinery equipment and temporary offices will be located to limit environmental impacts, as far as is reasonably practicable, having due regard to neighbouring accommodation and the constraints of each site

d. Site lighting will be located and directed so as to minimise intrusion into occupied residential properties and on sensitive areas, or constitute a road, rail or river hazard
e. River sites will have appropriate lighting, as required, by the Port of London Authority (PLA) to assist river navigation
f. Internal vehicle routes will be arranged to minimise the risk of mud being carried out of the site
g. Site drainage will be carefully considered to minimise areas of mud in one part of the site contaminating other areas
h. Security cameras will be sited and directed so that they do not intrude into occupied residential properties
i. Site plant and facilities will be powered from mains electrical sources, where reasonably practicable.

4.3.2 The contractor will display an information board containing contact names, telephone number and address, and the helpline number at appropriate locations on the boundaries of the sites (see Section 3, *Communications and community liaison*, for more detail). This will be in accordance with the project specification.

4.3.3 The type of hoarding or fencing used will vary from location to location but will accord with the following principles:

a. Comply with the project specification and standard detail drawings
b. The standard hoarding will be of an appropriate height
c. The extent and height of hoarding or fencing at a particular location will be selected to maintain effective security and achieve appropriate noise attenuation, dust containment and visual screening
d. Hoardings will be maintained in good condition throughout the contract
e. Suitable measures will be used for tree protection (see Section 11.5)
f. Where reasonably practicable, existing walls, fences, hedges and earth banks will be retained (also to aid in site security where practicable)
g. Notices will be displayed on all site boundaries, where appropriate, to warn of hazards onsite such as deep excavations, construction access
h. Appropriate sight lines/visibility splays will be maintained to ensure safety of both vehicles and pedestrians is preserved (see *HSSE Standard*, Section 6.9)
i. Temporary fences may be used in certain areas, such as for short-term occupation of sites or at more remote locations.

4.3.4 Vehicle access and egress points will have gates positioned such that no gate will open outwards onto the highway where possible. As far as is reasonably practicable, gates will be located to allow vehicles to drive into the site, clear of any public highway. Where provided for noise control, gates will be of a similar material and construction to the boundary in which they are situated, and will be closed except when being used for access (see *HSSE Standard*, Section 9 – *Security*, and also document F (16)-A Section 7).
4.3.5 The contractor will promote and enforce ‘good housekeeping’ arrangements on all the construction sites to ensure that clean, tidy and safe sites are provided.

4.3.6 Arrangements will be implemented to provide effective preventative pest control and prompt treatment of any pest infestation. This will be assessed as part of the Considerate Constructor Scheme, where applicable.

4.3.7 The contractor will ensure that appropriate welfare facilities are provided at all major sites. The facilities will include canteens, toilets, showers, locker rooms, fire points and first aid posts (for small sites, provision of all these elements may not be possible). The facilities will be connected to mains services and drainage, where reasonably practicable. Alternative arrangements should be provided when connection to the mains is not possible (see HSSE Standard, Appendix 6, for further details).

4.4 Controls for works outside main site areas
4.4.1 This includes work activities around existing sewer systems and connection or construction works to existing CSOs.

4.4.2 In general, the principles detailed within this CoCP will apply, as appropriate, to other works, taking regard for size, location, duration and scope of works being undertaken.

4.4.3 Each site requires appropriate method statements, risk assessments and consultation with the LA and relevant stakeholders.

4.5 Cranes
4.5.1 Crane arcs will be confined within the site boundary, unless agreed otherwise with the LA and property owners/occupiers whose air space is affected (eg, London Underground (LU), Docklands Light Railway (DLR), Transport for London (TfL), Network Rail (NR)). The contractor will obtain the relevant permissions from TfL or the LA, as appropriate, for cranes located adjacent to roads. Cranes will be operated in accordance with the requirements of BS7121, Code of Practice for Safe Use of Cranes. There may also be site specific issues, which will be detailed within CoCP Part B.

4.6 Site lighting
4.6.1 Site lighting and signage will be provided to ensure the safety and security of the construction sites. Where appropriate, and in discussion with the police, lighting to site boundaries will be provided and illumination will be sufficient to provide a safe route for the passing public. In particular, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths and roads, to deter the potential for muggings. Appropriate industry standard procedures will be implemented. This will include that lighting will be positioned and directed so as not to unnecessarily intrude on adjacent buildings and land uses, and so as to prevent unnecessary interference with local residents or passing transport users (road, rail, and river).
4.6.2 The lighting will be designed to comply with the provisions of BS5489, *Code of Practice for the Design of Road Lighting*, where applicable. Further guidance is contained within *Guidance Notes for the Reduction of Light Pollution*, 2000, published by the Institute of Lighting Engineers.

4.6.3 A lighting management plan will be prepared by the contractor. This will ensure that provision for ecology is also considered (eg, bats).

### 4.7 Security

4.7.1 Site security is a significant issue, particularly for central London, and with highly visible construction sites (a project security policy will be developed).

4.7.2 The contractor will ensure that all construction site(s) are secure and staffed for security on a 24-hour basis, where appropriate (swipe card access may be considered). Access to the site will be limited to specified entry points only and all personnel entries/exits will be recorded and monitored for security, health and safety purposes.

4.7.3 The contractor has a statutory duty to prevent unauthorised access to the site (including children), and will be required to carry out site specific assessments of the security and trespass risk at each site, and implement appropriate control measures.

4.7.4 The site boundary will be secured and constructed such that it minimises opportunities for unauthorised entry. The boundary will be monitored, both directly and remotely (by CCTV) at relevant (agreed with the LA or local police) sites by the contractor/contractor’s security team. Should the site boundary suffer damage, it will be immediately rectified by the contractor.

4.7.5 The contractor will consult with local crime prevention officers to agree security proposals for each site and to identify any security problems at particular sites (eg, for security sensitive central London sites), with regular liaison to review security effectiveness and response to incidents.

### 4.8 Emergency planning and response plan

4.8.1 TW will put in place an EPRP (see HSSE Standard for further details) at each site location, which the contractor will be required to adhere to. The procedures will be standardised, as far as possible, across the worksites and will be adapted to be appropriate to the anticipated hazards and the specific layout. The EPRP will include emergency pollution control measures that will take into account Environment Agency (EA) guidelines. The emergency procedure will contain emergency phone numbers and the method of notifying LAs, statutory authorities and local community representatives. Contact numbers for the key TW and contractor’s staff will also be included.

4.8.2 Consideration should be given to buildings ‘at risk’, such as bridges and tunnels infrastructure, where the consequence could exceed just environmental impacts.

4.8.3 The contractor will ensure that the requirements of the LFEPA will be followed for the provision of safe site access points. This might include ‘blue light forums’ where appropriate. Where appropriate, the access will
be designed to the requirements of LFEPA publication, *Fire Safety Guidance Note Number 29, Access for Fire Appliances*. The accesses, if varied over time, will be notified to the emergency services in accordance with procedures and processes agreed prior to start of construction. In all cases, the arrangements put in place will also be suitable for and agreed with the London Ambulance Service (LAS).

4.8.4 The contractor will need to have standby equipment readily available (eg, road diversion signs).

4.9 **Pollution incident response**

4.9.1 This will be intrinsic to the above EPRP, but with the responsibility with the contractor. Works will be carried out in such a way as to avoid pollution incidents. However, should any occur, emergency response procedures, including appropriate equipment, materials and resources, will be implemented to contain and limit the effects as far as is reasonably practicable.

4.9.2 The site procedures, methods of working and selection of materials will consider the risk of pollution incidents, and include mitigation measures to reduce the likelihood and impact of any incident. Preventative containment measures should also be considered.

4.9.3 Such procedures and measures will cover atmospheric, aquatic or land pollution and procedures in the event of fire.

4.9.4 The correct storage, handling, use, and disposal of any potentially hazardous materials will be used in accordance with the relevant statutory provisions and EA and Health and Safety Executive (HSE) codes of practice and guidance notes, together with any manufacturer's recommendations.

4.9.5 Suitable spill kits will be provided and positioned in vulnerable areas. Briefings and toolbox talks will be given to site personnel to raise awareness. Procedures should also be in place for dealing with spillages and pollution incidents, and with all staff trained in emergency procedures.

4.9.6 The contractor is required to produce a pollution incident control plan.

4.9.7 The relevant statutory bodies, including the HSE (Construction), Fire Authority, the EA, and the LA (Emergency Planning) will be consulted in preparing the pollution incident control plan. This plan will cover the procedures to be followed to limit the spread of pollution in the event of an incident. The pollution incident control plan will complement and be consistent with the relevant emergency preparedness plans (EPPs), as required by health and safety legislation, other environmental management and health and safety procedures.

4.9.8 The pollution incident control plan (see *HSSE Standard* for further information) will contain, but not necessarily be limited to:

a. an assessment of the type of materials to be used and the risk of contamination

b. guidance on the storage and use of hazardous materials, with the aim of preventing and containing spills and releases
c. guidelines on the degrees of containment which take account of the nature of the materials and the sensitivity of the environment

d. procedures to be adopted in the event of a pollution incident, to contain and limit any adverse effects

e. procedures and appropriate information required in the event of any incident such as a spillage or release of a potentially hazardous material

f. systems for notifying appropriate emergency services, authorities, TW and the contractor's personnel

g. arrangements for notifying appropriate statutory bodies and LAs of pollution incidents, where required to by legislation

h. standby equipment and materials

i. specific arrangements for sites on or adjacent to the river

j. relevant procedures and contacts for each work site for forwarding to the emergency services and appropriate authorities.

4.9.9 Where pollution is likely to affect an environmentally designated site, safeguards will be included in the ecology management plan.

4.10 **Fire prevention and control**

4.10.1 All construction sites and associated accommodation and welfare facilities will have in place appropriate plans and management controls to prevent fires (see *HSSE Standard*, Appendix 4, for further information). The site fire plans will be prepared, regularly reviewed and updated as necessary, and will have due regard for the LFEPA requirements (and liaison where applicable) and to the following documents:

a. *Fire Prevention on Construction Sites (Joint Code of Practice on the Protection from Fire of Construction Sites & Buildings Undergoing Renovation)*

b. *Operational Guidance for Tunnelling and Underground Structures*


4.10.2 During detailed construction planning and design development stages, the contractor will look to reduce fire risk and potential fire load applicable to the works. The specification of non-combustible materials, products and packaging will be pursued wherever reasonably practicable.

4.10.3 Any tunnelling works should consider TBM refuges, where appropriate.

4.11 **Electromagnetic interference**

4.11.1 The contractor will consider the effects of electromagnetic interference on wireless telecommunication systems (and including traffic and rail signalling equipment) during the design and construction of the Thames Tunnel, which will include site specific impacts from the demolition of buildings and the installation of tower cranes and, where appropriate, will employ best practice technology to ensure that levels of RFI associated with the project are low and at acceptable levels.
4.12 Unexploded ordnance

4.12.1 A risk assessment will be completed by the contractor for the possibility of unexploded ordnance being found on all sites (particularly those within the foreshore) and a response process will be included in the emergency response procedures.

4.13 Utility works

4.13.1 The utility diversions and new works required by the design will be identified, and schedules produced and agreed with the utility owners. This will be carried out in accordance with the appropriate approvals.

4.13.2 Account will be taken of any outages in planning the utility diversions.

4.13.3 Where further changes in utility infrastructure cannot reasonably be avoided, the contractor will agree arrangements with TW and owner of the equipment to be relocated, either temporarily or permanently, outside the area of the Thames Tunnel works. In some instances, the apparatus may be surplus to requirements and can be decommissioned.

4.13.4 Wherever practicable, when the work is carried out, the new equipment will be installed and commissioned before the existing infrastructure is disconnected but there may be circumstances where a period of disconnection will be essential to allow safe completion of the work. In these circumstances, the contractor will agree appropriate arrangements (such as planned night-time or weekend closures) with the relevant utility operator.

4.13.5 The contractor will locate, identify and protect (or divert if necessary) all utility plant and equipment reasonably expected to be materially adversely affected by the Thames Tunnel works. The use of ground penetrating radar (GPR) and vacuum excavation will be used where applicable. On a site specific basis, this will include preliminary site investigations to confirm the extent and exact location of underground infrastructure, to confirm the accuracy of existing and provided records. Even with these precautions, there is a risk that unrecorded infrastructure will be encountered unexpectedly, in a city as densely developed as London. Before starting construction, the contractor will establish procedures with the utility operators for the management and mitigation of unforeseen events. Information from the ES and site investigations work will be made available.

4.14 Worker access and welfare

4.14.1 TW will produce a green travel plan (logistics plan) for the TTP. The plan will be developed to encourage the use of public transport by those working on the project (see HSSE Standard, Appendix 6, for further information).

4.14.2 The contractor will only allow site vehicles necessary to undertake the works on site.

4.14.3 No temporary living accommodation is permitted on site.
4.14.4 The contract shall provide mess rooms, locker rooms, toilets and showers on each main drive site, and maintain these in a clean condition in accordance with the project specification.

4.15 Clearance of site on completion of activities

4.15.1 The contractor will clear and clean all working areas and accesses as work proceeds and when no longer required for the works.

4.15.2 At the completion of the construction activity plant, temporary buildings or vehicles not required during subsequent construction works shall be removed from the site. All land, including highways, footpaths, public open spaces, river embankments/waterways, loading facilities or other land occupied temporarily shall be made good to the satisfaction of TW and the LA. This will be in accordance with the restoration and landscaping scheme provided by TW.

4.16 Considerate Constructors Scheme

4.16.1 Contractors will be required to manage sites and achieve formal certification under the CCS, operated by the Construction Federation. Contractors will be required to attain certification under the following eight sections:
   a. Considerate
   b. Environmentally aware
   c. Site cleanliness
   d. Good neighbour
   e. Respectful
   f. Safe
   g. Responsible
   h. Accountable.

4.16.2 For each site, contractors will be required to achieve a minimum score (four out of five) for each of the above sections (maximum score = 40). Should the site not be able to achieve a score of 32, an explanation indicating that the highest possible score has been achieved will be required from the contractor.

4.16.3 A copy of the CCS certificate will be sent to TW, and audited through the EMS.
5 Public access, the highway and river transport

5.1 Traffic management and control

5.1.1 The CoCP establishes the framework within which project related traffic will be controlled. The CoCP should be considered as a high-level document which will foster the production of further information at a site specific level. The CoCP Part B will identify any site specific requirements, such as access/egress points for the worksites, and temporary and permanent closures and diversions of highways.

5.1.2 The contractor will ensure that legal requirements for works affecting highways are implemented and will undertake the works in such a way as to maintain, as far as is reasonably practicable, existing public access routes and rights of way during construction (see HSSE Standard, Section 6.21, and document F16 (A) for further information). Alternative signposted routeing will be provided where required and feasible.

5.1.3 The contractor will carry out the works in such a manner as to limit undue inconvenience to the public arising from increased traffic flows and disruptive impacts of construction traffic, as far as is reasonably practicable.

5.1.4 For each worksite, a site specific TMP will be produced, co-ordinated and then implemented by the contractor. The plan will be prepared in consultation with highway and traffic authorities and the emergency services. The TMP(s) will include:

a. site boundaries and the main access/egress points for the worksites
b. temporary and permanent closures and diversions of highways (including programme and/or phasing)
c. the strategy for traffic management, including parking
d. local routes to be used by lorries generated by construction activity including, where required, lorry holding areas, lorry route signing strategy, means of monitoring lorry use and any routes prohibited from use.

5.1.5 The planning of the works will include consideration of the access and servicing requirements of affected residential and commercial premises. The contractor will be required to undertake regular communications with parties affected by the works, as detailed in Section 3. Local residents and businesses will be informed in advance of the dates and durations of closures, and will be provided with details of diversion routes at least two weeks in advance of the works. Access and servicing will be maintained, as far as is reasonably practicable, within the constraints of the works and the need to ensure the safety of the public.

5.1.6 Some traffic management proposals may require traffic regulation orders under the Road Traffic Regulation Act 1984 to cover measures such as the introduction of one-way streets, road closures, banned turns, temporary speed limits and the suspension of parking places. These will be discussed at the liaison meetings and applications for these orders will be made to the relevant traffic authority.
5.2 Lorry management and control

5.2.1 Where necessary, approval of local routes to be used by construction lorries will be sought from the local highways authority.

5.2.2 The route to/from the site from the Transport for London Road Network (TLRN) and Strategic Road Network (SRN) will be selected to minimise effects on residential properties, businesses and sensitive receptors, such as schools, as far as is reasonably practicable.

5.2.3 As far as is reasonably practicable, there will be no parking of lorries on the highway in the vicinity of any worksite, except in specified waiting areas for lorries waiting to deliver or remove materials from the site.

5.2.4 The contractor will communicate with all suppliers the requirements for access to each site to ensure that lorries do not arrive before standard working hours or wait in non-agreed areas.

5.2.5 An appropriate control system will be implemented for the arrival and dispatch of all vehicles containing excavated material, demolition materials or other material, to prevent congestion around the worksite and its access routes. Any waste will be controlled and deposited in accordance with relevant legislation.

5.3 Works within the highway or on a public right of way

5.3.1 All necessary consents and licences will be obtained in advance of implementing the highway works.

5.3.2 All temporary closures of highways and public rights of way will be for as short a time as reasonably practicable. Pedestrian access to premises will be maintained.

5.3.3 As far as is reasonably practicable, diverted rights of way will be provided prior to the commencement of the relevant parts of the works. Suitable signage, lighting and barriers will be provided.

5.3.4 Local residents and businesses will be informed in advance (as far as is reasonably practicable) of the dates and durations of closures, and will be provided with details of diversion routes, as detailed in Section 3.

5.3.5 The contractor must also consider the following:

a. Minimising the need for diversions of public rights of way, cycle routes or National Trails (including the Thames Path)

b. Minimising the length of any necessary diversions of the above

c. Minimising the length of time diversions are in place

d. Where practical, place controls to ensure the safety of pedestrians and cyclists if they need to cross a haul route

e. Providing clear signage for any diversions, and advance notice of any closures/diversions

f. Ensure any diversions are fully accessible and in line with Disability Discrimination Act (DDA) requirements, as far as practicable and in the context of the route that is being closed temporarily.
5  Public access, the highway and river transport

5.3.6 Consideration should also be given to people with reduced mobility in the design and operation of works.

5.4 Road cleanliness

5.4.1 All reasonably practicable measures will be put in place to avoid/limit and mitigate the deposition of mud and other debris on the highway. This will also minimise dust generation.

5.4.2 These measures will have regard to the nature and the use of the site, and could include:

a. hardstanding at the access and egress points which will be cleaned at appropriate intervals
b. vehicle wash-down points to clean vehicle wheels at each exit point from the site
c. the correct loading of vehicles and sheeting of loads where necessary to avoid spillage during their journeys
d. the use of sealed vehicles for transportation of wet materials that otherwise would have the potential to leak from the vehicle
e. the use of mechanical road sweepers combined with water sprays for the suppression of dust to clean site hardstanding, roads and footpaths in the vicinity of the site
f. the flushing of gullies in the vicinity of the site.

5.4.3 After completion of any works affecting a highway, all surplus materials arising from the works will be cleared from the highway, leaving it in a clean and tidy condition in accordance with the reasonable requirements of the highway authority.

5.5 Highway and public right of way reinstatement

5.5.1 Where temporary alterations to the highway are required, the highway will be restored to the reasonable satisfaction and approval of the local highway authority.

5.5.2 Surveys will be used to establish the condition of the highway and public right of way prior to the commencement and after the completion of Thames Tunnel’s works, in consultation with the highway authority. The locations where surveys will be undertaken will be identified in the TMP. The highway authority will be notified of surveys and may send a representative if it wishes.

5.6 River transport

5.6.1 The CoCP establishes the framework within which project related river transport will be controlled. The CoCP should be considered as a high-level document which will foster the production of further information at a site specific level. The CoCP Part B will identify any site specific requirements such as moorings, loading facilities, navigational aids and signage.
5.6.2 The contractor will ensure that legal requirements for works affecting navigational channels are implemented and will undertake the works in such a way as to maintain, as far as is reasonably practicable, existing navigational channels during construction.

5.6.3 The contractor will carry out the works in such a manner as to limit undue inconvenience to the public arising from increased barge movements, as far as is reasonably practicable.

5.6.4 For each relevant worksite, a site specific river transport management plan (RTMP) will be produced, co-ordinated and then implemented by the contractor. The plan will be prepared in consultation with the PLA and Maritime and Coastguard Agency (MCA), as well as with the emergency services. The RTMP will include (but will not be limited to):

a. roles and responsibilities for activities associated with transportation on the river, including a navigation risk assessment and site specific arrangements

b. dredging arrangements

c. a standard operating methodology, including methods to meet statutory and regulatory requirements (e.g., a River Works Licence)

d. emergency arrangements and a contingency plan.

5.6.5 The planning of the works will include consideration of access and requirements of affected river users. The contractor will be required to undertake regular communication with parties affected by the works, as detailed in Section 3. Access will be maintained, as far as is reasonably practicable, within the constraints of the works and the need to ensure the safety of the public.

5.6.6 The RTMP shall include assessment of risks to recreational and commercial river users, and details of mitigation measures that will be considered.
6 Noise and vibration

6.1 General

6.1.1 The CoCP establishes the framework within which noise and vibration as a result of the works will be controlled. The CoCP should be considered as a high-level document which will foster the production of further information at a site specific level. The CoCP Part B will identify any site specific requirements such as noise and vibration sensitive receptors, restrictions on noise generating activities or working hours, activities and locations requiring detailed consideration in Section 61 applications, and proposed noise and vibration monitoring locations.

6.1.2 Contractors will be required to apply for Section 61 consents (s.61) under the Control of Pollution Act 1974 (CoPA). In some instances, a Section 61 consent may not be necessary; if this is the case, this will be detailed on a site specific basis in CoCP Part B.

6.1.3 The contractor will be required to maintain best practicable means (BPM), as defined under Section 72 of the CoPA 1974, is being adopted at all times to all activities, to minimise noise and vibration from these works.

6.1.4 The CoCP details the reasonably foreseeable worst case working hours for the works, including extended working hours for particular types of work that it is known cannot practicably be carried out within normal working hours. Exceptions to this will be detailed in CoCP Part B.

6.1.5 The generic noise and vibration suppression measures to be employed are included within the CoCP. Agreement of these measures is sought from the LA prior to submitting an s.61 application.

6.1.6 Notification of the start of works and the provision of advanced information are covered within the following section. Advanced notification is a key part of mitigating the effect of noise and vibration generated.

6.1.7 The contractor shall take into account statutory requirements in respect of noise and vibration (see Section 6.7) as well as the guidance set out in the Mayor’s Ambient Noise Strategy (Greater London Authority (GLA), 2004).

6.2 Working hours

6.2.1 Control of working hours is a fundamental means of controlling noise and vibration.

6.2.2 The contractor will carry out the works in such a way as to limit, as far as is reasonably practicable, the adverse noise and vibration impact of the construction activities. Therefore, as far as practicable, works will be undertaken during standard working hours. Details of the working hours are given in Section 4.2.

6.2.3 Locations of works that are anticipated to require works outside the normal working hours will be assessed in the TTP ES, defined in the CoCP Part B and confirmed in the s.61 application.
Section 61 consents

6.2.4 Before any works which may cause an impact can be undertaken, the contractor will submit to the LA an application for prior consent under s.61 of the CoPA (s.61 consent).

6.2.5 The s.61 will set out the specific method of working, the actual working hours required, and the specific standards and measures that will be used at identified locations to minimise noise and vibration.

6.2.6 The contractor will engage in early discussions with the LAs with respect to the information provided in the s.61 applications. This is to enable all parties to focus on and agree those activities that could give rise to complaint and the most efficient approach to the consent applications.

6.2.7 As required by the CoPA, BPM will be employed and demonstrated through programme, method and noise predictions to the LA in the s.61 consent application.

6.2.8 Justification, detailed description and assessment will be provided for activities outside normal working hours.

Section 61 consents: Dispensation/variation

6.2.9 In the event that works for which an s.61 consent has been applied for have to be rescheduled or modified (eg, method or working hours) for reasons not envisaged at the time of the s.61 submission, the contractor will apply at least 14 days in advance of the start of those works for a dispensation or variation (see Part B) from the appropriate LA. The dispensation will be sought by means of an application for a variation to the agreed matters, setting out the revised construction programme or method and the relevant noise calculations. The guidance on use of dispensations and variations is included as Part B.

6.2.10 Where the rescheduling relates to work of a more urgent or critical nature (such as a key activity likely to delay other key activities), the contractor will apply to the relevant LA, where practicable, seven days (but at least two working days) ahead of the start of those works for a dispensation or variation to the agreed matters.

6.2.11 Where working outside normal hours has been discussed and accepted in an s.61, a dispensation or a variation, occupiers of nearby residential or other sensitive property who are likely to be affected will be informed, as soon as reasonably practicable, by the contractor about this and, where appropriate, the likely duration of works (in accordance with Section 3).

Unscheduled overruns

6.2.12 In the event that planned works not covered by a consent (either full Section 61 application or dispensation/variation) extend beyond the approved working hours and continue due to unforeseen circumstances that would affect safety or engineering practicability, the nature, time, location and reasons for the overrun will be notified to the relevant LA and TW as soon as possible, and records kept by the site management.
6.2.13 The authority will be requested to provide a telephone number and nominate an officer to receive such notifications. Overruns and the reasons for these will be reviewed by the contractor, project manager and relevant LA on a monthly basis, with the aim of reducing the potential for further action.

6.2.14 In the case of work required in response to an emergency (or which, if not completed, would be damaging or unsafe), the relevant LA will be advised as soon as is reasonably practicable of the reasons for, and likely duration of, such works.

6.3 **Section 61 consent applications**

6.3.1 For each construction site and before starting any construction activities which may cause an impact, the contractor will, using the format agreed with the LA, prepare and submit to the relevant LA information which will include:

a. an outline of the proposed construction method, type and number of plant to be used

b. definition of the working hours required and, where these differ from the normal working hours detailed in Section 4.2 of this document, a justification for the working hours sought

c. a work programme which identifies the location and duration of each significant noise-generating activity

d. the sound power levels, or sound pressure level at 10m, for each item of plant for each relevant activity

e. appropriate (in terms of noise level, duration and working hours) justification that the method and plant proposed demonstrates that BPM has been employed to control noise and vibration levels

f. predicted noise and vibration levels at specified locations (determined in the EIA and agreed with the LA), supported by calculations

g. all steps to be employed to minimise noise and vibration during the works

h. assessment of cumulative noise arising from the works for which consent is being sought, any other works that the contractor already has consent for and other Thames Tideway contractors working nearby.

6.3.2 The contractor will employ sufficient suitably qualified persons to develop the s.61 consent applications and to discuss them with the LAs.

6.3.3 The number, extent (geographically and in terms of construction activities) and duration of s.61 approvals will be the subject of prior consultation between the contractor and each LA.

6.3.4 Where the predicted noise levels exceed the noise insulation or temporary rehousing thresholds, the contractor shall inform TW.

6.3.5 Where works are near LA boundaries, the s.61 submission will be made to the authority within which the construction activities are located, with a
noise assessment made at locations representative of all neighbouring noise-sensitive receptors. Neighbouring LAs will be consulted for agreement and determination for the need for any additional measures.

6.3.6 Where the works are to be undertaken on the boundary within two LAs, an application will be made to each authority. The authorities are requested, through discussion, to agree a common set of consent conditions to be issued from each LA.

6.3.7 Further information and good practice guidance for the development of consent applications is included in Appendix B.

6.4 Noise and vibration control measures

Noise

6.4.1 BPM shall be employed where possible and at all sites.

6.4.2 Generic measures to be considered in implementing BPM will be consistent with the recommendations of BS 5228 and may include one or more of the following, as appropriate:

a. Careful selection of construction plant, construction methods and programming
b. Equipment to be suitably sited so as to minimise noise impact on sensitive receptors
c. Use of site enclosures and temporary stockpiles, where practicable and necessary, to provide acoustic screening
d. Choice of routes and programming for the transportation of construction materials, excavated material and personnel to and from the site (see also Section 5)
e. Careful programming so that activities which may generate significant noise are planned with regard to local occupants and sensitive receptors.

6.4.3 Specific measures to be employed should be based on best practice and may include:

a. acoustic suppression systems
b. operation of equipment in the mode of operation that minimises noise
c. shutting down equipment when not in use
d. selection of piling methods which limit noise and vibration to acceptable levels
e. breaking out concrete by means other than percussion
f. handling materials in a manner which minimises noise
g. conveyors:
   i. The mounting of underground conveyors used to remove excavated material from the tunnel face will be designed and installed so as to ensure that ground-borne noise and vibration to buildings above the tunnel do not exceed acceptable levels.
A. A maintenance programme will be implemented to ensure that the noise generation of the conveyor does not deteriorate over time.

iii The surface conveyor systems will be acoustically enclosed where they run through or adjacent to noise-sensitive areas.

h. temporary construction railway:

i The alignment, jointing and mounting of temporary construction railway will be installed, maintained and operated in a manner so as to minimise the transmission of vibration and ground-borne noise from the passage of rail vehicles.

ii All diesel locomotives will be fitted with efficient exhaust silencers.

i. temporary tunnel ventilation:

i 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.

j. reversing alarms: The contractor will, as far as is reasonably practicable, ensure that the noise from reversing alarms is considered.

**Underwater noise and vibration**

6.4.4 The contractor will be required to introduce controls on vibration-generating activities (particularly ‘in river’ works such as piling and installation of jetties and cofferdams) with regard to protecting fish.

6.4.5 Any site specific BPM identified are included in the relevant CoCP Part B. No formal regulatory standards exist in England and Wales to limit underwater noise emissions or vibration, and the current informal EA policy is based on pragmatic use of noise predictions and evidence from relevant field studies. Where reasonably practicable, the following should be considered:

a. Avoiding piling at night, to ensure free windows of opportunity for no disturbance within each 24-hour period

b. Limit noise and vibration levels at the midpoint of the navigable channel to leave part of the river cross-section passable at all times

c. Undertaking measurements at prescribed points and intervals to ensure compliance

d. Where technically feasible, utilise low noise/vibration cofferdam or pile/pier installation techniques, such as pressing or vibro piling rather than impact/percussive piling

e. Where vibro piling is used, slowly increase the power of the driving to enable fish to swim away before the full power of the pile driver is felt through the river.

6.4.6 Toolbox talks should be provided to inform staff of the need to consider noise and vibration impacts on aquatic ecology.

6.4.7 Where predictions indicate that best practice limits would not be achievable, confining as much of the underwater noise-generating
activities as possible to outside peak fish migration periods should be considered.

**Vibration**

6.4.8 The contractor shall use BPM to minimise vibration generated by the works in order to:

a. avoid adverse effects on vibration sensitive equipment

b. to minimise disturbance to residents and other users of buildings close to the works

c. to protect buildings from physical impact, if it is not reasonably practicable to avoid very high levels of vibration.

6.4.9 The contractor shall use BPM to minimise the effects of vibration on people, buildings and vibration-sensitive equipment. Appropriate control measures will be agreed with the LA through the s.61 process. In establishing criteria, controls and working methods, the contractor will take account of guidance in British Standard 6472, British Standard 5228 and British Standard 7385. At a minimum, the criteria used for assessment in the ES shall be considered.

6.4.10 Where activities that are likely to give rise to high levels of vibration are planned, the need to undertake vibration predictions in support of the relevant s.61 consent application shall be agreed with the LA in advance of the consent application. The predictions shall be used to guide the selection of steps to minimise vibration and other activities (such as advanced information leafleting and, in extreme cases, building condition surveys) where it is not practicable to minimise vibration at source.

6.4.11 For the protection of buildings from damage, the contractor will need to carry out vibration predictions and act on the results of the predictions and/or measurements.

6.4.12 Action to assess and, where necessary, minimise any adverse effects on vibration-sensitive equipment will be dealt with on an individual basis as appropriate within the relevant s.61 application (see the project settlement policy for further information).

6.5 Noise and vibration monitoring

**General statement**

6.5.1 The need for noise and vibration monitoring and potential monitoring locations will be identified in the s.61 application, and should be the subject of discussion between the contractor, TW and the LA prior to submission of the s.61.

6.5.2 The contractor will need to adhere to any site specific noise and vibration related planning conditions imposed by the LA.

6.5.3 Consent from landowners will be required for the erection of any monitoring equipment.
6.6  **Suitably qualified persons**

6.6.1 The person(s) responsible for the noise and vibration calculations and/or monitoring shall, as a minimum, be able to demonstrate, where relevant:

a. a summary of training and education relevant to the management of construction noise and vibration

b. experience of the s.61 process and of monitoring noise and vibration

c. confirmation that the individual is, at minimum, an Associate Member of the Institute of Acoustics

d. a 'Certificate of Competence' from the Institute of Acoustics course, 'Environmental Noise Measurement'.

6.7  **References**

**Relevant acts of parliament/regulations**

a. *Control of Pollution Act 1974*, Section 61


e. *Environment Act 1995*

f. *Environmental Protection Act 1990*

g. *Noise Act 1996*

h. *The Control of Noise at Work Regulations 2005* (Statutory Instrument (SI) 2005/1643)

i. *Pollution Prevention and Control Act 1999*


k. Public Health Acts 1936 and 1961

l. *The Town and Country Planning Act 1990*

**British standards**


c. BS 6472: 2009 *Guide to evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz)*, British Standards Institution.

d. BS EN 60651:1994 *Specification for sound level meters*. 
General guidelines

7 Air quality

7.1 General

7.1.1 Gaseous and particulate pollutant emissions to the atmosphere from vehicles and plant used on the site, and dust from construction activities, will be controlled and limited as far as is reasonably practicable. Potential sources and sensitive receptors will be identified and appropriate control measures will be applied.

7.2 Vehicle and plant emissions

7.2.1 The contractor will ensure that the adverse effects of vehicle and plant emissions are controlled, and will be based on the measures contained within the Best Practice Guidance (BPG), The Control of Dust and Emissions from Construction and Demolition, published by the GLA and London Councils in November 2006 (BPG, 2006). Measures to be considered for limiting emissions and avoiding nuisance will include (but not be limited to) the following, as appropriate:

a. Ensuring that the engines of all vehicles and plant onsite are not left running unnecessarily
b. Using low emission vehicles and plant fitted with catalysts, diesel particulate filters or similar devices (so as to comply with particle emission limits)
c. Minimise movement of construction traffic around the site in both site layouts and routine operations
d. Operation procedures for tugs and other river transport will consider emissions and include methods to reduce these where practical.

7.3 Dust emissions

7.3.1 The contractor will comply with the provisions of the Health and Safety at Work Act 1974, the Environmental Protection Act 1990, the Environment Act 1995 and the Clean Air Act 1993, and the regulations made thereunder, including the Control of Substances Hazardous to Health Regulations (SI 2002/2677).

7.3.2 The contractor will design and implement appropriate measures to reduce the impact of dust to an acceptable level.

7.4 Dust control

7.4.1 The contractor will ensure that air quality management plans will be prepared and implemented for each worksite, including controls to limit dust emissions. Two levels of control for dust impacts are planned, with the techniques used in line with the BPG and the Building Research Establishments publication, Controlling particles, vapour and noise pollution from construction sites (2003).

7.4.2 Emergency control arrangements will be adopted in the event of a pollution incident arising from dust. This will include appropriate liaison with the relevant LA.
**Standard dust control procedures on all sites**

7.4.3 The standard dust control procedures will include (but not be limited to) the measures detailed within the BPG, as appropriate:

a. Measures to reduce dust formation
b. Measures to reduce dust resuspension
c. Measures to control dust present
d. Measures to reduce particulate emissions
e. Monitoring and recording of dust-generating activities
f. Site based training (eg, toolbox talks).

**Additional dust control procedures on main drive sites**

7.4.4 For main drive sites, the type of activity onsite and the duration of operations are likely to require more dust control. The dust control procedures adopted will include those detailed in the LBPG for the most high risk sites (high risk refers to the likelihood of dust generation).

7.4.5 The additional dust control procedures will include, as appropriate (and will be confirmed in the relevant CoCP Part B), measures such as:

a. additional screening of dust-generating activities
b. sealing of dust-generating surfaces
c. additional monitoring.

7.4.6 Techniques such as total enclosure of certain operations to protect vulnerable receptors shall be implemented where appropriate. The measures will be proportionate to the risk and will be site specific. The air quality management plan will include an inventory and timetable of dust-generating activities, and identify appropriate control measures and arrangements for dust monitoring, with particular regard to the location of sensitive receptors, including monitoring equipment to be used.

7.5 Dust monitoring

7.5.1 The contractor will ensure that, where appropriate, dust monitoring will be carried out on Thames Tunnel construction sites. A risk-based approach will be used to identify the type of dust monitoring to be used at each worksite by looking at the details of the specific packages of work within the site boundaries. Monitoring locations will be agreed with the relevant LA.

7.5.2 All sites will have passive deposition monitoring techniques adopted at appropriate locations (site boundaries/local receptors) according to specific site conditions.

7.5.3 A baseline will be established by the contractor prior to construction at appropriate sites. This will be determined, where reasonably practicable, for a twelve-month period (where possible, or for a shorter period agreed with TW and the relevant LA), derived from data sourced from local background PM$_{10}$ concentrations measured by the Automatic Urban and
7 Air quality

Rural Network (AURN) monitoring sites, appropriate LA automatic monitoring sites and baseline data collected to inform the EIA.

7.5.4 The contractor will be required to begin dust monitoring as soon as reasonably practicable after obtaining possession at relevant sites in order to provide localised data to augment the data obtained from the AURN/LA sites.

7.5.5 During construction, particulate monitoring will be undertaken using appropriate survey instruments. This will be detailed within CoCP Part B.

7.5.6 Instruments will be set up at relevant sites to operate an alert system when a predetermined site action level is reached. If the alarm is triggered, the following actions will be taken:

a. The contractor, or someone delegated by the contractor, 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 LA notified of the incident and actions by telephone or email, as soon as practicable, after or during the incident.

c. If no source of the incident is identified, other Thames Tunnel sites and LA 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 alert is not related to site operations, the outcome of any investigation will be recorded in the site logbook and reported to the relevant LA at an appropriate time.

7.5.7 Dust monitoring will be continued until the site is deemed to be low risk. The cessation of monitoring is subject to consultation and agreement with TW and the LA in whose area the worksite is situated.

7.6 Asbestos

7.6.1 The CEMP will adopt measures to manage the risk from release of asbestos during alteration and demolition works and excavation work. This system will ensure compliance with the Control of Asbestos Regulations 2006 (SI 2002/2675) and associated approved codes of practice, and will provide for inspection, survey sampling and analysis in accordance with HSE guidance MDHS100, Surveying, sampling and assessment of asbestos containing materials.

7.6.2 Measures for managing asbestos (see HSSE Standard, Section 6.31 for further information, and TTP document F16(A)) in alteration, demolition and excavation works will include:

a. employing competent contractors and subcontractors to carry out alteration and demolition works

b. contractors implementing a procedure for dealing with potentially suspect materials exposed requiring sampling and analysis by an independent specialist consultant
c. formal exchange of information before start of work, including relevant information from the Asbestos Register to clearly identify location of asbestos-containing materials
d. method statements for any works in the vicinity of asbestos-containing materials to avoid any disturbance to such materials which are not to be removed.

7.6.3 Measures for managing work involving asbestos-containing materials encountered in construction will include:

a. appointment of a specialist consultant independent of the asbestos treatment contractor
b. ensuring any work with asbestos-containing materials is notified to the HSE
c. ensuring any work with asbestos-containing materials is carried out by licensed specialist asbestos treatment contractors in accordance with the Asbestos (Licensing) Regulations 1983 (SI 1983/1649) as amended in 1998 (SI 1998/3233)
d. requiring a method statement defining detailed control measures to be produced by the specialist asbestos treatment contractor and approved by the independent specialist consultant
e. air sample monitoring by the independent specialist consultant of work to ensure required air quality standards are achieved
f. disposal of asbestos-containing materials to licensed waste sites in accordance with the Special Waste Regulations 1996 (SI 1976/972).

7.7 Odours

7.7.1 It is not anticipated that the works will give rise to any significant odour effects but, if necessary, the contractor will adopt appropriate measures so as to avoid the creation of statutory nuisance from odours.

7.7.2 Where connection works to the existing sewer systems are to be made, the contractor’s method statement will consider the potential increase of odour to sensitive receptors, and manage and control foul water flows as appropriate.

7.8 References

a. The Air Quality Standards Regulations 2010 (SI 2010/1001)
b. The Air Quality Limit Values Regulations 2003 (SI 2003/2121)
c. Environmental Protection Act 1990
d. Clean Air Act 1993
e. Pollution, Prevention and Control Act 1999
f. Pollution Prevention and Control (England and Wales) Regulations 2000


8 Water resources

8.1 General

8.1.1 The contractor will undertake the works and implement working methods to protect surface water and groundwater from pollution and other adverse impacts, including change to flow volume, water levels and quality. This will be completed in accordance with relevant legislative requirements and industry guidance.

8.1.2 The contractor, within its CEMP, will include detailed arrangements to obtain EA approval for works which could affect any surface water or groundwater resource.

8.1.3 Water management plans will be produced by the contractor for each of the construction sites, including water courses or underlain by aquifers, and will take account of the guidance contained within the relevant Pollution Prevention Guidelines (PPGs) issued by the EA and other Construction Industry Research and Information Association (CIRIA) documents. Specific receptors in the water environment will be listed in the plans. Where appropriate, integrated aquatic ecology and water quality plans will be developed.

8.1.4 The pollution incident control plan/emergency response plan, detailed in Section 4.10, will include effects on water resources. EA guidance on pollution incident response planning will be reflected in the emergency plans.

8.2 Site drainage

8.2.1 Site drainage, including surface runoff and dewatering effluents, will be discharged to sewers where reasonably practicable, and relevant permissions will be obtained from the statutory undertaker. Discharge to watercourses will only be permitted where permits or other relevant approval has been obtained. Sufficient allowance should be made for the EA to issue permits.

8.2.2 The contractor will ensure that the site drainage meets the effluent and flood risk standards required by the sewerage undertaker or EA, as appropriate, in accordance with the relevant permit, and will provide and maintain holding or settling tanks, separators and other measures as may be required. The contractor will ensure that access is provided to the undertaker so that samples of discharge can be obtained and analysed, and the flows verified as required.

8.2.3 Water flows from sites should be limited during construction to ensure there is no increase in runoff rates, unless otherwise agreed. This is particularly important for sites which are currently greenfield (or not hardstanding) and should be carried out in line with the recommendations given within the project flood risk assessment (FRA).

8.2.4 The relevant sections of British Standard 6031: Code of Practice for Earthworks for the general control of site drainage will be followed.
8.3 Protection of watercourses

8.3.1 The contractor will seek to control flood risk to appropriate levels set by the contract and the EA, using mitigation, compensation (although this will need to be addressed by TW) and/or monitoring where required. Approval will be obtained in advance for all crossings of, diversions to, and work affecting watercourses from the EA. Sufficient allowance should be made for the EA to issue land drainage consents.

8.3.2 Protection measures for works in or adjacent to watercourses will be provided in accordance with requirements set out by the EA.

8.3.3 Watercourses, including land and/or road drainage, within the construction sites will be maintained to provide effective working conditions at all times.

8.3.4 All reasonably practicable measures will be taken to prevent the deposition of silt or other material in, and the pollution by sediment of, any existing watercourse, canal, lake, reservoir, borehole, aquifer or catchment area, arising from work operations. The measures will accord with the principles set out in industry guidelines, including as the EA’s note PPG 5, Works in near or liable to affect water courses, and CIRIA’s report C532, Control of water pollution from construction sites. Measures may include use and maintenance of temporary lagoons, tanks, bunds and silt fences or silt screens, as well as consideration of the type of plant used and the time of the year for working in watercourses.

8.3.5 Other than in waterbodies where the PLA guidelines will be applied, sediment plumes from dredging in inland waterways, including those under control of British Waterways, will be controlled by measures in accordance with the principles set out in industry guidelines such as the CIRIA’s report 169, Inland Dredging – guidance on good practice, and Section 6 of CIRIA’s report C547, Scoping the assessment of sediment plumes from dredging. Contaminated dredged material will be managed as described for other contaminated land materials in Section 9.

8.3.6 Appropriate measures will be taken with regard to ‘in river’ works to minimise the release of suspended sediment and solids into the water column.

8.4 Control of pollution of surface water

8.4.1 The contractor will ensure that protection measures to control the risk of pollution to surface water will be adopted and will include, where appropriate and reasonably practicable, the following:

a. Any containers of contaminating substances onsite will be leak-proof and kept in a safe and secure building or compound from which they cannot leak, spill or be open to vandalism. The containers will be protected by temporary impermeable bunds with a capacity of 110% of the maximum stored volume. Areas for transfer of contaminating substances will be similarly protected.

b. Any permanent oil storage tanks and temporary storage of over 200 litres of oil in drums and mobile bowers, and ancillary pipework, valve, filters, sight gauges and equipment require secondary
containment, eg, bunding or drip trays (The Control of Pollution (Oil Storage) (England) Regulations 2001). Also, any oil stored within 10m of a watercourse or within Source Protection Zone (SPZ) 1 requires secondary containment, eg, secondary bunding impermeable to water and oil, with no drainage valve fitted for draining of rainwater.

c. The secondary containment must be sufficient to contain at least 110% of the maximum contents of an oil tank, mobile bowser or intermediate bulk container, or 25% of the total storage capacity, whichever is the greater.

d. Above-ground pipework should be properly supported, and underground pipework should be protected from physical damage and have adequate leakage detection; and all mechanical joints on oil pipes must be easy to inspect.

e. All refuelling, oiling and greasing shall take place above drip trays or on an impermeable surface with sealed drainage or oil interceptor, which provides protection to underground strata and watercourses, and away from drains as far as is reasonably practicable. Vehicles will not be left unattended during refuelling.

f. Only construction equipment and vehicles free of oil/fuel leaks which could cause material contamination will be permitted onsite. Drip trays will be placed below static mechanical plant.

g. All wash down of vehicles and equipment will take place in designated areas, and wash water will be prevented from passing untreated into watercourses and will comply with PPG 13.

h. PPG 23 will be followed when carrying out maintenance of structures over water. As far as is reasonably practicable, only biodegradable hydraulic oils will be used in equipment working in or over watercourses.

i. Appropriate measures are to be taken to protect erodible earthwork surfaces.

8.5 Control of pollution to groundwater

8.5.1 The contractor will ensure that protection measures to control the risk of pollution to groundwater will be included within the CEMP; these will, in particular, be consistent with the Groundwater Regulations 2009. The CEMP will address the following:

a. The potential for construction activities to cause cross-contamination, either by upper aquifer being connected to the lower aquifer or by the movement of groundwater of different qualities, thereby affecting the lower aquifer.

b. The handling of material from the excavation of shafts and tunnels is another potential source of contamination. The CEMP will need to ensure that the handling of contaminated excavated material, any treatment processes required and the storage of excavated material does not affect the upper or lower aquifer.
8.5.2 Where reasonably practicable, the contractor will avoid using materials in the permanent or temporary works that could result in direct or indirect discharge of hazardous substances or non-hazardous pollutants to groundwater, as defined under the Groundwater Regulations 2009 (“The input of hazardous substances to groundwater should be prevented, and the input of non-hazardous pollutants should be limited to ensure that they do not pollute groundwater”).

8.5.3 Personnel employed on hand excavation of aquifer materials or the handling of excavated material within a zone designated as an inner SPZ or 50-day time of travel zone (SPZ Zone 1) will be required to undergo prestart and ongoing health screening, to protect the water from potential contamination. Inductions for these personnel will include the need for personal hygiene and the dangers of contamination to groundwater.

8.6 Management of impact on abstraction boreholes

8.6.1 The foregoing sections describe the measures used to minimise the risk of groundwater pollution. However, at any particular abstraction, there will be a residual risk that the water quality may deteriorate, such that the abstracter may no longer use the water for the current or licensed purposes. The following precautionary actions will be applied, where applicable and reasonably practicable, to limit and manage the residual risks:

a. Where determined and agreed with the owners/operators or other abstraction licence holders, targeted risk-based audits and checks of water quality monitoring may be undertaken at abstraction sources by the contractor. The period of monitoring will be appropriate to the timing and type of work undertaken, and will include a period of baseline monitoring. The need for intermediate monitoring holes and procedures for water and contaminant testing during construction and operation will be discussed with the owners/operators or other abstraction licence holders.

b. The contractor will arrange any necessary monitoring of water levels in areas where dewatering of the deep aquifer is planned.

c. Where the water quality monitoring shows an adverse impact on water quality as a result of the works, the contractor will contact the relevant abstracter (licence holder and operator) and the EA as soon as practicable. The contractor will put in place appropriate emergency measures to overcome the adverse impact, where this has resulted from the TTP works. These emergency measures may include the transfer of a potable water supply to another water source and informing the water users. Further monitoring and remediation should be arranged as appropriate.

8.6.2 The contractor will, as far as is reasonably practicable, recognise the rights of existing abstractors and consult them on measures to avoid or minimise loss or interruption of supply, or provision of alternative supplies. The EA will also be consulted through the permitting of discharges for the dewatering schemes required (see Section 8.8). The Environmental Permitting (England and Wales) Regulations 2010 apply to discharges of
water to surface waters that are controlled waters. Discharges to groundwater are excluded from these regulations.

8.7 Flooding

8.7.1 The contractor, as far as is reasonably practicable, will ensure that flood risk is managed safely throughout the construction and implementation period, and that all designs (design/build contractors, but may not apply to early works) are compliant with the FRA, and include the provision of a safe refuge during a flood event. To achieve this, a compliance procedure will be implemented. Within the water management plan, a ‘flood risk compliance procedure’ will be included. This will deploy a risk-based precautionary approach, using the source–pathway–receptor concept, and will apply to temporary and permanent works.

8.7.2 The contractor will be responsible for providing and maintaining continuous flood defence provision, for both permanent and temporary works, to the statutory flood defence level as detailed within the FRA. This is a requirement of the Thames River Protection of Floods Amendment Act 1879, and is essential to ensure that both the sites themselves and third-party land and assets in the surrounding area are protected from flooding. Flood defence consent will be required (where not part of the DCO) from the EA for any works within 16m of the Thames tidal defence alignment, under the Land Drainage Act 1991.

8.7.3 The contractor should also consider and implement appropriate measures to manage the potential risks of flooding from fluvial rivers, localised perched groundwater, overland surface water flows and sewer surcharging, in accordance with the details provided within the FRA. This should include consideration of potential flow paths within the site which could become active in the event of extreme rainfall and/or sewer surcharging, particularly during temporary works. Overland flow paths will be determined by site topography, therefore vulnerable operations and materials should be located within elevated parts of the site, away from potential flow paths. If this is not possible, other appropriate protection measures should be incorporated.

8.8 Dewatering

8.8.1 The foregoing provisions will also apply to dewatering, in addition to the following:

a. Records of water pumped (volume and quality) will be kept at all major dewatering sites where wells are constructed in the lower aquifer, or where required under the terms of a permit.

b. Water quality at all major dewatering sites will be monitored, applying a risk-based check and audit sampling approach. Monitoring will comprise laboratory testing and field tests required under the conditions of a permit. Any contamination noted onsite will be recorded, and more frequent monitoring should be undertaken.

c. Regular and frequent visual inspection of the discharged water should be carried out to ensure excessive suspended solids are not present in the discharge. Pumping should cease immediately (without risk to site
personnel and equipment) if polluted discharge is noted. The frequency will be agreed with TW and will be included within the water management plan.

8.8.2 Monitoring arrangements for dewatering will be developed in liaison with TW and EA.

8.8.3 Any site specific monitoring arrangements outside of limits will be dealt with by consent with relevant parties.

8.9 **Ground treatment**

8.9.1 The ground conditions at sites principally in the central and eastern of the scheme may require ground treatment techniques. Ground treatment may be required at both shaft sites and around the connection points of connecting tunnels to the main tunnel. The use of ground treatment techniques does have the potential to affect both groundwater resources and water quality.

8.9.2 Any materials used for ground treatment will receive EA approval before being used. The CEMP will identify the products authorised for use.

8.9.3 Site specific monitoring recommendations for those sites where ground treatment will be used, will be agreed with the EA and relevant parties.

8.10 **Monitoring**

8.10.1 Where significant changes in water levels in the upper aquifer are expected, additional site investigations may be required. Water levels at selected observation piezometers will be monitored after dewatering or construction of the cut off is completed. The monitoring data will be analysed in relation to data on elevations of nearby basements and existing drains. Additional drainage will be provided as mitigation where necessary. Where appropriate, any existing monitoring from either the ES or site investigation work should be adopted/considered.

8.10.2 The dewatering activities around certain sites have the potential to affect both the lower aquifer resources and a number of ‘key’ abstractors from the Chalk aquifer. The groundwater environmental monitoring programme will define baseline conditions and trigger levels using a risk-based approach. If any triggers are exceeded, emergency measures will be implemented to mitigate any significant effects.

8.11 **Dredging**

8.11.1 Dredging will be undertaken in accordance with any dredging licenses.

8.11.2 The contractor will follow PLA guidance for dredging in the Thames Tideway and its tributaries. So far as is practicable, the critical period of June to August for dredging will be avoided. This will be achieved through programming capital dredging outside this period, and implementing a monitoring programme to identify future maintenance dredging. Where practicable, the contractor will undertake a single maintenance dredge prior to the critical period.

8.11.3 The contractor may need to undertake emergency dredging within the critical period of June to August, should there be a requirement to do so.
Dredging in response to an unforeseen event or occurrence, which could not be reasonably expected or planned and which jeopardises the operation of the barge loading facilities, constitutes an emergency.

8.11.4 So far as is practicable, dredging will be undertaken using techniques that limit the dispersal of intertidal sediments. For example, a back hoe dredger releases less sediment than a trail suction hopper dredger.

8.11.5 Some sites that may require dredging lie within the stretch of the river known to support spawning habitat for smelt. Due regard should be given so as to minimise any impact on biodiversity within the river.

8.11.6 The restricted period for dredging (ie, June to August) may need to be extended to include the spring period (ie, April and May) at sites lying close to known spawning areas. These sites are listed in the CoCP Part B.

8.12 References

b. Land Drainage Act 1991
c. Water Act 2003
e. EA PPGs, including:
   i. PPG 1: General guide to the prevention of pollution
   ii. PPG 2: Above ground oil storage tanks
   iii. PPG 3: Use and design of oil separators in surface water drainage systems
   iv. PPG 6: Pollution prevention guidance for working at construction and demolition sites
   v. PPG 21: Pollution incident response planning
f. CIRIA C532 Control of water pollution from construction sites: Guidance for consultants and contractors
g. CIRIA/EA Joint Guidelines: Concrete Bunds for Oil Storage Tanks
h. CIRIA/EA Joint Guidelines: Masonry Bunds for Oil Storage Tanks
i. EA Guidance Note: Piling into Contaminated Sites
k. The Control of Substances Hazardous to Health Regulations 2002 (SI 2002/2677)
l. The Groundwater (England and Wales) Regulations 2009, No. 2902
m. The Environmental Permitting (England and Wales) Regulations 2010
9 Land quality

9.1 General

9.1.1 The contractor will assess contaminated land under guidance contained within the *Environmental Protection Act 1990* (Part IIA). This guidance, referred to as the Part IIA regime, came into force in England in April 2000 by enactment of Section 57 of the *Environment Act 1995*. The accompanying *Contaminated Land (England) Regulations 2000* (SI 2000/227) state the conditions under which land is defined as contaminated. The contractor will develop mitigation measures in accordance with these regulations.

9.1.2 The main objective of Part IIA is to provide a system for the identification of land where contamination is causing unacceptable risks to human health or the wider environment, with respect to the current use and setting of the land. If contaminated land is identified, the guidance contained within Part IIA is intended to ensure that where it is reasonable to do so, mitigation is carried out so that the land no longer presents an unacceptable risk.

9.1.3 The contractor should review information available within the ES relating to contaminated land.

9.2 Site assessment and remedial practice

9.2.1 The contractor will carry out site assessments, investigations and/or risk assessments wherever construction work is planned in order to assess the potential for contamination in both soil and groundwater, in accordance with standard industry guidelines such as *Contaminated Land Register 11*. Any necessary measures will be agreed with TW, the EA and LAs as part of the construction planning process in accordance with relevant legislation.

9.2.2 A set of criteria for site investigation will be developed prior to the commencement of any intrusive works. Where site investigation reveals the presence of contamination, an appropriate remedial strategy will be developed to identify the most appropriate option for dealing with the presence of contamination. This strategy would include the following:

a. The contractor will liaise with the LA, the EA and other relevant statutory bodies with a view to addressing their requirements, and will agree control or protection measures necessary to provide appropriate mitigation. This may involve the sealing, excavation and disposal of soil or onsite remedial works.

b. The *Consolidated European Waste Catalogue (EWC)* lists those wastes that are ‘absolute entries’ (hazardous waste regardless of their concentration) and ‘mirror entries’ (hazardous waste only if ‘dangerous substances’ are present above threshold concentrations). Contaminated soils are ‘mirror entries’ in the EWC. This means that contaminated soils may be classified as either hazardous or nonhazardous, depending on the concentrations of ‘dangerous substances’ in the soil. An assessment of the composition of the
waste soil using appropriate techniques, which could include sampling and laboratory analysis, will be undertaken to determine if the waste is classifiable as hazardous.

c. The contractor will also give consideration to alternatives to landfill disposal as the solution to treating contaminated soil. This may include the use of remedial technologies (in situ and ex-situ) to reduce the quantity of soil requiring disposal, and/or treatment of soils to a standard such that they can be reused at a site or be disposed of as nonhazardous waste. Onsite remedial works will be carried out under the Waste Management Licensing Regulations 1994.

d. Contamination issues will be recorded in the project health, safety and environment plans, in accordance with the Construction (Design and Management) Regulations 2007 (CDM), to protect affected parties.

e. Monitoring of excavation works will be undertaken to check for unexpected or unusual materials with a contaminative potential. This material could consist of buried drums, tanks or containers, soil, groundwater or liquids with an unusual colour or odour, or other evidence of contamination. If this type of material is encountered, work will be stopped until the material has been properly identified and suitable precautions taken, including amending risk assessments and the remedial strategy, if appropriate. This approach will be included in the HSP.

f. The contractor will undertake specific precautions if materials containing asbestos are present or encountered during works, in order to comply with the Control of Asbestos at Work Regulations 1987 and Asbestos (Licensing) Regulations 1983 and their amendments, and adhering to relevant guidance, including Asbestos: Exposure Limits and Measurement of Airborne Dust Concentrations (EH10 and MDHS 39/4) and Managing Asbestos in Workplace Buildings 1988.

g. The contractor will ensure that there are designated areas onsite where contaminated materials can be separated from clean ones and stored in an appropriate environment. Storage of contaminated materials may require specific facilities to prevent contaminants from leaching into the ground, nearby watercourses or neighbouring properties.

h. Guidance provided in the EA’s PPGs in respect of water pollution, in particular PPG 1, PPG 2, PPG 5, PPG 6, PPG 21 and PPG 23, will be followed as far as is reasonably practicable. Further guidance is provided in Planning Policy Statement 23: Planning and Pollution Control and Defra/EA’s Model Procedures for the Management of Land Contamination (Contaminated Land Register 11).

i. Provision of a watching brief by an appropriately qualified person, throughout the investigation.

j. On completion of any remedial works, a record will be kept of the works undertaken to comply with the remedial strategy. A verification report will be issued to TW, EA and the LA.
9.3 **Site works**

9.3.1 During the site works, and in particular during the initial below-ground works, the contractor should ensure that the works are routinely monitored for contamination, eg, the presence of odours and unusual staining, as well as oily, tarry or fibrous materials.

9.3.2 In the event of such contamination being suspected, works in the immediate area should be made safe and secured, and the incident reported via the defined reporting procedure (including TW and the contractor’s Environmental Manager). The Site Environmental Engineer (SEE) should inspect the site and, where deemed necessary, arrange for further sampling and laboratory testing of soils or liquids. Further risk assessments to receptors should be undertaken as necessary and reported to TW, the LA and/or EA.

9.3.3 Should unacceptable risks be identified, a revised remediation method statement will be submitted and agreed with the EA.

9.3.4 The site induction for construction workers (and visitors if necessary) should include a section on the potential presence of contaminated materials being encountered onsite and the risks that these may pose to workers or others (including offsite receptors via dust generation). Training should be given in the identification of potentially hazardous materials, and a clearly defined reporting procedure be set up in the event of any suspect substances being encountered.

9.3.5 All staff and visitors should be made aware of the requirement to adopt the appropriate personal protective equipment (PPE), eg, dust masks, respirators, gloves, etc, and also the observation of good hygiene practices and the avoidance of hand to mouth contact.

9.3.6 All staff should be made aware of regulations governing the storage, handling, treatment and disposal procedures for all wastes. In particular, staff should be made aware of the need to segregate and manage potentially hazardous/harmful materials which could pose an immediate risk to the site workers or wider environment.

9.4 **References**

**Contaminated land**

- *Environmental Protection Act 1990*
- *The Contaminated Land (England) Regulations 2006 (SI 2006/1380)*

**Asbestos**

a. *Control of Asbestos Regulations 2006* (SI 2006/2675)

**Duty of care**


**Hazardous waste**


**Environment Agency Pollution Prevention Guidelines**

a. PPG 1 *General guide to the prevention of pollution*
b. PPG 2 *Above ground oil storage tanks*
c. PPG 5 *Works and maintenance in or near water*
d. PPG 6 *Pollution prevention guidance for working at construction and demolition sites*
e. PPG 21 *Pollution incident response planning*
f. EA Guidance Note: *Piling into Contaminated Sites*.

**Other regulations**

h. *The Animal Health Act 2002, Notifiable Disease Burial Sites*

10 Waste management and resource use

This section should be read in conjunction with the HSSE Standard (HSSE Standard, Section 7.3 and Appendix 3).

10.1 Excavated material and Waste Management Strategy

10.1.1 The TTP Waste strategy provides a framework for the management of materials and waste that will be produced throughout the construction and operational phases of the TTP.

10.1.2 The Waste strategy provides a strategic direction and framework for the management of excavated materials and waste, while ensuring that legislative, policy, environmental, financial and corporate drivers are all addressed and met.

10.1.3 The contractor will manage the excavated materials and all wastes generated at worksites, in accordance with the Waste strategy and the waste hierarchy, and within the relevant regulatory controls and cost restraints under the general protocols described below.

10.1.4 It is anticipated that the majority of the material to be removed from Thames Tunnel sites will be excavated material, which will generally be categorised as non-waste material.

10.1.5 The contractor will ensure that the requirements of the waste hierarchy are enforced. The waste management hierarchy sets out how waste operators, carriers and producers should manage their waste in the priority order of prevention, preparing for reuse, recycling, other recovery (for example, energy recovery) and disposal.

10.1.6 The Thames Tunnel excavated material should be put to beneficial use wherever possible.

10.1.7 The contractor will ensure compliance with the Duty of Care Regulations, which places a duty on all parties to take responsibility for protecting the interests and safety of others from the potential impacts of handling, storing, transporting and depositing of excavated materials and waste.

10.1.8 The contractor will ensure that, for the relevant areas, waste is managed in accordance with local, regional and London specific policies (eg, the London Plan 2011), as well as with the SWMP Regulations 2008. The Waste strategy sets out further details on the Waste management plan (WMP) and the SWMPs.

10.1.9 The WMP provides an overarching framework and consistent approach to managing the excavated materials and waste at the construction sites. The WMP will provide a central location for all Thames Tunnel waste information. The WMP will:

a. record TW’s responsible person, as well as the responsible person for each site

b. record the waste types generated by the entire project

c. provide the details of all waste minimisation actions

d. provide project-wide waste forecasts for each waste type
e. provide a complete register of all approved waste carriers and receptor sites for the project
f. summarise the information relating to waste transactions from each site
g. report against project KPIs.

10.1.10 Under the SWMP Regulations 2008, each site will be required to produce a SWMP. These SWMPs will report into the WMP and provide a framework to facilitate best practice on construction sites, as well as recording and monitoring environmental performance, meeting regulatory control requirements and reducing waste disposal costs.

10.1.11 The SWMP will identify:

a. the approach taken to excavated material and waste management
b. the types of excavated material and waste removed from site, its description and estimated quantities of waste generated
c. the authorised waste carrier details and their waste carrier registration number
d. opportunities for reuse and recycling
e. identify disposal routes and permitting requirements
f. details of the site that the waste and/or material was taken to
g. details of the environmental permit or exemption held by the receptor site where excavated material is taken
h. details of the environmental permit or exemption held by the site where the waste is taken.

10.1.12 The SWMP will be updated (within three months of completion) to include:

a. comparisons between estimated waste and/or material, and the actual waste and/or material levels produced
b. an explanation of any differences between the estimated and actual levels of waste and/or material produced
c. an estimate of the cost savings that were achieved through implementing the SWMP.

10.1.13 An excavated materials options assessment will be undertaken to identify the preferred options for the management of the excavated material. The assessment is designed to provide a systematic and transparent approach for assessing the most suitable management options for reuse, treatment and/or disposal of the excavated materials that will arise from the project during its construction phase.

10.1.14 The options will be assessed against a set of evaluation objectives and indicators. The result of this assessment will be a shortlist of options (receptor sites) that will have the ability to receive this excavated material.

10.1.15 The project Waste strategy contains further details of how the individual SWMP will be developed and maintained. The Waste strategy sets out a
number of objectives and targets that are closing, linked to the project Sustainability strategy.

10.1.16 Sites with existing buildings that will be demolished, where demolition forms a part of the contractor’s works contract, must comply with the following:

a. A review of the existing buildings will be carried to establish if asbestos is present (see Section 10.4, Asbestos waste)

b. Complete an audit before demolition to maximise the recovery of material for subsequent high-grade/value applications

c. The audit will be detailed in the SWMP and cover:
   i  identification of the demolition materials
   ii potential applications and any related issues for the reuse and recycling of the key demolition materials.

10.1.17 Waste materials will be sorted into separate waste groups, as defined in the WMP (according to the waste streams generated by the scope of the works), either onsite or offsite through a licensed contractor for recovery.

10.2 Duty of care

10.2.1 The project will comply with the ‘duty of care’ regulations to protect the interests and safety of others from the potential effects of handling, storing, transporting and depositing of excavated materials and demolition/ construction wastes arising under the project. Such compliance will include the implementation and monitoring of accepted industry practices for the control of dust, mud and other debris onsite. The guidance set out in Waste Management – The Duty of Care, Code of Practice (Her Majesty's Stationery Office (HMSO) March 1996) will be followed, in addition to the obligations under the Waste (England and Wales) Regulations 2011.

10.2.2 The SWMP will include detailed procedures for compliance with the requirements for waste transfer notes, in accordance with the Waste (England and Wales) Regulations 2011, and arrangements for auditing the actions of other parties in the waste handling chain. A sample waste transfer note document, together with details of the administrative arrangements for record keeping, will be included in the SWMP.

10.2.3 The arrangements for registering the site, consigning, handling and transporting hazardous wastes will be followed in the context of duty of care and the specific consignment note procedures applicable under the Hazardous Waste (England & Wales) Regulations 2005 (SI 2005 No.894) or any succeeding relevant legislation.

10.3 Asbestos waste

10.3.1 Within the CEMP, a system will be established, which will adopt measures complying with the regulations and codes of practice, to manage the risk from release of asbestos during alteration and demolition works and excavation work. This system will ensure compliance with the Control of Asbestos at Work Regulations 2002 (SI/2002/2675) and associated
approved codes of practice, and will provide for inspection, survey sampling and analysis in accordance with HSE guidance MDHS100, *Surveying, sampling and assessment of asbestos containing materials*.

10.3.2 Measures for managing asbestos in alteration, demolition and excavation works will include:

a. employing competent specialist contractors to carry out alteration and demolition works

b. contractors implementing a procedure for dealing with potentially suspect materials exposed requiring sampling and analysis by an independent specialist consultant

c. formal exchange of information before start of work, including relevant information from the Asbestos Register to clearly identify location of asbestos-containing materials

d. method statements for any works in the vicinity of asbestos-containing materials to avoid any disturbance to such materials.

10.3.3 Measures for managing work involving asbestos-containing materials encountered in construction will include:

a. appointment of a specialist consultant independent of the asbestos treatment contractor

b. ensuring any work with asbestos-containing materials is notified to the HSE

c. ensuring any work with asbestos-containing materials is carried out by licensed specialist asbestos treatment contractors in accordance with *Asbestos (Licensing) Regulations 1983* (SI 1983/1649) as amended in 1998 (SI 1998/3233).

10.3.4 Method statements defining detailed control measures will be produced by the specialist asbestos treatment contractor and approved by TW/independent specialist consultant:

a. Air sample monitoring of work to ensure required air quality standards are achieved

b. Disposal of asbestos-containing materials to licensed waste sites in accordance with the *Special Waste Regulations 1996* (SI 1976/972).

10.4 **Energy usage**

10.4.1 The TTP will develop an energy statement on the principles of how energy consumption during construction will be minimised.

10.4.2 The contractor shall produce an energy management plan, containing measures to minimise during construction, as far as is practical, energy consumption and carbon emissions. The energy management plan should also include ways to:

a. measure and reduce energy savings

b. monitor, report and set targets for CO₂, or energy arising from site activities and from transportation to and from the site.
10.4.3 The procurement, maintenance and use of construction plant should be shown to have considered energy efficiency.

10.4.4 There should be consideration and assessment of energy from renewable and/or low emission sources that has been used during construction.

10.5 References

Waste

a. Environmental Protection Act 1990
b. Environmental Protection (Duty of Care) Regulations 1991
c. The Environmental Permitting (England and Wales) Regulations 2010
d. The Waste (England and Wales) Regulations 2011
h. Waste Management – The Duty of Care, Code of Practice (HMSO March 1996)
i. CIRIA guidance

Asbestos

a. Control of Asbestos at Work Regulations 2002 (SI 2002/2675)

b. Asbestos (Licensing) Regulations 1983 and their amendments

b. HSE guidance MDHS100: Surveying, sampling and assessment of asbestos containing materials


11 Ecology (aquatic and terrestrial and nature conservation)

11.1 General


11.1.2 The ES will contain site specific detail of the ecology relevant to each construction site and, as such, the contractor should make use of the information contained within the relevant sections.

11.2 Procedures

11.2.1 The contractor will ensure compliance, where appropriate, with other relevant nature conservation policy and guidance, including the Mayor’s Biodiversity Strategy and local biodiversity action plans, where practicable.

11.2.2 Where species are protected by specific legislation, approved guidance will be followed to comply with the requirements and sufficient time will be allowed to obtain the required licences or consents.

11.2.3 Where working on a relevant site, the contractor will produce a general ecological/biodiversity management plan for approval with TW, LAs and relevant statutory agencies, including a programme and methodology for any measures during construction to be adopted in the event of the discovery of protected/notable species, and measures for the relocation of certain species.

11.2.4 The contractor shall, where applicable and particularly during site clearance and demolition activities, use a suitably qualified ecologist to ensure that the procedures and provisions established by the project EIA, with respect to terrestrial and aquatic ecology, are followed.

11.2.5 The contractor’s ecologist shall carry out regular walkovers and spot checks of the sites, as well as watching briefs during key periods of work and sensitivity, with regards to protected and notable species.

11.2.6 The contractor will implement watching briefs, to be undertaken by the suitably qualified ecologist, when site clearance activities are undertaken. This is to ensure that any unanticipated discoveries of notable flora and fauna are appropriately dealt with, to ensure legal compliance. Watching briefs should be undertaken immediately prior to site clearance. In the event that an unanticipated discovery is made, the ecologist/contractor will seek advice from TW, the relevant statutory body and/or LA, and agree a mitigation strategy to be implemented.
11.2.7 The contractor will implement a programme of monitoring to review the status of ecological issues, including the monitoring and maintenance of any measures implemented as part of advanced mitigation works.

11.2.8 The Environmental Manager will be responsible for reporting to TW on any incidents conflicting with agreed procedures as non-compliance events.

### 11.3 Detailed provisions

11.3.1 The contractor will produce a site specific ecological management plan that includes assessments for all sites, and should reference the ES for the list of known ecological constraints, on and surrounding a particular site, and the methods by which these resources and features are to be managed.

11.3.2 The first priority will be to avoid impacts through the retention of habitats intact and undisturbed and, where possible, to make improvements to enhance natural habitats.

11.3.3 Where it is not practicable to retain habitats in their existing condition, any protected/notable species that are present in such habitats will first be dealt with according to the agreed mitigation strategy.

11.3.4 Those habitats that are temporarily disturbed and damaged as a result of the works will be reinstated and restored to an equivalent or ecologically richer status after construction work ceases, where this is practical.

11.3.5 The contractor will ensure the protection of identified wildlife habitats (on the site) from construction activities by the use of appropriate measures, such as hoarding and fencing.

11.3.6 Compounds and works areas should be sited in such a way, where reasonably practicable, so as to avoid any sites identified as important for nature conservation, including areas for the storage of machinery and materials. This will largely have been dealt with by the site selection process.

11.3.7 For provisions relating to the control of potential effects on aquatic ecology, see Section 6.4 (*Underwater noise and vibration)*.

### 11.4 Habitat and species considerations

#### Invasive and noxious plants

11.4.1 Construction may involve works within areas containing Japanese knotweed, and may result in the disturbance and potential spread of this species. Japanese knotweed is listed on Schedule 9 of the *Wildlife and Countryside Act 1981*, making it illegal to cause it to grow or spread.

11.4.2 The contractor shall undertake detailed surveys to map the extent of Japanese knotweed for each of the sites where present (reference to baseline surveys within the ES should be made), and a subsequent site specific management and eradication plan will be produced, dependent on proposed works at the site and the timescale for these works.

11.4.3 It is likely that an advanced herbicide application regime will be recommended in relevant locations, prior to construction works, in order to
eradicate much of the Japanese knotweed from those areas where construction works will take place, and a detailed protocol for this will be developed.

11.4.4 The methodology to be used will be selected from avoidance (by fencing off areas from the works), barrier (to prevent the spread and permit use of the area) or removal options, and will consider herbicide application to treat and to prevent spread. The contractor will follow this approach to ensure that the spread of Japanese knotweed is controlled, and hence works do not result in conflict with the legislation. The EA should be consulted for operations to use herbicide alongside any watercourses.

11.4.5 Other species that may require similar consideration include Himalayan balsam and Russian ivy, as detailed within the ES.

**Birds**

11.4.6 Construction where loss of areas of habitat that are likely to be used by nesting birds will need to take account of the *Wildlife and Countryside Act 1981*, as amended. All species of wild bird, their nests and their eggs, are protected by law. This makes it an offence to intentionally (recklessly) take, damage or destroy the nest or eggs of any wild bird while the nest is in use or being built.

11.4.7 Areas most likely to support nesting birds as identified by the ES will require measures to be implemented between October and February, immediately prior to the start of construction, to deter birds from nesting. These measures will involve the clearance of suitable nesting habitat such as trees and scrub, where necessary, to make the area unsuitable for nesting birds. Works will only begin in an area once a watching brief has confirmed that nesting birds are not present and will not be affected by the works.

**Schedule 1 species**

11.4.8 Certain uncommon species of bird are given additional protection from disturbance, in that it is also an offence to disturb any such bird while it is nest building or at a nest containing eggs or young, or to disturb the dependent young of such a bird. These species are listed on Schedule 1 of the *Wildlife and Countryside Act 1981*, as amended and, of these, the black redstart is the most likely to be encountered in association with the project.

11.4.9 The site clearance measures outlined above, for nesting birds in general, will also serve to make habitats less suitable for foraging black redstart. It is not possible to remove all potentially suitable black redstart nesting habitat, such as brickwork crevices and ledges, prior to site clearance. To further minimise the risk of disturbing a black redstart nest, the following approach will be taken:

a. Those habitats with the potential for use by black redstarts (in particular, structures that are to be demolished) will be identified and surveyed specifically for black redstarts prior to the commencement of construction.
b. In the event that black redstarts are found, consultation with Natural England will be undertaken in order to identify and agree the appropriate measures to be undertaken in respect of this species.

c. The actions required of the contractor, should a Schedule 1 species be discovered within an area to be disturbed, are those general measures as set out above for birds (see Section 11.4.6), with the added requirement that any Schedule 1 species (black redstart) or its dependent young must not be disturbed while at or building a nest. Hence, in addition to the measures undertaken as above, exclusion/protective measures may be required, in order to prevent conflict with the legislation. The precise measures necessary to ensure that such species are not disturbed will be agreed with Natural England.

**Bats**

11.4.10 Construction works may involve the removal, damage and disturbance of structures and trees along the project route that have some potential to be used as roost sites by bats. All species of bat in the UK are protected by law, under the *Wildlife and Countryside Act 1981*, and under the *Conservation and Habitats and Species Regulations 2010*. This makes it an offence to intentionally (or recklessly) kill, injure, capture or disturb bats, and to damage, destroy or prevent access to roost sites (even when bats are not present).

11.4.11 Bat survey information is available within the ES. The contractor will undertake a watching brief immediately prior to site clearance and construction works in areas identified as containing sites with the potential to support bats, to ensure the works are legally compliant. Should bats be found, Natural England will be consulted to agree the mitigation strategy to be taken, and to obtain licenses for works that may affect bat roosts (while works in the locality are postponed, if necessary).

11.4.12 The ES has identified areas where bat transit routes may be affected by site lighting and, as such, due consideration will need to be taken so as to minimise impact on these routes where practicable.

**Reptiles**

11.4.13 Where construction works take place in areas that have potential to support (see ES for site specific details) common reptile species, such as common lizard and slow worm, all British native reptile species are afforded at least some level of protection under the *Wildlife and Countryside Act 1981*. Common lizards, grass snakes, adders and slow worms are protected from killing and injury only; protection is not extended to their habitats.

11.4.14 Reptile survey work undertaken by the ES to establish the presence of reptiles should be referenced. In order to ensure that no unlawful activities take place during site clearance and construction in respect of reptiles, the contractor will implement a watching brief. Any individual reptiles found will be relocated to the nearest safe, suitable habitat. In the unlikely event that large numbers of reptiles are found, a programme of trapping and
translocation will need to be agreed with Natural England before works in that area can continue.

**Animal welfare**

11.4.15 Construction works will take place in areas where wild mammals, such as foxes and rabbits, may be present. While there are no specific legal requirements/constraints in respect of works affecting such species (ie, these animals are not specifically protected), the contractor will undertake to exclude such animals from the construction areas in a humane manner.

**11.5 Protection of trees**

11.5.1 The contractor will use reasonably practicable measures to minimise the loss of protected trees, as detailed in the ES. Any essential remedial or protective work to trees adjacent to construction activity will be carried out by suitably trained or qualified personnel, using recognised methods in accordance with BS5837, *Guide for trees in relation to construction*.

11.5.2 Appropriate protection measures for tree protection will be implemented as specified in BS5837, where practicable, and based on consultation with the LA tree officer (as detailed in the ES). This will include protective fencing and prohibition of storing or dumping materials within the protected area.

11.5.3 All tree surgery will comply with BS3998, *Recommendations for Tree Works*, insofar as these are reasonably practicable. The elements of this approach are as follows:

a. Selective removal of lower branches in an approved manner, to reduce mechanical damage by construction plant.

b. Retained trees will be protected with tree protective fencing to BS5837, *Guide for trees in relation to construction*, if working conditions allow.

c. Tree protection is to be installed before any materials or machinery are brought onto the site and before any stockpiling commences. Special attention should be paid to ensuring that barriers remain rigid and complete.

d. Matting is to be installed around the root zone to minimise soil compaction.

e. Notwithstanding the above, construction activities will be controlled to minimise compaction of the ground beneath the entire tree canopy. No heavy plant or materials or plant will be stored, and construction movements will be controlled by fencing or other means so as to minimise vehicle movement within the canopy footprint.

f. The existing ground levels will not be altered beneath the extent of the tree canopy, unless agreed by an arboriculturalist in relation to tree pruning requirements.

g. No ploughing, ripping, storage of materials or soil tipping, etc, will take place in the protected areas beneath the tree canopy.
h. All works to ground within the protected area will be undertaken by hand, unless agreed otherwise with the arboriculturalist. In particular, any works to eradicate invasive plants (eg, Japanese Knotweed) will need to use the ‘cut and inject’ method or contact surface application of herbicide.

i. Any works to the tree canopies will be undertaken by a qualified tree surgeon.

11.5.4 All works in relation to trees with a tree preservation order (TPO) applied, trees in conservation areas and all LA owned trees will need to be agreed with TW and the LA tree officer. This will include the extents of tree protection fencing, any pruning, any removal, etc. Details should be checked against any contained within the DCO.

11.5.5 Works within the root protection area of trees should be avoided wherever practicable. However, where some works within the root protection area cannot be avoided, eg, for access or stockpiling, it is possible (if the tree officer agrees) to use cellular confinement systems to minimise/avoid compaction to the ground. Protection would still be required to avoid physical damage to the tree (ie, trunk, branches or crown). In addition, if works are deemed essential within the root protection area, it should be noted that the length of time of the impact should also be limited.

11.6 Reinstatement of grassed areas

11.6.1 The contractor will reinstate the haul roads and compound areas in accordance with the approved scheme.
12 Historic environment

12.1 General

12.1.1 The contractor shall carry out the works in accordance with all relevant legislation, guidance and best practice, as outlined below.

12.1.2 The historic environment includes heritage assets above and below ground, such as buildings and public infrastructure, townscapes and landscapes, trees, woodland and hedges, archaeological sites and artefacts, natural topography and strata, and social history.

12.1.3 If significant heritage assets are to be retained in situ, they shall be suitably protected from the contractor’s plant and operations during construction.

12.1.4 Where adverse effects cannot reasonably be avoided, alternative mitigation shall be implemented, for archaeological investigation and record, before and during construction (‘preservation by record’).

12.2 Procedures

12.2.1 Procedures apply to all significant heritage assets, whether or not subject to statutory or other designation.

12.2.2 The contractor shall prepare a site specific HMP, indicating how the historic environment is to be protected in a consistent and integrated manner, co-ordinated with all other relevant environmental topics.

12.2.3 The HMP shall address all construction related advance, enabling, temporary and permanent works, including demolition, utility diversions, access routes, works compounds and dredging – plus potential effects on heritage assets from third-party impacts, vibration, ground settlement and dewatering.

12.2.4 The HMP shall be developed in accordance with PPS5, *Planning for the Historic Environment* (2010), any conditions of planning consent, and consultation with relevant statutory bodies such as English Heritage (EH) and the local planning authority (LPA).

12.2.5 The HMP shall include a generic written scheme of investigation (GWSI), defining (in general terms) the procedures and mitigation measures to be applied under preservation in situ and preservation by record.

12.2.6 The contractor shall define procedures for unexpected archaeological discoveries during the works in the HMP and EPP. These include ceasing work in the vicinity, making safe, and notifying TW, EH and the LPA, so that suitable mitigation may be agreed and implemented.

12.3 Detailed provisions

12.3.1 Works affecting statutorily protected assets shall be undertaken in accordance with all required consents and licences under legislation, such as the Planning (Listed Buildings and Conservation Areas) Act 1990, Ancient Monuments and Archaeological Areas Act 1979 and the Burial Act 1857.
12.3.2 During the works, the contractor shall also give EH and the LPA adequate notice before implementing measures defined in the site specific written scheme of investigation (SSWSI). Their representatives may wish to monitor the works for compliance.

12.3.3 Mitigation defined in the ES will include archaeological investigation, excavation and recording prior to development. Risk may be further contained by a follow-up watching brief.

12.3.4 Mitigation measures shall include an appropriate level of analysis, reporting and public dissemination of the results. The resulting archive of records, data and finds shall then be transferred into the public domain with a suitable receiving body, such as a local museum.

12.3.5 Provisions shall include the following, where appropriate:

a. Protective measures, such as temporary support, hoardings, barriers, screening and buffer zones around heritage assets, and archaeological mitigation areas within and adjacent to worksites

b. Advance assessment to inform the types of plant and working methods for use where heritage assets are close to worksites, or attached to structures that form parts of worksites

c. Where elements to be demolished are attached to listed structures being retained, they will be separated where practicable, prior to demolition, using non-vibratory techniques such as diamond sawing

d. Condition surveys to define settlement and vibration limits for heritage assets potentially affected by the works – to include monitoring regimes and provision for cessation of works where feasible, should levels exceed the specified limits

e. Procedures under EPRP for the emergency repair of damage to listed buildings

f. Security procedures to prevent unauthorised access to heritage assets and archaeological investigations, and damage to or theft from them, including by the use of metal detectors

g. Procedures in the event of the discovery of human remains

13 Third-party impact and settlement

13.1 Protection of existing infrastructure and buildings

13.1.1 TW has employed consultants to undertake assessments of existing infrastructure potentially impacted by construction of the works. Where possible, ‘approval in principle’ documents have been prepared and submitted to the third-party for acceptance. These include, where necessary, preliminary instrumentation and monitoring plans.

13.1.2 The contractor is responsible for reviewing the assessments and undertaking any necessary calculations, documentation and revisions to take account of their method of construction, and obtaining approval to proceed from the third-party.

13.1.3 The contractor shall undertake a dilapidation/condition survey of the infrastructure and buildings prior to commencing works that could impact the infrastructure. This will include the installation of any safeguards necessary to reduce the risk of impact.

13.1.4 The contractor shall undertake any necessary mitigation measures and install instrumentation and monitoring to confirm that ground movements/construction impacts are as predicted and acceptable.

13.1.5 The contractor will develop an EPRP in conjunction with the asset owner in proportion to the level of residual risks.

13.1.6 An exception report shall be undertaken, as required, of buildings adversely impacted by construction of the works to determine the level of impact associated with construction of the works.

13.1.7 Further details can be found in the project settlement strategy paper.

13.2 Impact assessment of construction induced ground movements

13.2.1 The contractor will design and undertake construction of the scheme in a manner that will minimise the impact to third-party infrastructure and buildings as a result of ground movement.

13.2.2 Appropriate techniques will be implemented in order to control and limit, as far as is reasonably practicable, the impacts of construction induced ground movements.

13.2.3 As part of the asset protection process, assessment results and trigger/action levels are to be related to EPRP.
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ambient</td>
<td>Surrounding. For noise, for example, it is the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.</td>
</tr>
<tr>
<td>ancient monument</td>
<td>A monument protected under the Ancient Monuments and Archaeological Areas Act 1979.</td>
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<tr>
<td>aquifer</td>
<td>A permeable geological stratum or formation that is capable of both storing and transmitting water in significant amounts.</td>
</tr>
<tr>
<td>baseline</td>
<td>The situation against which the potential impacts due to the proposed development are assessed.</td>
</tr>
<tr>
<td>biodiversity</td>
<td>Biological diversity – or ‘biodiversity’ – is the term given to the variety of life on Earth and the natural patterns formed as a result. Biodiversity has been defined by the Convention on Biological Diversity (CBD), signed in 1992, as: &quot;The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.&quot; – CBD Article 2. UNEP 1992.</td>
</tr>
<tr>
<td>borehole</td>
<td>A hole driven into the ground to obtain geological information.</td>
</tr>
<tr>
<td>bund</td>
<td>An embankment which acts as a visual or noise screen.</td>
</tr>
<tr>
<td>Chalk</td>
<td>In England, the Chalk topographically forms what are known as the 'Downs' in southern and eastern counties. It is comprised of a sequence of mainly soft, white, very fine-grained, extremely pure limestones which are commonly 300-400m thick. These rocks consist mainly of coccolith bimicrites formed from the skeletal elements of minute planktonic green algae, associated with varying proportions of larger microscopic fragments of bivalves, foraminifera and ostracods.</td>
</tr>
<tr>
<td>Code of construction practice (CocP)</td>
<td>Document setting out control measures to be adopted during the project construction period.</td>
</tr>
<tr>
<td>combined sewer overflow (CSO)</td>
<td>A structure, or series of structures, designed to allow spillage of excess wastewater from a combined sewer under increased rainfall conditions. Flows may discharge by gravity or by pumping.</td>
</tr>
<tr>
<td>condition survey</td>
<td>A survey of an asset undertaken prior to construction works that could affect the asset. A further survey can also be carried out after construction is to be completed, if required.</td>
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<td>Term</td>
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<tr>
<td>conservation area</td>
<td>This is defined in the Planning Listed buildings and Conservation Areas Act 1990 as “an area of special architectural and historic interest, the character or appearance of which it is desirable to preserve or enhance.”</td>
</tr>
<tr>
<td>contractor</td>
<td>Any contractor, including the Principal Contractor appointed by TWUL to this function for a venue or other package of work (in accordance with CDM), and any contracting organisations contracted to a Principal Contractor as a subcontractor.</td>
</tr>
<tr>
<td>dewatering</td>
<td>The removal of water from solid material or soil by wet classification, centrifugation, filtration, or similar solid-liquid separation processes, such as removal of residual liquid from a filter cake by a filter press as part of various industrial processes. Construction dewatering is a term used to describe removal or draining groundwater or surface water from a riverbed, construction site, caisson or mine shaft, by pumping or evaporation.</td>
</tr>
<tr>
<td>drive site</td>
<td>A main tunnel site containing the shaft from where the TBM is ‘driven’ forward, ie, starts from. Excavated material is removed from and segments are fed into the tunnel via the shaft at the drive site.</td>
</tr>
<tr>
<td>dust</td>
<td>Coarse particulate matter (between 1µm and 75µm in diameter) produced as a result of abrasive activities during the construction phase of the development/project.</td>
</tr>
<tr>
<td>ecology</td>
<td>The relationship between organisms and their environment.</td>
</tr>
<tr>
<td>effect</td>
<td>The result of an impact on a particular resource or receptor.</td>
</tr>
<tr>
<td>effluent</td>
<td>The treated wastewater discharged from the sewage treatment works.</td>
</tr>
<tr>
<td>emergency preparedness plan</td>
<td>A plan prepared for each asset where required. The plan will detail actions to be taken at each trigger level and will link directly to the outcomes of the risk workshops.</td>
</tr>
<tr>
<td>environmental impact assessment (EIA)</td>
<td>An assessment of the possible positive or negative impact that a proposed project may have on the environment, consisting of natural, social and economic aspects. The purpose of the assessment is to ensure that decision makers consider the ensuing environmental impacts when deciding whether to proceed with a project.</td>
</tr>
<tr>
<td>environmental statement</td>
<td>A document to be prepared following an EIA which provides a systematic and objective account of the EIA’s findings.</td>
</tr>
<tr>
<td>excavated material</td>
<td>The earth/soil/ground material removed when the shafts and tunnels are excavated. Excavated material can be either topsoil, subsoil or other material, such as rock, etc.</td>
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<td>Term</td>
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<tr>
<td>flood risk assessment</td>
<td>An assessment of the likelihood of flooding in a particular area so that development needs and mitigation measures can be carefully considered.</td>
</tr>
<tr>
<td>fluvial</td>
<td>The processes associated with rivers and streams and the deposits and landforms created by them.</td>
</tr>
<tr>
<td>foreshore</td>
<td>Ground uncovered by the river when the tide is low.</td>
</tr>
<tr>
<td>greenfield sites</td>
<td>Land not previously developed, can include agricultural land.</td>
</tr>
<tr>
<td>ground treatment</td>
<td>A range of measures to improve the properties of the naturally occurring ground, or counter the potential pore water pressure changes arising from underground working/excavations, so as to facilitate tunnel or shaft construction and/or reduce ground movement caused by the works.</td>
</tr>
<tr>
<td>groundwater</td>
<td>Water located beneath the ground surface in soil pore spaces and in the fractures of rock formations.</td>
</tr>
<tr>
<td>groundwater body</td>
<td>A column of water beneath the water table or a unit volume of ground that is saturated.</td>
</tr>
<tr>
<td>haul roads</td>
<td>Temporary roads provided within the contractors’ site area to allow the transportation of material around the site.</td>
</tr>
<tr>
<td>impact</td>
<td>A physical or measurable change to the environment attributable to the project.</td>
</tr>
<tr>
<td>impermeable surface</td>
<td>Surfaces or ground unable to absorb rainfall, eg, concrete, most tarmac surfaces and hardstandings.</td>
</tr>
<tr>
<td>$L_{\text{AEQ(T)}}$</td>
<td>Equivalent continuous sound level is a notional steady sound level which would cause the same A-weighted sound energy to be received as that due to the actual and possibly fluctuating sound over a period of time (T). It can also be used to relate periods of exposure and noise level. Thus, for example, a halving or doubling of the period of exposure is equivalent in sound energy to a decrease or increase of 3dB(A) in the sound level for the original period.</td>
</tr>
<tr>
<td>$L_{\text{AMAX}}$</td>
<td>The maximum sound level measured on the A-weighted scale occurring during an event.</td>
</tr>
<tr>
<td>listed buildings</td>
<td>Buildings or other built structures included in the statutory list of buildings of special architectural or historic interest of national significance, which is compiled by the Secretary of State for Culture, Media and Sport. Buildings are graded and are protected both internally and externally. Listed building consent is required for almost all works to a listed building.</td>
</tr>
<tr>
<td>London Plan</td>
<td><em>The London Plan</em> is the strategic spatial planning document for London, produced by the Mayor of London.</td>
</tr>
<tr>
<td>main tunnel</td>
<td>The tunnel from Abbey Mills to Acton Storm Tanks.</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
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<td>-----------------------------</td>
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</tr>
<tr>
<td>main tunnel site</td>
<td>A site from where the main tunnel is built. Each site needs to provide enough space for all the construction related activities, which vary depending on the type of TBM used and whether the site is a drive site, a double drive site or a reception site.</td>
</tr>
<tr>
<td>method statement</td>
<td>Under CDM regulations, a method statement must be prepared for each task prior to work on site. The statement is to give details of how the task will be carried out and include possible risks/dangers, along with methods of control to be established which will ensure safety.</td>
</tr>
<tr>
<td>mitigation measures</td>
<td>Actions proposed to moderate adverse impacts and to enhance beneficial impacts arising from the whole or specific elements of the development.</td>
</tr>
<tr>
<td>modelling</td>
<td>Simulation of the proposed design (eg, hydraulic modelling of the drainage network, physical modelling of drop shafts or odour modelling, etc).</td>
</tr>
<tr>
<td>monitoring</td>
<td>Monitoring, recording and collection of existing situation data prior to construction (eg, CSO spill frequency, vehicle/pedestrian traffic movements or building settlement monitoring pre/during construction).</td>
</tr>
<tr>
<td>oil interceptor</td>
<td>Underground tank, split into sections and connected into the drainage system, which contains oil and prevents it being discharged into rivers and streams, etc.</td>
</tr>
<tr>
<td>piezometer</td>
<td>A small-diameter observation well used to measure the hydraulic head of groundwater in aquifers; a standpipe, tube, vibrating wire piezometer or manometer used to measure the pressure of a fluid at a specific location in a column.</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>PM$_{10}$ is any particulate matter with an aerodynamic diameter equal to or less than 10µm. Particulate matter of this size is respirable.</td>
</tr>
<tr>
<td>receptors</td>
<td>People (both individually and communally) and the socio-economic systems they support.</td>
</tr>
<tr>
<td>reception site</td>
<td>A main tunnel site containing the shaft from where the TBM is ‘received’, ie, ends up. The TBM is removed from the tunnel via the shaft at this reception site.</td>
</tr>
<tr>
<td>recreational water users</td>
<td>People who use the river for leisure, eg, rowers.</td>
</tr>
<tr>
<td>sewerage undertaker</td>
<td>The statutory undertaker for sewerage – responsible for sewerage maintenance.</td>
</tr>
<tr>
<td>shaft</td>
<td>Duct/pipe/vertical tunnel</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
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</tr>
<tr>
<td>silt</td>
<td>Granular material of a grain size between sand and clay derived from soil or rock. Silt may occur as a soil or as suspended sediment (also known as suspended load) in a surface water body. It may also exist as soil deposited at the bottom of a water body.</td>
</tr>
<tr>
<td>sites and monuments record</td>
<td>A resource and repository of information about the archaeology and historic landscapes under the care of an organisation such as the National Trust and local authorities.</td>
</tr>
<tr>
<td>sound level meter</td>
<td>An instrument for measuring the sound pressure level.</td>
</tr>
<tr>
<td>suspended solids</td>
<td>The small solid particles that remain in suspension within a liquid.</td>
</tr>
<tr>
<td>temporary works</td>
<td>All works required to facilitate the execution of the design, including any left in place after completion.</td>
</tr>
<tr>
<td>Thames Tunnel project</td>
<td>The Thames Tunnel project (TTP) including all associated works undertaken by the Principal Contractor or members of its supply chain. The Thames Tunnel is a scheme which is intended to capture and store unacceptable discharges from combined sewer overflows (CSOs) along the route of the Thames Tideway.</td>
</tr>
<tr>
<td>Thames Water (TW)</td>
<td>Thames Water (TWUL), the organisation that will manage the TTP during construction.</td>
</tr>
<tr>
<td>topography</td>
<td>The study of Earth’s surface shape and features or those of planets, moons, and asteroids. It is also the description of such surface shapes and features (especially their depiction in maps).</td>
</tr>
<tr>
<td>Transport for London Road Network (TLRN)</td>
<td>The 580km network of major roads that is administered by Transport for London. It accounts for 5% of London's roads but carries 33% of its traffic.</td>
</tr>
<tr>
<td>tree preservation orders</td>
<td>The designation of trees that contribute significantly to the amenity value of an area. A TPO designation requires an application is made before any works are carried out to them, including routine maintenance.</td>
</tr>
<tr>
<td>trigger level</td>
<td>A predetermined value that can be measured (eg, by survey processes) from a stable baseline, due to construction works. When a trigger level is exceeded, there shall be preset actions that should be followed. Trigger levels and preset actions are normally set out in safety case assurance documentation, related to the construction works.</td>
</tr>
<tr>
<td>tunnel boring machine</td>
<td>A machine used to excavate tunnels with a circular cross-section through a variety of ground conditions.</td>
</tr>
<tr>
<td>ventilation shaft/column</td>
<td>Pressure release pipe.</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
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</tr>
<tr>
<td>works</td>
<td>All construction work associated with the construction of the Thames Tunnel.</td>
</tr>
</tbody>
</table>
Appendix A – Project environmental policy

Environmental policy

The Thames Tunnel delivery team is committed to exceeding industry best practice in environmental performance. We recognise that our activities will have some impact on the environment but we will endeavour to minimise any adverse impacts. We believe that good environmental practice helps ensure good business performance.

In pursuit of these goals the Thames Tunnel delivery team will:

- Always conduct our activities within the legislative obligations
- Promote practices that minimise, where practicable, the detrimental environmental impacts that construction activities have upon the environment. These practices will be available for scrutiny
- Encourage the development of suitable construction methods, which promote environmental protection and or minimise their environmental impacts
- Encourage clients and suppliers to pursue environmental best practice and to apply environmentally favourable solutions to the maximum degree practicable
- Aim to provide education and training for our employees, to help them include environmental considerations in all aspects of their work
- Attempt to make efficient use of natural resources and prevent pollution
- Continually review our activities to ensure a programme of continual improvement
- Develop and implement targets to minimise detrimental environmental impacts during construction

Environmental legislation and environmental priorities will change with time, therefore the Thames Tunnel delivery team will monitor environmental developments, regularly review and, where necessary amend, revise or make additions to this policy.

Jim Ota
Programme director
Thames Tunnel delivery team
Date: 30 June 2011

Tim Preston
CDM / HSSE manager
Thames Tunnel delivery team
Appendices

Appendix B – Section 61 application guidance

B.1 Guide to making a Section 61 application

B.1.1 The CoCP requires that Section 61 applications (s.61) under the CoPA are made to relevant LAs for works carried out under the contract. This appendix provides guidance on the process of application for a s.61 consent, and gives recommendations on liaison with the LA.

B.1.2 For clarity, and consistency with the CoPA, the term ‘noise’ includes vibration.

B.1.3 This appendix provides a sample form for making an s.61 application. In the event that, due to circumstances that were not foreseen at the time of making the application, changes occur to the planned works, a number of steps must be taken by the contractor. These are outlined in the sections following the guidance on the initial s.61 application.

S.61 application

B.1.4 The required level of information in the s.61 will be dependent on local circumstances, ie, the proposed work and the area in which it is to be carried out.

B.1.5 The s.61 consent process must be ‘owned’ by the construction team within the contractor as the consents are for the method of work and mitigation measures (which will include constraints on hours of working and potentially other significant cost items), and hence the processes for developing consent applications and ensuring compliance with the approved methods must be the responsibility of senior level construction management.

B.1.6 S.61 consent should be sought for all construction activities, even those considered to be non noise-generating. Efficient development of consent applications will therefore involve screening of the activities to determine whether they are likely to give rise to significant noise levels at adjacent noise-sensitive receivers.

B.1.7 For packages of works which are required to be undertaken outside of normal working hours and/or are predicted to result in noise levels in excess of the noise insulation trigger level, a separate Section 61 application is required. This Section 61 application is in addition to any application for works undertaken during normal working hours and which result in noise levels below the noise insulation trigger level (as discussed in CoCP, Section 6.3).

B.1.8 Noise calculations and development of steps to minimise noise should be focussed on the significant noisy activities; this will be of relevance for both applications. The quiet activities should simply be listed as items in the method statement. Quiet and noisy activities should be agreed with the LA before submission.

B.1.9 The screening process should also consider the extent of each consent application. Coverage of a very large number of activities or a small number of activities should usually be avoided. The former can result in
excessive consent development time and cost. The latter is also inefficient as it involves too much paperwork for both the contractor and LA. It may be applicable for the normal working hours s.61 application to run for a longer period than the application covering works outside of normal working hours.

B.1.10 The duration of consents should be considered carefully. Seeking consent for future activities that have yet to be fully developed can lead to significant and unnecessary work for the contractor and LA in agreeing subsequent amendments. It should also be noted that some LAs might wish to time limit consents on large projects (eg, six months) to allow for regular review (of complaints, for example).

B.1.11 Consideration should also be given to the content of applications. Two approaches are typical, covering all activities for a fixed period or seeking consent for activities or groups of activities. The latter approach can often fit better with the development of the construction programme and placement of subcontracts.

B.1.12 A full screening process should therefore be undertaken at the start of the contract to define a programme of applications which should be agreed between the contractor and LAs. The screening process may need to be revisited during the course of the works.

B.1.13 Early discussions between the contractor and the LAs are encouraged to ensure that all parties are familiar with the issues associated with the planned construction works to be covered by a consent application. A draft s.61 application should be submitted to the relevant LA at least one month before the intended submission date. The draft can then be used as the basis of more detailed discussions between the contractor and LA with respect to the works, and the need for any alteration of the information provided in the s.61 can be identified, with sufficient time for changes to be implemented.

B.1.14 In advance of the formal submission of the first s.61 application, the contractor should provide to the LAs information on the personnel authorised on behalf of the contractor to sign off s.61 applications and requests for changes to s.61s. The contractor should provide the names of the personnel and sample signatures. In the event that the authorised signatories change, the contractor should inform the LA as soon as possible.

B.1.15 The draft s.61 could include the following information:

a. Scheme of work (including description of the works to be carried out, working methods and duration of the works)

b. Details to demonstrate that BPM will be used to control noise and vibration

c. Location of the noise-sensitive receivers identified for which noise predictions will be made

d. Predicted noise levels (and vibration where required) for the noise- and/or vibration-sensitive receivers identified above
e. Sufficient information for the LA to validate predictions:
   i. Plant: Number and types selected, sound power levels of that plant (and the source of the information, eg, BS 5228)
   ii. Noise source and receiver heights
   iii. Information used in a BS 5228 calculation, ie, angle of view corrections, percentage on time
   iv. Screening calculations
   v. Facade correction
   vi. Information on calculations may be provided as a spreadsheet for ease, both in submission and for validation.

f. Proposed noise monitoring locations (indicated on a plan)

g. Details of activities within the start-up/close-down periods

h. Plan showing the working area, main plant locations and named nearby noise-sensitive receivers.

For packages of works which are required to be undertaken outside of normal working hours and/or are predicted to result in noise levels in excess of the noise insulation trigger level, additional information is required to be incorporated within the consent application, including:

i. the number of days for which the thresholds for noise insulation/temporary rehousing are met or exceeded (see CoCP Section 6.4)

j. a detailed BPM assessment of possible quieter alternative methods and full justification of why these are not reasonably practicable

k. particular emphasis should be given to the consideration of specific mitigation measures over and above the general measures discussed in CoCP Section 6.4

l. for works proposed to be undertaken outside of normal working hours, full justification for why these works cannot be completed within normal working hours.

B.1.16 Following discussion of the draft s.61 with the relevant LAs and the implementation of any necessary changes, the formal application for the s.61 should be made. Submission of ‘normal working hours’ applications must be at least 28 days before the commencement of any works onsite. Submission of consent applications for works to be undertaken outside of normal working hours, and/or are predicted to result in noise levels in excess of the noise insulation trigger levels, will need to ensure that there is sufficient time between the consent being granted and the works starting to allow any additional mitigation to be implemented. For example, where noise insulation is to be provided, the associated s.61 consent may need to be submitted four months or more in advance of starting the works that give rise to the need for the insulation.
Details of noise levels to be provided

Period $L_{Aeq}$

B.1.17 The range of times over which noise predictions will be required will be dependent on the hours of work needed for the particular construction site. Predictions should be carried out for whichever of the following periods work is expected. Works within the start-up/close-down periods are to be included.

Table B.1 $L_{Aeq}$ period hours of work

<table>
<thead>
<tr>
<th>Day</th>
<th>Works between these hours</th>
<th>Period for $L_{Aeq}$ (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon-Fri</td>
<td>7am – 8am</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>8am – 6pm</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>6pm – 7pm</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>7pm – 10pm</td>
<td>3</td>
</tr>
<tr>
<td>Sat</td>
<td>7am – 8am</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>8am – 1pm</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1pm – 10pm</td>
<td>1</td>
</tr>
<tr>
<td>Sun/Bank/Public holidays</td>
<td>7am – 10pm</td>
<td>1</td>
</tr>
<tr>
<td>Any day</td>
<td>10pm – 7am</td>
<td>1</td>
</tr>
</tbody>
</table>

B.1.18 Where works outside of normal working hours are required, the worst case $L_{Aeq(1 \text{ hour})}$ between 18:00 and 22:00 hours and between 22:00 and 07:00 hours should be stated. Worst case $L_{Aeq(1 \text{ hour})}$ values may need to be stated at other times, depending on local sensitivities. The need for these predictions should be discussed with the LA as part of consultation prior to the application.

Maximum noise levels

B.1.19 In the event that percussive operations are required near receptors that could be sensitive to noise and/or vibration maximum noise level ($L_{A\text{Max}}$) and peak particle velocity, vibration predictions shall be made. If percussive operations are planned, this should be discussed as part of the consultation prior to the application. Where these types of activity are required, it will be necessary to give careful consideration to BPM noise and vibration control measures (eg, equipment selection, screening and/or working hours).

Management of changes to proposed works

B.1.20 It is recognised that there may be changes to planned works between the time at which the s.61 application is made and the works being carried out onsite. Changes have been divided into three categories, as described below.
Dispensation for significant change

B.1.21 The dispensation procedure is to be used when a change in works is required that was not foreseen at the time the s.61 application was made. A dispensation will need to be applied for when the change in works may result in a change in the potential disturbance to noise/vibration-sensitive receivers. Examples would be changes resulting in different noise levels, working hours or duration of works.

B.1.22 An application for a dispensation must be made to the relevant LA at least 14 days before the works (to which it relates) are due to commence. When rescheduling relates to works of a critical or urgent nature, the application should, where practicable, be made seven days (but at least two working days) before the commencement of the work.

Minor change (variation)

B.1.23 Minor changes may be required to the scheme of works described in the s.61 application. The contractor may apply to the LA for a variation in these circumstances. Minor changes are those that would not give rise to a change in the predicted noise/vibration levels. The procedure for applying to the LA for a variation may also be used where additional activities are required which do not change the predicted noise/vibration levels. It is not anticipated that extensive supporting information would be required for application for variation.

B.1.24 It is intended that the application for variation would be filled out by the contractor and faxed to the LA. If the LA is satisfied that the variation will not give rise to additional effects on local noise/vibration-sensitive receivers, it will sign and return the fax. The LA may attach conditions to the variation.

Overrun

B.1.25 It is recognised that there will be occasions when overruns occur, particularly where, for reasons of health and safety or engineering requirements, a specific work item needs to be completed. It is intended that a notification should be faxed to the LA by the contractor. The LA would then sign to acknowledge its receipt, and return it to the contractor. The notification system for overruns is not an approval process.

B.1.26 The LA may follow up notifications of overrun. If the overrun and consequent notification are found not to have been carried out for a valid reason, the LA may pursue this with the contractor.

Emergency deviation

B.1.27 In the event that an occurrence onsite requires an emergency change to works set out in the s.61, the contractor must notify the relevant LAs within one hour. The notification must include details on:

a. when and where the incident occurred, and its duration
b. mitigation measures used to control noise and vibration
c. the reason for the deviation
Appendices

Community relations

B.1.28 Maintaining good community relations with both residential and commercial neighbours of the worksite is essential. The contractor must discuss the appropriate level of community liaison with the relevant LAs at an early stage.

d. who is in control of the works onsite for the contractor, and their contact details

e. any notification of the public

f. how recurrence of the incident will be prevented.
Phase two consultation (Autumn 2011)

For further information see our website: www.thamestunnelconsultation.co.uk or call us on 0800 0721 086