



Application for Development Consent

Application Reference Number: WWO10001

Examining Authority's Second Written Round of Questions and Requests for Information Response from Thames Water

**Code of Construction Practice Part A: General Requirements
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Code of Construction Practice Part A: General Requirements

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Thames Tideway Tunnel

Code of Construction Practice Part A: General Requirements

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List of abbreviations

AURN	Automatic Urban and Rural Network
BPG	Best practice guidance
BPM	Best practicable means
CEMP(s)	Construction environmental management plan(s)
CIRIA	Construction Industry Research and Information Association
CoPA	Control of Pollution Act 1974
<i>CoCP</i>	Code of Construction Practice
CSO(s)	Combined sewer overflow(s)
DCO	Development Consent Order
EA	Environment Agency
EIA	Environmental impact assessment
EMS	Environmental Management System
EPP(s)	Emergency preparedness plan(s)
ES	Environmental Statement
FRA	Flood risk assessment
GLA	Greater London Authority
HBMCE	Historic Buildings and Monuments Commission for England
HSSE	Health, Safety, Security and Environment
MMO	Marine Management Organisation
<i>OAWSI</i>	Overarching Archaeological Written Scheme of Investigation
PLA	Port of London Authority
PPG(s)	Pollution Prevention Guidelines(s)
SPZ	Source protection zone
SRN	Strategic Road Network
TBM(s)	Tunnel boring machine(s)
TfL	Transport for London

1 Introduction

1.1 General

- 1.1.1 All works covered in this document are to be managed and performed to the culture within the Thames Tideway Tunnel project's vision of 'Zero Incidents, Zero Harm, Zero Compromise'.
- 1.1.2 This *Code of Construction Practice (CoCP)* is submitted as part of the application for development consent (the 'application') for the Thames Tideway Tunnel project (the 'project'). The development consent order (DCO) is an order under the Planning Act 2008 approving a development; it is the statutory instrument defining the terms under which development consent would be granted.
- 1.1.3 The principles and requirements within this *CoCP* relate to the management of construction impacts and are to be read in conjunction with safety legislation and the employer's *Health, safety, security and environment standard* (the '*HSSE Standard*ⁱ) for contractors.
- 1.1.4 The *CoCP* has been carefully developed to reduce and mitigate the effects of the project during construction. It aims to provide appropriate and clear means of monitoring and ensuring compliance with a wide range of good practice measures and sets out a series of measures and standards of work, which will be applied by the contractor throughout the construction period to:
- a. provide effective planning, management and control during construction to manage and mitigate potential impacts on people, businesses and the natural and historic environment
 - b. provide the framework to engage with the local community and its representatives throughout the construction period.
- 1.1.5 The employer is the party responsible for the delivery of the project, (ie, the party in whom the powers of the DCO are vested or transferred to deliver the project). The employer is responsible for all of the works, which includes overseeing the contractor. The employer will have a project management organisation in place, which will be suitably skilled and resourced to undertake this duty.
- 1.1.6 The term 'construction' in the *CoCP* includes all physical works undertaken to implement the project: utility diversions, site preparation, demolition, material delivery, removal of excavated material and waste, tunnelling and shaft construction, interception of existing combined sewer overflows (CSOs), installation of equipment, landscaping, commissioning, and all related engineering and construction activities as defined in Schedule 1 to the DCO.

ⁱ This will be produced for the project to achieve outstanding arrangements for health, safety, security and environment.

- 1.1.7 As the project extends across 14 London boroughs, the *CoCP* establishes the basis for a consistent approach to the management of construction impacts across local authority boundaries and a range of key stakeholders. Any construction codes or guidance documents relating to construction that have been produced by the local authorities were considered during the preparation of this document.
- 1.1.8 The *CoCP* comprises two parts:
- a. Part A: General requirements. These measures are applicable project wide.
 - b. Part B: Site-specific requirements. These are minimum site-specific measures or deviations from the general requirements indicated in Part A that will be implemented by the contractor.
- 1.1.9 The *CoCP* sets out a series of measures to be applied throughout construction to mitigate the potential impact of site activities on the natural and human environment, amenity, well-being, health and safety of local residents, road users and traffic flow, businesses and the public. Any significant effects from construction will be limited in the vicinity of the works by implementation of the code.
- 1.1.10 The *CoCP* supports the planning and delivery of the project in a sustainable, efficient and cost-effective manner to meet the objectives of the *Sustainability Statement*. It also promotes co-operation with other projects in the vicinity, as far as practicable, in order to reduce combined impacts.
- 1.1.11 The contractor shall adhere to a construction contract, which will reference UK water industry standards, Thames Water requirements for capital delivery standards and Sewers for Adoption, as appropriate.
- 1.1.12 Requirements within the DCO state that the project will be carried out in accordance with both Parts A and Part B of the *CoCP* unless agreed otherwise with the relevant local authority. Where a plan, procedure, report, or other item is to be approved, such an approval shall be in writing by the relevant body identified in this document.
- 1.1.13 Further specific measures for each site may be made through amendments to the *CoCP* Part Bs, in agreement with the relevant local authority and in consultation with key stakeholders which may include Transport for London (TfL), the Environment Agency (EA), the Port of London Authority (PLA), the Historic Buildings and Monuments Commission for England (HBMCE, formerly referred to as English Heritage), and the Marine Management Organisation (MMO).
- 1.1.14 When an agreement or approval is sought from the relevant local authority and not obtained (or obtained on terms that are not satisfactory to the employer), then it will be open to the employer to appeal to the Secretary of State under the appeal mechanism set out in the DCO (Schedule 17, para. 4). Applications made further to Requirements are to be regulated by virtue of Schedule 17, paras. 1 to 3; and any other applications or requests made under the DCO are to be regulated by DCO article 53(2).

- 1.1.15 Within this document, the term 'consultation' is used to describe the process of sharing and discussing draft information with stakeholders. Consultation will have due regard to any comments received, wherever practicable. If no comments are returned within the consultation period, this will be deemed to mean tacit acceptance. The length of consultation periods may vary. Where the *CoCP* states "*approved or agreed by the employer*", the plan, procedure, report or other item will be managed in accordance with the contract between the employer and the contractor and administered by the acceptance procedures of the Project Manager, as defined within the contract.
- 1.1.16 The contractor shall comply with the terms of the DCO, including this *CoCP* and any other relevant legislation referenced in this document or otherwise, or any legislation amending or replacing it.

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2 General requirements

2.1 Environmental impact assessment

- 2.1.1 An environmental impact assessment (EIA) was carried out for the project and an *Environmental Statement* prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, as amended. Through the EIA process, mitigation identified with respect to construction effects was embedded within the *CoCP* in order to form part of the application for the construction of the project. The findings of the EIA are reported in the *Environmental Statement*.
- 2.1.2 The employer will ensure that the residual environmental effects of the construction and operation of the project are not worse than those described in the *Environmental Statement*. In line with this duty, the contractor will have to implement the mitigation measures described in the *Environmental Statement*, or any other appropriate or equivalent mitigation measures included in the DCO and its requirements, or Section 106 obligations.
- 2.1.3 The *Environmental Statement* is, therefore, a worst case assessment in terms of adverse environmental effects, which the employer and contractor shall seek to improve on within those bounds.
- 2.1.4 The contractor shall comply with and implement the mitigation measures described in the *CoCP*.

2.2 Environmental management system

- 2.2.1 The contractor shall be required to develop and implement an environmental management system (EMS) consistent with British Standard (BS) EN ISO 14001: Environmental Management. This will be aligned with the employer's EMS and will set out:
- the contractor's environmental policy
 - the procedures to be implemented to deliver and monitor compliance with environmental legislation
 - the procedures to be implemented to deliver and monitor compliance with the environmental provisions in this *CoCP*.
- 2.2.2 The contractor's EMS will ensure and demonstrate that all the environmental requirements of the contract and all relevant legislation, standards, regulations and consents are being met.

2.3 Construction environmental management plan

- 2.3.1 The Construction Environmental Management Plans (CEMPs) will be prepared by the contractors to set out details of the practical execution of the construction works and the implementation of the environmental management measures. Contractors will be required to provide the CEMP to the employer for review and approval to ensure that controls set out in

the CoCP (Parts A and B), all relevant Requirements, Obligations and Marine Licence Conditions will be adequately addressed during the works.

2.3.2 The CEMPs will be produced in advance of construction works commencing at a site and a draft CEMP shall be provided to the relevant local planning authority, the EA, the PLA and HBMCE for consultation that shall be not less than two weeks. Observations made by statutory bodies will be taken into account to help ensure compliance with the controls put in place to manage and limit construction-related impacts. The final CEMPs shall then be made available to the relevant planning authority before commencement of construction works.

2.3.3 The CEMPs will provide a consolidated document that details the 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. The CEMPs draw on information contained within other management plans that are subject to other approvals. For each relevant worksite, the CEMP draws together the following management plans::

- a. Pollution incident response plan (refer to Section 4): to detail how the controls set out at 4.9.7, the relevant CoCP Part B and, for marine works, those details approved pursuant to Deemed Marine License Condition 13ⁱⁱ would be implemented to manage any pollution incidents..
- b. Emergency preparedness plan (refer to Section 4): to detail how the controls set out in Section 4.9, would be implemented, including procedures to deal with hazards and incidents and to take account of security requirements.
- c. Lighting management plan (refer to Section 4.6): to provide design layouts and demonstrate how the requirements are met. For marine works it would relate to those details approved pursuant to Deemed Marine License Condition 13.
- d. Traffic management plan (refer to Section 5): to include details approved by the relevant planning authority pursuant to the relevant site specific Requirement for a Construction Traffic Management Plan to be prepared [e.g. ACTST6 and HAMPS4 (Construction Traffic Management Plan)]. Such plans would include 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 road works. Highway and Public Right of Way reinstatement and river transport and navigational controls will also be included.

ⁱⁱ Reference to requirements, Schedules, license conditions, protective provisions or other DCO provisions in this Code of Construction Practice will be reviewed and may need to be updated following grant of the DCO. This may be necessary to reflect any additional requirements or provisions added to the DCO by the Secretary of State or any other renumbering or reordering of the DCO terms that may be undertaken by the Secretary of State.

- e. Noise and vibration management plan (refer to Section 6): to include the details approved by a relevant Section 61 Consents, including the measures to control and mitigate noise and vibration during construction and monitoring systems to be employed during the construction works.
- f. Air quality management plan (refer to Section 7): to detail how the controls set out at Section 7 would be implemented, including dust, air pollution, vehicle, plant emissions and odour controls.
- g. Water management plan (refer to Section 8 and Section 10.4): to include details of water use, site drainage, protection of watercourses; controls to prevent contamination of surface water and groundwater resources, flooding, dewatering, dredging; and monitoring systems to be employed during the construction works. This would also include the details approved pursuant to the relevant site specific Requirement [eg, ACTST10 and HAMPS7 (Surface Water Drainage)].
- h. Land quality (refer to Section 9): to include the details approved by the relevant planning authority pursuant to the relevant site specific Requirement for a Site Specific Remediation Strategy [eg, ACTST3 and HAMPS2 (Contaminated Land)].
- i. Site waste management plan (refer to Section 10): to include details of the management plan approved with the EA, including details of handling, storage, transfer and removal of waste materials and contaminated materials, as well as measures for the reuse or recycling of excavated material and waste.
- j. Ecology and landscape management plan (refer to Section 11): to include details of procedures and mitigation measures relating to legally protected and notable species, as well as habitat protection and reinstatement. This would also include the details approved pursuant to the relevant site specific Requirement [eg, ACTST4 and BAREL5 (Landscape Scheme)].
- k. Heritage management plan (refer to Section 12): this would include the details approved pursuant to PW9 (Monitoring of, and Protective Works to Listed Buildings and Structures), PW10 (Built Heritage Recording) and the relevant site specific Requirement [eg, ACTST5 and HAMPS3 (Archaeology)].
- l. Community liaison plan (refer to Section 3): to include plans for engagement with communities, local authorities and other stakeholders as well as helpline/website information and a mechanism for dealing with complaints.
- m. Resource management plans (refer to Section 10.4): these will include details for resource use management (water, energy and materials).

2.3.4 The CEMPs, the subsidiary plans and other management plans will be live documents that will be updated and refined by the contractor as necessary, in response to the changing needs of the works during construction. The contractor will obtain approval for alterations to the scope of the CEMPs from the employer, in consultation with stakeholders

including the relevant planning authority. See Appendix B for the structure of the CEMP.

- 2.3.5 The CEMPs will set out the contractor's arrangements for providing supervisory and site personnel with relevant, adequate training before they are employed on a construction site, including project induction and site-specific environmental induction. Supervision, training and competency requirements are set out in the construction phases plan.
- 2.3.6 The CEMPs will include details of those responsible for their effective implementation and set out procedures to be implemented in order to monitor compliance with the CEMPs during construction.
- 2.3.7 The contractor will manage sites and achieve formal certification under the Considerate Constructors Scheme operated by the Construction Federation (refer to Section 4.3).
- 2.3.8 The contractor responsible for tunnelling will be required to follow the Association of British Insurers/British Tunnelling Society's *Code of Practice for Risk Management in Tunnelling*.

2.4 Enforcement

- 2.4.1 Compliance with the provisions of this *CoCP* will be enforceable by virtue of a number of mechanisms. Not complying with the *CoCP* would be a breach of a DCO Requirement PW6 (*CoCP* Part A) and would be enforced in the same way as if a control was a standalone requirement..
- 2.4.2 Project-wide requirement PW4 requires the details of the body or bodies responsible for undertaking each of the works at a site to be provided to the local planning authority. Both the contractor and the employer would be open to enforcement action under Section 161 of the Planning Act 2008 and, in the event of failure to comply with the terms of a Section 61 notice, under the Control of Pollution Act 1974 (the '*CoPA*').As set out in 1.1.18, the employer will be able to enforce the contractor's compliance through the construction contracts.
- 2.4.3 The *CoCP* obliges the consent pursuant to Section 61 of the *CoPA* to be obtained, detailing the way in which certain works are to be carried out. Local authorities will have the power to serve a notice under Section 60 of the *CoPA* in the event that the terms of the consent are not adhered to. Contravention of the requirements of such a notice without a reasonable excuse is an offence.
- 2.4.4 Similarly, the *CoCP* identifies certain other consents, licences and permits that are required under other legislation, which provide a further means of ensuring that the works are carried out as described in the *CoCP*.
- 2.4.5 Each contractor will be responsible under the terms of the contract with the employer for ensuring that the work is planned and managed to be undertaken in accordance with all requirements of the *CoCP*. Each contractor will require their environment management to undertake a programme of monitoring and auditing to confirm compliance.

2 General requirements

- 2.4.6 Site inspections and audits will be carried out by the employer to ensure compliance with the *CoCP*. Regulating authorities may also attend site to ensure compliance with relevant permits and consents.
- 2.4.7 The construction contract will require the contractor to ensure that all sub-contractors and suppliers meet the requirements of the *CoCP*.
- 2.4.8 The following compensation policies will be secured by way of a Section 106 obligation to all relevant local planning authorities:
- a. *Exceptional hardship procedure*
 - b. *Non-statutory mitigation compensation procedure*
 - c. *Non-statutory disturbance compensation procedure*
 - d. *Settlement Information Paper* (but not including the Settlement Deed, since Thames Water is offering that already)
 - e. *Noise insulation and temporary re-housing policy*.
- 2.4.9 Documents (a) and (d) are now proposed to be secured by legal agreement. Draft agreements will be provided shortly, along with the details of the securing mechanism.

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3 Communications and community/stakeholder liaison

- 3.1.1 The employer and contractor shall provide community/stakeholder relations focussed on engaging with the community/stakeholder to provide appropriate information and be the first line of response to resolve issues of concern. The employer and contractor shall take reasonable steps to engage with nearby residents, especially those who may be detrimentally affected by construction impacts. The employer will ensure that the contractor makes reasonable endeavors to inform occupiers of nearby properties 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 local authority and local residents will be advised as soon as reasonably practicable that such work is taking place. This will comply with the HSSE communication procedure (refer to *HSSE Standard*, Section 8.1).
- 3.1.2 The contractor shall develop, in conjunction with the employer, a 'community liaison plan' for approval by the employer, 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 project. (These will be defined in the *Sustainability Statement* and in the project environmental management plan).
 - 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 contractor shall 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, at least two weeks prior to construction activity taking place. A liaison plan will be issued in advance to the employer and local authorities, detailing the information to be supplied, for approval by the employer. The plan will include details and a map of properties to be notified directly with information sheets.
 - c. For tunnel boring, a website will be established (by the employer) that will provide information on the forecast and actual passage of the tunnel boring machines (TBMs). The contractor shall 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. Liaison with appropriate local community projects, local tenant and resident groups, employment and educational initiatives.
 - e. Provision of a point of contact for a small claims procedure, relating to claims of physical damage to property, or minor injuries. The

contractor shall assist in enabling any claims to be progressed promptly in co-ordination with the employer and insurer.

- f. Co-ordination of preconstruction defect surveys in properties which have been identified. Liaison, in conjunction with the employer, 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 The community liaison plan would be used to identify and further consult with the local authority with regards to relevant equalities groups to determine if there are any additional issues or mitigation required.
- 3.1.4 Appropriate meetings will be held with residents (or their representatives), businesses and other local occupiers to keep them informed about the works, and to provide a forum for them to express their views. The relevant local authority will be invited to participate.
- 3.1.5 The employer 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.
- 3.1.6 A confidential reporting line will be operated by the employer which links to the HSE and Project Incident Plan.
- 3.1.7 A complaints register will be maintained by the employer, and a copy will be provided to the relevant local authority each month (or such other interval as is agreed with the local authority). The contractor shall notify the employer of complaints when they are received, along with the event and any on-going actions.
- 3.1.8 Onsite communications, such as daily shift and activity briefings 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). This communication will be given to all relevant workforce, including new starters and sub-contractors, before they commence work. 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 on a routine basis.
- 3.1.9 The employer will establish coordination and communication meetings with key stakeholders. The contractor shall attend meetings as required and arrange other meetings where required. Any other meetings identified by the contractor shall be notified to the employer. Meetings will include a regular traffic/transport liaison meeting with TfL, EA, PLA, and Natural England where relevant, and the associated borough to consider all sites in that borough.

3 Communications and community/stakeholder liaison

- 3.1.10 The employer will also establish project-wide coordination meetings with local authorities, TfL, the EA, PLA, MMO, and Natural England at critical phases throughout the works for the scheme as a whole.
- 3.1.11 Any plans which have been consulted on and approved by the employer will be notified to the relevant stakeholders (eg, emergency preparedness plan).

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4 General site operations

4.1 Construction process

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

4.2 Working hours

General

- 4.2.1 The activities at the worksites are varied and include construction of major shafts, tunnels and other activities that will be constructed over extended periods of time and will include periods of working on a continuous 24-hour, seven days a week basis.
- 4.2.2 There will be variations in the hours of working between different sites which will be dependent on the ability to mitigate the potential effects of site working. The specific land uses and potential receptors surrounding the sites will also influence the working hours. The working hours by type of site are described in paras. 4.2.11 to 4.2.13.
- 4.2.3 Working hours are identified in the *CoCP* Part B for each site. Requirements within the DCO provide that the project will be carried out in accordance with both Part A and Part Bs of the *CoCP*, unless agreed otherwise with the local authority. The contractor may apply pursuant to Section 61 of the Control of Pollution Act 1974 to vary these working hours which will have been fixed and approved by virtue of the *CoCP* Part B in the light of the contractor's detailed working methods. Further Section 61 application guidance is contained in Appendix A.
- 4.2.4 The Section 61 application process will include submitting noise and vibration predictions and associated mitigation, as appropriate and agreed with the local authority. This is detailed in Section 6 of this document. When implementing best practicable means (as defined in the *CoPA*) for the control of noise and vibration, measures 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 This section provides details of the working hour classifications, as well as the flexibility to enable detailed agreement of the works between the contractors and local authorities through Section 61 consents, dispensations or variations to ensure that the construction activities are mitigated 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. The working hours shall be complied with unless and until any variations to working hours is first approved by a Section 61 Consent.

Table 4.1 Classification of different types of working hours

Classification	Description
<p>Standard working hours 08:00 to 18:00 weekdays 08:00 to 13:00 Saturday</p> <p>Plus up to one hour before and after for mobilisation, ie, 07:00 to 19:00 weekdays, 07:00 to 14:00 Saturdays</p> <p>Plus maintenance periods 13:00 to 17:00 Saturdays 10:00 to 16:00 Sundays</p>	<p>These hours consist of:</p> <ol style="list-style-type: none"> a. standard working hours b. mobilisation period c. maintenance period. <p>These are the standard hours that will apply to the majority of worksites and construction activities.</p> <p>These hours are the same as those that are defined by most local authorities within their individual boroughs.</p> <p>Mobilisation period: Mobilisation activities will comprise the following: 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 jerry cans only, use of fuel tractors/bowsers to be limited to standard working hours); site inspections and safety checks; site meetings (briefings and quiet inspections/walkovers); site clean-up (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 does not require or cause hammering or banging etc).</p> <p>Mobilisation does not include lorry movements into and out of the sites.</p> <p>Maintenance period: The activities allowed in this period are limited to those that do not cause significant noise or vibration. Maintenance activities will comprise general mechanical maintenance to construction machinery and plant such as cranes, excavators, compressors, grouting equipment and dewatering pumps. Only essential maintenance works will be undertaken on Sundays.</p>
<p>Extended working hours 18:00 to 22:00 weekdays 13:00 to 17:00 Saturdays</p>	<p>These are intermittent and are required to cover certain construction activities that will not be completed during standard working hours.</p> <p>These activities comprise works for major concrete pours and piling/diaphragm wall works.</p> <p>The number of work activities that require these extended working hours are limited, and are not</p>

Classification	Description
	<p>necessarily on consecutive days.</p> <p>The detail of the duration and frequency of the intermittent requirement for extended working hours will be included within the Section 61 application.</p> <p>Where these works are not defined within the CoCP Part B, they will be agreed with the local authority through a Section 61 consent, dispensation, or variation, and notified to relevant stakeholders (eg, TfL).</p>
<p>Continuous working hours 00:00 to 00:00 Monday to Sunday</p>	<p>For the tunnel construction activities, the underground work and essential surface support activities will be undertaken on a continuous 24-hour, seven days a week basis. Underground work includes maintenance of underground machinery and plant.</p> <p>Essential surface support activities comprise works required to support tunnelling including excavated material processing and handling, shaft lifting operations, tunnel lining supply, grout and concrete batching plant operation, barge loading and movements.</p>
<p>Out of hours/ possession working</p>	<p>It is beneficial to undertake a number of activities outside of the standard working hours. These are required:</p> <ol style="list-style-type: none"> a. 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 b. for utilisation of periods with low demand or flows for utility diversions and works on the existing sewer system c. to ensure minimum disruption to third parties who may have on-going operations during the day. <p>This will be agreed with the local authority through a Section 61 consent, dispensation or variation, and in consultation with relevant stakeholders.</p>
<p>Tidal working</p>	<p>Certain works are located in the foreshore and the construction activities will be required to be undertaken at high or low tides. Any tidal working outside of standard working hours will be agreed with the local authority through a</p>

Classification	Description
	Section 61 consent, dispensation or variation, and notified to relevant stakeholders.
<p>River and rail transport hours As continuous working hours 00:00 to 00:00 Monday to Sunday</p>	<p>Main tunnel construction sites have the opportunity for excavated material to be removed by barge or train. At these sites barge and/or train loading and transfer will be on a continuous 24-hour, seven days a week basis.</p> <p>The movement of barges from construction sites is linked to the state of the tide and will be undertaken when the tide suits barge movement. Small CSO sites using the river will be dealt with on a site-by-site basis in Part B of the <i>CoCP</i>.</p>
<p>Short notice working</p>	<p>On a major project such as this, 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.</p> <p>At the commencement of the works, the process for notifying and coordinating these works with the local authorities and relevant stakeholders will be agreed with the local authority through a Section 61 consent, dispensation or variation, and notified to relevant stakeholders.</p>

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 (refer to Section 6).

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.

Deliveries and lorry movements

4.2.9 Deliveries will be arranged to limit impacts on the road system. As detailed in Section 5.1, a Construction Traffic Management Plan shall be prepared for each site, pursuant to the relevant site specific requirement [e.g. ACTST6 and HAMPS4 (Construction Traffic Management Plan)]. Deliveries and all vehicle movements will be restricted to standard working hours, or extended hours, unless agreed with the local authority through a Section 61 consent, dispensation or variation, or site specific requirements in the *CoCP* Part B. Abnormal and special loads (as defined in the Road Vehicles (Authorisation of Special Types) (General) Order 2003” (S.I. 2003/1998) may be delivered outside standard working hours, subject to the requirements of the highways authority and the police. Any further

requirements for a specific site will be included in the *CoCP* Part B. Lorry movements during extended working hours must relate to the activity that requires the extension.

- 4.2.10 Deliveries by lorry at night may be allowed subject to approval from the local highway authority in accordance with relevant legislation on a site-specific basis; for example, in areas away from sensitive noise receptors.

Description of site types and associated working hours

Main tunnel construction sites

- 4.2.11 The main tunnel (including Greenwich and Dormay connection tunnels) will be constructed from a number of worksites. The construction phases undertaken on each worksite will include associated development works, site establishment, shaft construction, tunnel construction, shaft and tunnel lining, surface works and commissioning.
- 4.2.12 The tunnel construction phases (including secondary lining) 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 through either a Section 61 consent, dispensation or variation, and notified to relevant stakeholders.
- 4.2.13 There are practicality considerations that necessitate the construction of diaphragm walls, and for other major concrete pours for the main shafts to be undertaken beyond 'extended working hours'.

CSO sites

- 4.2.14 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.
- 4.2.15 The majority of the construction phases and activities will be completed within the 'standard working hours'.
- 4.2.16 Certain activities cannot be completed within the 'standard working hours' and will require 'extended hours'. These activities comprise major concrete pours and piling/diaphragm wall works during shaft construction.
- 4.2.17 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

- 4.2.18 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'.

Associated development works

- 4.2.19 Associated development works are required, including traffic management and utility diversions. The working hours for these activities will aim to minimise disruption to traffic and the local environment. Any works giving

rise to noise effect will be captured under the Section 61 process, and as such approved by the local authority in consultation with the highway authority. It may be appropriate for certain work, such as works within existing highways, to be undertaken in out of hours/possession working hours.

4.3 Worksite layout

4.3.1 The contractor shall ensure 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 employer's specification.
- b. Noise generating activities will be sited away from noise sensitive receptors or screened so as not to exceed agreed levels.
- c. Storage sites, fixed plant and machinery equipment and temporary offices will be located to limit environmental impacts, and have due regard to neighbouring properties and the constraints of each site.
- d. The site layout will also consider and limit where practical, potential impacts from restrictions to natural light to adjacent property.
- e. Site lighting will be located and directed so as to minimise intrusion into occupied residential properties and on sensitive areas including the river, and will not constitute a road, rail or river hazard.
- f. River sites will have appropriate lighting to assist river navigation in accordance with draft Deemed Marine Licence Condition [13] and relevant legislation, such as the Port of London Act 1968.
- g. Internal vehicle routes will be arranged to minimise the risk of mud being carried out of the site.
- h. Site drainage will be carefully considered to minimise areas of mud in one part of the site contaminating other areas.
- i. Security cameras will be sited and directed so that they do not intrude into occupied residential or commercial properties.
- j. Site plant and facilities will be powered from mains electrical sources, where reasonably practicable.
- k. Where required temporary fencing will include appropriate noise attenuation.
- l. Pedestrian access to and from adjacent residential and commercial premises will be maintained.

4.3.2 The contractor shall display an information board containing contact names, telephone number and address, and the helpline number at appropriate locations on the boundaries of the sites (refer to Section 3 for more detail). This will be in accordance with the employer's specification.

4.3.3 The type of hoarding or fencing is required to comply with the following principles:

- a. Meet the employer's specification and standard detailed drawings.

- b. The standard hoarding will be 2.4m high unless specified otherwise.
- 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. Measures will be used for tree protection (refer to Section 11.6).
- 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 and construction access.
- h. Appropriate sight lines/visibility splays will be maintained to ensure safety of both vehicles and pedestrians is preserved (refer to the *HSSE Standard*).
- i. Temporary fences may be used in certain areas, such as for short-term occupation of sites or at more remote locations. Where indicated in the *CoCP Part Bs*, temporary fencing will include appropriate noise attenuation.

4.3.4 Hoardings where required will be of a design appropriate to the character of the surrounding townscape. This may include one or more of the following:

- a. incorporation of art work visualising the proposed development or photographic views of the local area or incorporating art work, mounted onto standard well maintained hoardings
- b. incorporation of viewing windows into standard well maintained hoardings to preserve important views and provide opportunities to observe construction activity
- c. incorporation of a full cover of climbing plants on dark green painted hoardings, with the plants trimmed back only to allow for essential lighting and health and safety signage.

4.3.5 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 (refer to the *HSSE Standard*, Section 9).

4.3.6 The contractor shall obtain any required hoarding licences from the appropriate highway authority if the hoarding has to be placed on highway land. Where the area of works is stopped up and the hoarding falls within the stopped up area, a licence will not be required.

- 4.3.7 The contractor shall promote and enforce 'good housekeeping' arrangements on all the construction sites to ensure that clean, tidy and safe sites are provided. Arrangements will be implemented to provide effective preventative pest and vermin control and prompt treatment of any pest and vermin infestation. The contractor shall ensure that the risk of infestation by pests and vermin is minimised. Adequate arrangements for disposing of food waste or other attractive material must be implemented. If infestation occurs the contractor must take action to eliminate the infestation and prevent further occurrence. Measures will be implemented to protect ecologically sensitive areas or legally protected and/or notable species (refer to Section 11 for further details). This will be assessed as part of the Considerate Constructor Scheme, where applicable.
- 4.3.8 The contractor shall ensure that welfare facilities appropriate to the type of site (eg, drive site) are provided. The facilities will be connected to mains services and drainage, where reasonably practicable. Alternative arrangements will be provided when connection to the mains is not possible (refer to the *HSSE Standard* for further details).
- 4.3.9 Where there is potential for crane arcs to impact on trees and other ecology, suitable protection measures will be implemented (refer to Section 11).

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, having regard to size, location, duration and scope of works being undertaken.
- 4.4.3 Each site requires appropriate method statements, risk assessments and consultation and approval from the employer.

4.5 Cranes

- 4.5.1 Crane arcs will be confined within the site boundary or limits of land to be acquired, unless agreed otherwise with the local authority in accordance with statutory legislation for use of cranes which over-sail the public highway, and property owners/occupiers whose air space is affected (eg, London Underground, Docklands Light Railway, TfL, Network Rail, PLA). The contractor shall obtain the relevant permissions (eg. Licence for use of crane which over-sails the public highway), in accordance with the relevant legislation, from TfL or the local authority, 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.
- 4.5.2 Where there is potential for crane arcs to impact on trees and associated ecology, suitable protection measures will be implemented (refer to Section 11).

4.6 Site lighting

- 4.6.1 Site lighting will be provided to ensure the safety of work and to maintain security on the construction sites.
- 4.6.2 Where appropriate, and in discussion with the local authority and 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 street crime. Appropriate industry standard procedures will be implemented.
- 4.6.3 The lighting will be positioned and directed so as not to unnecessarily intrude on adjacent buildings and land uses, and to prevent unnecessary interference with local residents or passing transport users (road, rail, and river). The design will ensure that any artificial light emitted from premises will not be prejudicial to health or be a nuisance as required by the Environmental Protection Act 1990.
- 4.6.4 Road lighting will be designed to comply with the provisions of BS5489, Code of Practice for the Design of Road Lighting, where applicable.
- 4.6.5 Further guidance is contained within Guidance Notes for the Reduction of Light Pollution, GN01, 2005, or later revisions published by the Institute of Lighting Engineers. This includes effects on:
 - a. The lighting design needs to consider terrestrial ecology including measures to prevent disturbance to notable species and ecologically sensitive areas (refer to Section 11).
 - b. The lighting design needs to consider the aquatic environment and avoid direct lighting of watercourses, where reasonably practical, to avoid inhibiting movements of photophobic species such as eel.
- 4.6.6 A lighting management plan will be prepared by the contractor for each site to detail requirements, provide design layouts and to demonstrate how the requirements are met by the design and will be approved by the employer.

4.7 River works

- 4.7.1 All works in the river or foreshore below mean high water mark fall within the remit of the licensable works and Schedule 15 (Deemed Marine Licence) includes the powers to undertake those works. Schedule 15, Part 2, includes draft Deemed Marine Licence Conditions that will apply to all river works undertaken as part of the Authorised Project. The details will be discussed with the PLA and the EA prior to submission to the MMO.
- 4.7.2 The details of all works below mean high water mark would be approved by the MMO, pursuant to the relevant conditions to the deemed Marine Licence, along with any the protective provisions specified in the DCO relating to either the EA or the PLA.
- 4.7.3 The following sets out an overview of the key controls relating to the river works. Where such a control relates to a control proposed within the draft

deemed Marine Licence, this is stated. For the precise wording of these draft controls, please refer to Schedule 15, Part 2, of the DCO.

Construction activities

- 4.7.4 Condition 7 states that prior to commencement of construction activities (including temporary works), details of that activity shall be submitted to and approved by the the MMO, following consultation with the PLA and the EA. The details shall include:
- a. construction methodologies, including navigational safety risk assessment
 - b. materials to be used, including backfill to cofferdams
 - c. timings to construction activities, including sequencing of construction
 - d. details of environmental mitigation measures
 - e. details of contractors and vessels to be used.

Dredging activities

- 4.7.5 Condition 8 states that prior to dredging activities starting details of that activity shall be submitted to and approved by the the MMO, following consultation with the PLA and the EA. The details shall include:
- a. dredging methodologies
 - b. descriptions of dredge materials, including sediment quality sample analysis where appropriate (e.g. for the determination of the presence or otherwise of contaminants within those sediments to be dredged)
 - c. timings of the dredging activities
 - d. dredging volumes
 - e. waste disposal locations and quantities
 - f. details of environmental mitigation measures
 - g. details of contractors and vessels to be used.

Removal activities

- 4.7.6 Condition 9 states that prior to removal of any temporary works from the river or foreshore, details of that activity shall be submitted to and approved by the the MMO, following consultation with the PLA and the EA. The details shall include:
- a. removal methodologies
 - b. waste disposal locations and quantities for backfill materials
 - c. timing of removal activities, including the sequencing of removal
 - d. details of foreshore reinstatement measures and material to be used
 - e. details of environmental mitigation measures
 - f. details of contractors and vessels to be used.

Removal of in-river piles

- 4.7.7 Further to the details approved pursuant to Condition 9, the contractor shall design in river piling to facilitate removal, and make reasonable effort to remove all piles completely from the bed of the river upon completion of the works.
- 4.7.8 The contractor shall ensure any piles which prove impossible to fully extract on application of the confirmed minimum crane pull of 40 tonnes, are driven down, cut off or removed to a depth of a least 1 metre below the adjacent riverbed level unless otherwise agreed.
- 4.7.9 As the works are carried out the contractor shall compile and make available for inspection, by the MMO or PLA, a survey report and plan, with plotted cut-off piles, a suitable permanent reference point, a note of the top level of each pile and adjacent riverbed level relative to chart datum. Upon completion of the works the contractor shall provide a copy of the completed survey report and plan to the MMO and PLA.
- 4.7.10 The top of any cut-off piles will be retained and kept available for inspection by the PLA during the progress of the works and each one will be marked with the reference given to its pile stump in the survey so that by using the survey and plan the PLA can identify which stump it came from.

Cofferdam construction

- 4.7.11 The temporary and permanent material used for fill within cofferdams and temporary construction within the foreshore is to be suitable for use within the river environment and not cause any potential contamination to the river.

Scour and accretion monitoring and mitigation

- 4.7.12 Condition 9 states that prior to commencement of any river works, a scour and accretion monitoring and mitigation plan for that part of the works shall be prepared in consultation with the MMO, the EA, the PLA and HCMBE and then submitted to and approved by the MMO. The scour monitoring and mitigation plan shall be prepared in accordance with the Scour and accretion monitoring and mitigation strategy for temporary and permanent works in the foreshore.

Other Deemed Marine Licence conditions

- 4.7.13 The following sets out the other conditions proposed that have relevance to this CoCP, but have not been noted above. They are as follows:
- a. Condition 5: Notification of commencement of works
 - b. Condition 10: Details of Associate Development
 - c. Condition 12: Habitat Mitigation Plan
 - d. Condition 13: Construction Environment Management Plan
 - e. Condition 14: Concrete and Cement
 - f. Condition 15: Coatings and Treatment

- g. Condition 16: Spills (protection and procedures)
- h. Condition 17: Percussive Piling
- i. Condition 20: Construction Vessels.

4.8 Security

- 4.8.1 Site security is a significant issue, particularly for central London, and with highly visible construction sites. The contractor shall comply with the *HSSE Standard* relating to security details full requirements including the following:
- a. The contractor shall ensure that all construction sites are secure and have manned security on a 24-hour basis (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.
 - b. The contractor has a statutory duty to prevent unauthorised access to the site and will carry out site-specific assessments of the security and trespass risk at each site, and implement appropriate control measures.
 - c. The site boundary will be secured and constructed such that it minimises opportunities for unauthorised entry. The boundary will be monitored remotely by CCTV at relevant locations. These locations will be determined in consultation with the local authority or local police as appropriate. Should the site boundary suffer damage, it will be immediately rectified by the contractor.
 - d. The contractor shall consult with local crime prevention officers to determine security proposals for each site and to identify any security issues at particular sites with regular liaison to review security effectiveness and response to incidents.

4.9 Emergency preparedness plan

- 4.9.1 The employer will put in place an emergency preparedness plan (refer to the *HSSE Standard* for further details) at each site location, which the contractor shall 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 plan will include emergency pollution control measures that will take into account EA guidelines. The emergency procedure will contain emergency phone numbers and the method of notifying local authorities, statutory authorities and local community representatives. Contact numbers for the key employer and contractor's staff will also be included. The approved Emergency preparedness plan will be notified to relevant stakeholders.
- 4.9.2 Consideration will also be given to vulnerable buildings and elements of transport infrastructure.
- 4.9.3 The contractor shall ensure that the legislative requirements will be followed for the provision of safe site access points. This might include

forums with relevant emergency services where appropriate. In all cases, the arrangements put in place will also be suitable for and in consultation with the emergency services (London Ambulance Service, London Fire Brigade, and the Metropolitan Police).

- 4.9.4 The contractor shall need to have standby equipment readily available (eg, road diversion signs).
- 4.9.5 The contractor shall ensure procedures are in place for awareness of flood warning and preparation for a potential flood event relevant to the flood risks of each site. This will include the identification of an evacuation route and potential refuge areas in the event of a flood to enable egress and access from the site.
- 4.9.6 The plan will need to cover key areas of monitoring and mitigation activities. This includes for buildings, transport and utility infrastructure, and riverbed monitoring for scour. Any separate plans for these areas need to be identified and referenced.
- 4.9.7 Suitable spill kits will be provided and positioned in vulnerable areas and staff will be trained in their use and a record will be kept of all pollution incidents or near-misses, to ensure appropriate action is taken and lessons are learned. Regular ‘toolbox talks’ will be held to raise staff awareness of incident prevention and share lessons learned. There will be written procedures in place for dealing with spillages and pollution (the pollution incident control plan). The plan will contain the following as a minimum:
- guidance on the storage and use of hazardous materials with the aim of preventing and containing spills and releases
 - guidelines on the degrees of containment which take account of the nature of the materials and the sensitivity of the environment
 - procedures to be adopted in the event of an environmental incident, to contain and limit any adverse effects
 - procedures and appropriate information required in the event of any incident such as a spillage or release of a potentially hazardous material
 - process in place to link into the incident management plan of the project.
 - systems for notifying appropriate emergency services, the EA and other relevant authorities, the employer and the contractor's personnel.

4.10 Pollution incident response

- 4.10.1 This will be intrinsic to the above emergency preparedness plan. Works will be carried out in such a way as to avoid pollution incidents. However, should any occur, incident response procedures, including appropriate equipment, materials and resources, will be implemented to contain and limit the effects.

4 General site operations

- 4.10.2 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 will also be considered.
- 4.10.3 Such procedures and measures will cover atmospheric, aquatic or land pollution and procedures in the event of fire.
- 4.10.4 The correct storage, handling, use, and disposal of any potentially hazardous materials will be carried out in accordance with the relevant statutory provisions and EA and Health and Safety Executive codes of practice and guidance notes, together with any manufacturer's recommendations.
- 4.10.5 The relevant statutory bodies, including the Health and Safety Executive (Construction), Fire Authority, the EA, PLA and the local authority (Emergency Planning) will be consulted during the process of developing 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, as required by health and safety legislation, other environmental management and health and safety procedures. The approved pollution incident control plan will be notified to relevant stakeholders.
- 4.10.6 The pollution incident control plan (refer to the *HSSE Standard* for further information) will contain:
- 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 pollution prevention for sites on or adjacent to the river and watercourses
 - d. guidelines on the degrees of containment which take account of the nature of the materials and the sensitivity of the environment
 - e. procedures to be adopted in the event of a pollution incident, to contain and limit any adverse effects
 - f. procedures and appropriate information required in the event of any incident such as a spillage or release of a potentially hazardous material
 - g. systems for notifying appropriate emergency services, authorities, the employer and the contractor's personnel
 - h. arrangements for notifying appropriate statutory bodies and local authorities of pollution incidents, where required to by legislation
 - i. standby equipment and materials
 - j. specific arrangements for sites on or adjacent to the river
 - k. relevant procedures and contacts for each work site for forwarding to the emergency services and appropriate authorities.

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

4.11 Fire prevention and control

- 4.11.1 All construction sites and associated accommodation and welfare facilities will have in place appropriate plans and management controls to prevent fires (refer to the *HSSE Standard*, Section 8.7, for further information).

4.12 Electromagnetic interference

- 4.12.1 The contractor shall consider the effects of electromagnetic interference on wireless telecommunication systems (and including river vessels signals, traffic and rail signalling equipment) during the design and construction of the project, 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 Radio Frequency Interference associated with the project are low and at acceptable levels.

4.13 Unexploded ordnance

- 4.13.1 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.
- 4.13.2 Unexploded ordnance (UXO) surveys will be undertaken using a "magnetomer survey" carried out by an accredited specialists. Any magnetic contacts that model as an UXO will be investigated to confirm identity. Any confirmed UXO will be managed and made safe by a suitably qualified specialist.

4.14 Utility works

- 4.14.1 The utility diversions and new works required by the design will be identified, and schedules produced and agreed with the utility owners in accordance, where appropriate, with the protective provisions.
- 4.14.2 Account will be taken of any outages in planning the utility diversions.
- 4.14.3 Where further changes in utility infrastructure cannot reasonably be avoided, the contractor shall make arrangements with the employer and owner of the equipment to be relocated, either temporarily or permanently, outside the area of the project works, and in accordance, where appropriate, with the protective provisions. In some instances, the apparatus may be surplus to requirements and can be decommissioned.
- 4.14.4 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 shall agree appropriate arrangements (such as planned night time or weekend closures) with the relevant utility operator, and in accordance, where appropriate, with the protective provisions.

- 4.14.5 The contractor shall locate, identify and protect (or divert if necessary) all utility plant and equipment reasonably expected to be materially adversely affected by the project works. Methods will include the use of ground penetrating radar and vacuum excavation. 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 shall establish procedures with the utility operators for the management and mitigation of unforeseen events, and in accordance, where appropriate, with the protective provisions. Information from the *Environmental Statement* and site investigations work will be made available.

4.15 Worker access

- 4.15.1 The contractor shall produce a construction workforce travel plan for the project. The plan will be developed in accordance with the *Draft Project Framework Travel Plan* to encourage the use of public transport by those working on the project. This will be secured by requirements in the DCO [eg, ACTST7 and HAMPS5].
- 4.15.2 The contractor shall only allow site vehicles necessary to undertake the works on site. No worker parking will be allowed unless specifically identified in the *CoCP Part B*, or unless agreed with the local authority. Site parking will be limited to operational vehicles such as mini buses, management and maintenance vehicles. The contractor shall put measures in place to monitor and eliminate 'fly-parking' by workers in the vicinity of the site.
- 4.15.3 No temporary living accommodation is permitted on site.

4.16 Clearance of site on completion of activities

- 4.16.1 The contractor shall clear and clean all working areas and accesses as work proceeds and when no longer required for the works.
- 4.16.2 At the completion of the construction activity plant, temporary buildings or vehicles not required during subsequent construction works will be removed from the site. All land, including highways, footpaths, public open spaces, river embankments/waterways, loading facilities or other land occupied temporarily will be made good to the satisfaction of the employer. This will be in accordance with the ecology and landscape management plan and the approved landscape design for the site.
- 4.16.3 Temporary working areas within the foreshore will be reinstated to a similar condition and material as was presented prior to the works as

agreed with the EA prior to start of the works in accordance with any applicable part of the protective provisions. This is detailed in Section 11 – Ecology.

4.17 Considerate Constructors Scheme

- 4.17.1 The contractor shall be required to manage sites and achieve formal certification under the Considerate Constructors Scheme. Contractors will be required to attain certification under the following five areas (or as amended):
- a. enhancing the appearance
 - b. respecting the community
 - c. protecting the environment
 - d. securing everyone's safety
 - e. caring for the workforce.
- 4.17.2 For each site, contractors will be required to achieve a minimum score (eight out of ten) for each of the above sections (maximum score = 50). Should the site not be able to achieve a score of 40, an explanation indicating that the highest possible score has been achieved will be required from the contractor, as well as an improvement plan which will be agreed with the employer. Should the Considerate Constructors Scheme be updated, these requirements will be updated accordingly by the employer.
- 4.17.3 A copy of the Considerate Constructors Scheme certificate will be sent to the employer, and compliance with the Scheme will be audited through the contractor's EMS.

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5 Public access, the highway and river transport

5.1 Traffic management and control

- 5.1.1 The *CoCP* together with the *Transport Assessment* sets out the framework within which the project related traffic will be controlled and the basis for the production of further site specific level information. The *CoCP* Part B identifies any site-specific requirements and constraints, such as access/egress points for the worksites, and temporary and permanent closures and diversions of highways.
- 5.1.2 The contractor shall comply with the legislation as amended by the DCO (including but not limited to the Highways Act 1980, the Road Traffic Regulation Act 1984, the New Roads and Street Works Act 1991 and the Traffic Management Act 2004). Articles 18, 55 and 56 of the DCO modify and, in some cases exclude, relevant highways legislation and the contractor must also comply with these Articles. The contractor shall 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 (refer to the *HSSE Standard*). Alternative signposted routing will be provided where required and feasible.
- 5.1.3 The transportation of materials (including hazardous materials) will consider the risk of incidents, and include mitigation measures to reduce the likelihood and impact of any incident. Preventative containment measures will also be considered in advance.
- 5.1.4 The contractor shall carry out the works in such a manner as to limit inconvenience to the public arising from increased traffic flows and disruptive impacts of construction traffic.
- 5.1.5 For each worksite, a site-specific traffic management plan 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 plans will need to be approved by the relevant local authority in consultation with the relevant highway and traffic authority. The preparation and approval of these plans is a requirement within the DCO [eg, ACTST6 and HAMP54]. The plans 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. how the contractor shall meet the requirements of the *transport assessment*
 - d. the strategy for traffic management such as the use of parking measures and/or site operatives to manage how construction vehicles will enter and exit the sites

- e. local routes to be used by lorries, cranes and abnormal loads generated by construction activity including, where required, the timings of use of such routes, lorry holding areas, lorry route signing strategy, means of monitoring lorry use and any routes prohibited from use
- f. a schedule and programme of the planned traffic management schemes and measures required to undertake the works
- g. required bus diversions and bus stop locations
- h. requirements for amendments to traffic signal infrastructure or timing modifications that need to be agreed with and provided by TfL
- i. interfaces and effects with adjacent developments and other project construction sites, including measures to coordinate and reduce combined impacts
- j. arrangements for lorry management as detailed in Section 5.2
- k. measures (including notification to suppliers) to address potential risk to residents and activities on local roads adjacent to the construction site. These will include where appropriate restrictions on delivery hours where practical, and strict enforcement of speed limits
- l. procedures for carrying out regular full safety audits on all permanent highway works and temporary diversion routes
- m. a mechanism to monitor the assumptions within the travel plan.

5.1.6 Traffic management schemes to control, divert or amend traffic flows during the works will be submitted for approval to the relevant local highway authority in consultation with TfL. The submission will include:

- a. scheme details and layouts including drawings and any traffic signal amendments
- b. phasing and programming of scheme including control measures
- c. fully validated traffic modelling and reports for the traffic management and control measures where necessary and specified in the *CoCP* Part B. The reports will be produced in accordance with the relevant guidance as issued by TfL
- d. safety audits on all permanent highway works, temporary diversion routes and accesses and as required in the *CoCP* Part B
- e. details of mitigation measures to reduce impacts on traffic (buses, cyclists and pedestrians) including traffic signal amendments, temporary diversion routes and measures to minimise duration of scheme
- f. proposed publicity to notify and inform users before and during the implementation of all traffic management and control measures.

5.1.7 In conjunction with the Traffic Management Plan the contractor shall produce a separate Construction Logistics Plan for each site. This details the efficient and sustainable management of material, and material vehicle and vessel movements to and from the site. The plan will be prepared in

consultation with the PLA and local traffic authorities. The plans will be submitted and approved by the local planning authority in consultation with the PLA and relevant local traffic authorities before commencement of work.

- 5.1.8 The planning of the works will include consideration of the access and servicing requirements of affected residential and commercial premises. The contractor shall 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 requirements will be maintained, within the constraints of the works and the need to ensure the safety of the public.
- 5.1.9 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, and temporary speed limits. Where these have not been identified within schedules to the *Draft DCO*, applications will be made to the relevant highway authority in advance of the works.
- 5.1.10 The employer will assess overall traffic impact from the project and ensure that where required, traffic management is coordinated between the worksites and contractors.

5.2 Lorry management and control

- 5.2.1 The contractor shall have the following lorry management requirements and vehicle measures applied to his own vehicles and those of sub-contractors and suppliers:
- a. Membership of the TfL, Fleet Operators Recognition Scheme. The contractor and subcontractors will register, attain bronze membership for the start of construction progressing to silver within 6 months
 - b. Use of lorries that have 'active' fitted cyclist safety measures including side safety bars, a close proximity warning system comprising of a front mounted, rear facing CCTV camera or Fresnel lens, close proximity sensor, an in-cab warning device (visual or audible) and an external warning device to make the road user in close proximity aware of the driver's planned manoeuvre
 - c. Use lorries and vans which display prominent signage on the rear of the vehicle to warn cyclists of the dangers of passing the vehicle on the inside
 - d. Lorry drivers are required to have undertaken a Lorry Drivers Awareness course (TfL recommended) that identifies and considers travelling in and around London, the known risks and hazards, and the highways and the safety issues and implications
 - e. Establish a monitoring and reporting system to check training and driving licence of lorry drivers and to report and investigate all collisions of project vehicles

- f. Use of lorries that meet current best environmental practice, including Euro 6 emission standards, where appropriate
 - g. A review and assessment of potential conflicts and hazards that may lead to collisions with construction vehicles on route and accessing the site and confirm mitigation measures.
- 5.2.2 Where necessary, approval of local routes, holding areas and backup routes to be used by construction lorries will be identified in the applicable traffic management plan.
- 5.2.3 The routes between the sites and the Transport for London Road Network and Strategic Road Network will be selected to limit effects on residential properties, businesses and sensitive receptors, such as schools, as far as is reasonably practicable. Where available, this is identified in the *CoCP* Part B.
- 5.2.4 There will be no parking of lorries on the highway in the vicinity of any worksite for lorries waiting to deliver or remove materials from the site, except in specified areas identified in the applicable traffic management plan.
- 5.2.5 The contractor shall 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.
- 5.2.6 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. Only vehicles notified in advance will be allowed on to site. No vehicle queuing to enter site, outside of the site will be allowed unless identified in the applicable travel management plan. Procedures will be established for moving on vehicles to prevent queuing.

5.3 Works within the highway or on a Public Right of Way

- 5.3.1 The DCO will include provisions relating to the carrying out of highway works (including stopping up orders).
- 5.3.2 All temporary closures of highways and public rights of way will be for as short a time as practicable. Pedestrian access to premises will be maintained.
- 5.3.3 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. Any proposed temporary diversionary signage for pedestrians shall be approved by the local planning authority in consultation with the highway authority through the DCO requirements.
- 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 shall:
- a. limit the need for diversions of public rights of way, cycle routes or National Trails (including the Thames Path)
 - b. limit the length of any necessary diversions of the above
 - c. limit the length of time diversions are in place
 - d. place controls to ensure the safety of pedestrians and cyclists if they need to cross a haul route
 - e. provide 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 requirements, as far as practicable and in the context of the route that is being closed temporarily.
- 5.3.6 The design and operation of the works will take into account people with reduced mobility.

Relevant Requirements

- 5.3.7 Project-wide Requirement PW11 (Signage for temporary diversions) should also be read in conjunction with the above.

5.4 Road cleanliness

- 5.4.1 All reasonable 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 will 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. This will be available to respond to emergencies within 1 hour
 - f. the flushing of gullies in the vicinity of the site
 - g. the contractor is responsible to ensure concrete supplies do not spill on journeys to site, and any spills are adequately cleaned up.
- 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 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 condition it was before the works or to a standard acceptable by the relevant 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 project works, in consultation with the highway authority. The locations where surveys will be undertaken will be identified in the traffic management plan. The highway authority will be notified of surveys and may send a representative to agree the survey if it wishes.

5.6 River transport and works

5.6.1 The *CoCP* establishes the framework within which project related river transport and works will be controlled. The *CoCP* will be considered as a high-level document which will foster the production of further information at a site-specific level. The *HSSE standard* and *CoCP* Part B, where applicable, will give further details of any site-specific requirements such as moorings, loading facilities, navigational aids and signage.

5.6.2 The contractor shall ensure that legal requirements for works affecting navigational channels are implemented and will undertake the works in such a way as to maintain existing navigational channels during construction through liaison with the PLA and in accordance with navigational risk assessments.

5.6.3 The contractor shall carry out the works in such a manner as to limit undue inconvenience to the public and other river users arising from increased barge movements.

5.6.4 For each relevant worksite proposals for the management of river transport will be produced. These proposals will be put forward further to the protective provisions in the DCO and the related legal agreement with the PLA and other river regulators (ie, EA, MMO), and further to the sustainable freight transport provisions of the transport strategy.

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

5.6.6 The river transport management plan will include assessment of risks to recreational and commercial river users, and details of mitigation measures that will be considered.

Relevant Requirements and controls

- 5.6.7 In addition to those noted above, where river transport is proposed at work sites, requirements have been proposed that require Method Statements and Navigation Risk Assessments to be submitted and approved by the PLA. eg, Requirements PUTEF5, DRMST3, CREWD6, CHEEF10, KRTST2, HEAPS2, ALBEF11, VCTEF13, BLABF16, CHAWF6 (Works in the River). Project wide requirement PW13 (Excavated Material and Waste) is also of relevance.
- 5.6.8 The following sets out the Deemed Marine Licence conditions proposed that have relevance to river transport:
- a. Condition 5: Notification of commencement of works
 - b. Condition 13: Construction Environment Management Plan
 - c. Condition 20: Construction Vessels.

5.7 References

- a. Highways Act 1980
- b. New Roads and Street Works Act 1991
- c. Traffic Management Act 2004
- d. Road Traffic Regulation Act 1988
- e. Town and Country Planning Act 1990
- f. Disability Discrimination Act 2005

Design standards

- a. Traffic signs Regulations and General Directions 2002
- b. Department for Transport - Chapter 3 Traffic Signs Manual
- c. Department for Transport - Chapter 5 Traffic Signs Manual
- d. Department for Transport - Chapter 8 Traffic Signs Manual
- e. Department for Transport - Safety at street works and road works - a code of practice
- f. Department for Transport - Guidance on the use of tactile paving surfaces
- g. Department for Transport – Design Manual for Roads and Bridges

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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 and for the production of further information at a site-specific level. The *CoCP* Part B identifies any site-specific requirements such as restrictions on noise generating activities (including mitigation), or working hours, activities and locations requiring further detailed consideration. Section 61 applications may seek variations in the working hours specified in the *CoCP* Part B in the light of the contractors detailed working methods.
- 6.1.2 The appeals process in the CoPA1974 (Sections 60(7) and 61(7) has been changed by the Development Consent Order (Article 55, Schedule 19, Part 1, para. 14, Schedule 17, para. 4(1)(b)). The contractor shall be responsible for any appeals under the DCO in relation to Sections 60 and 61 of the CoPA 1974.
- 6.1.3 contractors will be required to submit to the local authority, applications for Section 61 consents, variations and dispensations under the CoPA 1974 for all construction activities that may generate a noise effect, including tunnelling, unless agreed with the relevant local authority. Activities that typically do not require a Section 61 consent include those which do not have significant noise and vibration impact, such as utility connections, existing sewer modifications, footpath crossovers, and traffic management schemes.
- 6.1.4 The contractor shall employ Best Practicable Means (BPM), as defined under Section 72 of the CoPA, are employed at all times to all activities, to minimise noise and vibration from the works.
- 6.1.5 The contractor shall assess, consider and implement mitigation in the following order:
- a. BPM, including:
 - i noise and vibration control at source - for example the selection of quiet and low vibration equipment, review of construction programme and methodology to consider quieter methods, location of equipment on site, control of working hours (see Section 5.2), the provision of acoustic enclosures and the use of less intrusive alarms, such as broadband vehicle reversing warnings;
 - ii screening - for example local screening of equipment, perimeter hoarding or the use of temporary stockpiles;
 - b. if the noise exposure is still predicted to exceed the criteria defined in table 6.1, the contractor shall propose noise insulation; or ultimately temporary re-housing.
- 6.1.6 Typical generic noise and vibration suppression measures to be employed are included in Section 6.4 and will be adopted on all sites where

applicable. Agreement of proposed measures will be sought from the local authority through Section 61 consent, dispensation or variation applications.

- 6.1.7 Notification of the start of works and the provision of advanced information to local stakeholders is a key part of mitigating the effect of noise and vibration.
- 6.1.8 The contractor shall take into account statutory requirements in respect of noise and vibration (refer to Section 6.8) as well as the guidance set out in the Mayor's Ambient Noise Strategy (Greater London Authority, 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 shall carry out the works in such a way as to limit 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 standard working hours has been assessed in the *Environmental Statement*, and defined in the *CoCP Part B*, and will be confirmed in any Section 61 application (consent, dispensation or variation).

Section 61 consents

- 6.2.4 Before any works are undertaken which may generate noise effects, the contractor shall seek to obtain from the relevant local authority consent under Section 61 of the CoPA.
- 6.2.5 The Section 61 application 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 Section 61 application for the tunnel drive sites will include predictions and an assessment of ground borne noise and vibration from the tunnel boring machine and the temporary construction railway. Separate Section 61 applications are required for each local authority the tunnel passes through.
- 6.2.7 The contractor shall engage in early discussions with the local authorities with respect to the information to be provided prior to submitting any Section 61 applications. This will include a list of the activities/stages for which separate Section 61 applications will be required. This is to enable all parties to focus on and agree those activities that could give rise to noise complaint and the most efficient approach to the Section 61 consent, dispensation or variation.
- 6.2.8 As required by the CoPA, BPM will be employed and demonstrated through programme, method and noise predictions to the local authority in the Section 61 consent application.

- 6.2.9 Justification, detailed description and assessment will be provided for activities outside standard working hours.

Section 61 consents: Dispensation/variation

- 6.2.10 In the event that works for which an Section 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 Section 61 consent submission, the contractor shall apply for a dispensation or variation from the appropriate local authority, in advance of the start of those works, at the time specified within the CoPA. 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 Appendix A.
- 6.2.11 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 shall apply to the relevant local authority using the Section 61 process, 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.
- 6.2.12 Where working outside standard hours has been discussed and approved in a Section 61 consent, 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).
- 6.2.13 The contractor shall be required to maintain an up to date log of all relevant agreed hours and controls on working. This will incorporate any changes to working hours or practices set out in the *CoCP* Part B which have been agreed through the Section 61 process.

Unscheduled overruns

- 6.2.14 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 local authority and the employer as soon as possible, and records kept by the site management.
- 6.2.15 The local 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, employer and relevant local authority, with the aim of reducing the potential for further unplanned overruns.
- 6.2.16 In the case of work required in response to an emergency (or which, if not completed, would be damaging or unsafe), the relevant local authority 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 Where a Section 61 consent is to be sought, before starting any construction activities which may cause noise and/or vibration, the contractor shall, using the format in Appendix A, or as agreed with the local authority, prepare and submit to the relevant local authority 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 standard 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 supported by calculations as per the methodology in BS 5228 part 1 and part 2
 - 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 nearby Thames Tideway Tunnel construction works.
- 6.3.2 The number, extent (geographically and in terms of construction activities) and duration of Section 61 approvals will be the subject of timely consultation between the contractor and each local authority.
- 6.3.3 Where works are near local authority boundaries but noise from the construction activities could cause disturbance in a neighbouring authority, the Section 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 local authorities will be consulted in advance of the works to determine the need for any additional measures.
- 6.3.4 Where the works are to be undertaken on the boundary within two local authorities, 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 local authority.
- 6.3.5 Further information and good practice guidance for the development of consent applications is included in Appendix A.

6.4 Noise and vibration control measures

Noise

- 6.4.1 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, 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 (refer to also Section 5)
 - e. careful programming so that activities which may generate significant noise are planned with regard to local occupants and sensitive receptors.
- 6.4.2 Specific measures to be employed will be based on best practicable means 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 (pressed in piling where possible)
 - e. breaking out concrete by means other than percussion
 - f. handling materials in a manner which minimises noise
 - g. limiting noise generation of river based plant, vessels and transport.
- 6.4.3 The following items of fixed plant will be contained within a suitable noise enclosure: pumps, generators, compressors, concrete batching plant, water settlement and waste water plant, and grout plant. This measure will only be required where the plant does not already have sufficient in built noise attenuation:
- a. 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 are limited
 - ii 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

- b. 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
 - iii track passing locations (including joints and switches) will be located away from sensitive surface receptors. In addition speed restrictions may also be required
- c. 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, including enclosures or screening
- d. reversing alarms: the contractor shall manage the noise from reversing alarms by means of the following:
 - i The site layout will be designed to limit and where reasonably practicable, avoid the need for the reversing of vehicles.
 - ii A banksman will be utilised to avoid the use of reversing alarms.
 - iii Reversing alarms incorporating one or more of the features listed below or any other comparable system will be used: highly directional sounders, broad band signals, self-adjusting output sounders, flashing warning lights.
 - iv Reversing alarms will be set to the minimum output noise level required for health and safety compliance.
- e. for temporary working areas including works within highways, the use of noise barriers or enclosures for machinery.

6.4.4 All noise and mitigation proposals within the CoCP Part A and Part Bs are subject to modification if accepted by the local authority under the Section 61 consenting process.

Underwater noise and vibration

6.4.5 The contractor shall be required to control vibration generating activities (particularly 'in-river' works such as pile installation and removal, installation of jetties, cofferdams, and campsheds) with regard to protecting fish. A piling method statement will be provided and agreed with the employer in consultation with the EA, and the PLA. The method statement will specify the type of piling technique proposed, with justification as to why the technique has been chosen, mitigation measures and timing of the piling works.

6.4.6 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. For vibro and percussive piling, the following will be applied:

- a. avoiding piling at night to ensure free windows of opportunity for no disturbance within each 24-hour period
- b. limiting 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 noise and vibration measurements at prescribed points and intervals
- d. where technically feasible, utilising low noise/vibration cofferdam or pile/pier installation techniques, such as pressing or vibro piling rather than impact/percussive piling.

- 6.4.7 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.
- 6.4.8 In the event that in-river percussive piling is needed, prior approval from the employer in consultation with EA will be required.
- 6.4.9 Toolbox talks will be provided to raise the skill level and competence of staff and labour undertaking piling works, of the need to consider noise and vibration impacts on aquatic ecology.
- 6.4.10 Where predictions indicate that best practice limits would not be achievable, the underwater noise-generating activities will be confined to outside peak fish migration periods, unless otherwise agreed with the employer in consultation with the EA.

Vibration

- 6.4.11 The contractor shall use BPM to minimise vibration generated by the works in order to:
- a. avoid adverse effects on vibration sensitive equipment
 - b. limit disturbance to residents and other users of buildings close to the works
 - c. protect buildings from physical impact, if it is not reasonably practicable to avoid very high levels of vibration.
- 6.4.12 The contractor shall use BPM to limit the effects of vibration on people, buildings and vibration-sensitive equipment. Appropriate control measures will be agreed with the local authority through the Section 61 process. In establishing criteria, controls and working methods, the contractor shall take account of guidance in BS 6472, BS 5228 and BS 7385. At a minimum, the criteria used for assessment in the *Environmental Statement* will be adopted.
- 6.4.13 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 Section 61 consent, dispensation or variation will be agreed with the local authority in advance of submitting the consent application. The predictions will 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.

- 6.4.14 For the protection of buildings from damage, the contractor shall need to carry out vibration predictions and act on the results of the predictions and/or measurements.
- 6.4.15 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 Section 61 application.

6.5 Noise insulation and temporary re-housing

- 6.5.1 The contractor shall provide noise insulation or organise temporary re-housing when instructed to do so by the employer. The employer is solely responsible for determining and instructing when the policy is to be enacted, based on the contractor's detailed methods of construction. It should be noted that this process is not part of the Section 61 consent process, and as such it is to be carried out in parallel.
- 6.5.2 The *Noise insulation and temporary re-housing policy* has been developed to provide additional protection for residential property in the event that it is not practical to mitigate construction noise on site, or reduce its exposure durations to tolerable levels. In the event of differences, the requirements of the policy will take precedence over this section of the *CoCP*.
- 6.5.3 Where, in spite of the measures set out in this *CoCP* and any Section 61 consents, noise levels at affected residential properties are expected to exceed the trigger levels for the periods defined below (Table 6.1), approved noise insulation, (or reimbursement of the reasonable costs thereof), or temporary re-housing of occupants as appropriate, will be offered. Affected parties will be notified in advance of the commencement of works which may cause the relevant trigger levels to be exceeded. Further details on this and the other issues listed below are included in the *Noise insulation and temporary re-housing policy*.
- 6.5.4 Noise insulation or temporary re-housing will be offered to qualifying parties when noise levels are predicted, or measured, to exceed:
 - a. the relevant trigger levels as detailed in Table 6.1; or
 - b. where the current ambient noise level is greater than the noise insulation trigger level:
 - i The ambient noise level will be used as the noise insulation trigger level.
 - ii The ambient noise level +10dB will be used as the temporary re-housing trigger level.

Table 6.1 Noise trigger levels

Day	Time	Averaging period, T	Noise insulation trigger level dB $L_{Aeq,T}$	Temporary re-housing trigger level dB $L_{Aeq,T}$
Mondays to Fridays	0700-0800	1 hour	70	80
	0800-1800	10 hours	75	85
	1800-1900	1 hour	70	80
	1900-2200	1 hour	65	75
Saturdays	0700-0800	1 hour	70	80
	0800-1300	5 hours	75	85
	1300-1400	1 hour	70	80
	1400-2200	1 hour	65	75
Sundays and public holidays	0700-2200	1 hour	65	75
Any day	2200-0700	1 hour	55	65

- 6.5.5 All noise trigger levels are predicted or measured noise levels, at 1m from any affected facade containing windows to bedrooms or living rooms in any property, due to construction noise only.
- 6.5.6 Noise insulation (or the reasonable costs thereof against agreed bills) will be offered to owners, where applied for by owners or legal occupiers, if all of the following apply to a property lawfully occupied as a permanent dwelling:
- The predicted or measured noise level exceeds the noise trigger level for noise insulation at the property during at least ten days out of any period of fifteen consecutive days or alternatively during 40 days in any six month period.
 - Noise insulation does not already exist that is of an equivalent standard to that which would be allowed for under the noise insulation (railways and other guided systems) regulations 1996.
 - The property complies with all other requirements of the noise insulation (railways and other guided systems) regulations 1996.
- 6.5.7 Temporary re-housing (or the reasonable costs thereof) will be provided, where applied for by legal occupiers, if both of the following apply to a permanent dwelling:
- The predicted or actual noise level exceeds the noise trigger level for temporary re-housing at that property for at least ten days out of any period of 15 consecutive days or alternatively 40 days in any six month period.
 - The property complies with all other requirements of the noise insulation (railways and other guided systems) regulations 1996.
- 6.5.8 The *Noise insulation and temporary re-housing policy* is primarily applicable to residential buildings but non-residential buildings will be

considered where these are occupied by noise sensitive uses such as hospitals and educational establishments on a case by case basis.

- 6.5.9 It may not be practicable to install noise insulation to achieve the required standard to some lightweight dwellings, including houseboats and residential caravans. Where noise insulation is not practicable, the temporary relocation of caravans or houseboats to an alternative site (or the reasonable costs thereof) will be provided if the property would otherwise be eligible for noise insulation under this *CoCP* provided that these residences were legally occupied as permanent residences on or before 16 July 2012 when the employer's Section 48 notice was published.

6.6 Noise and vibration monitoring

General statement

- 6.6.1 The need for noise and vibration monitoring and potential monitoring locations will be identified in the Section 61 application, and will be the subject of discussion between the contractor, the employer and the local authority prior to submission of the Section 61. Monitoring data will be made available to the local authority weekly, or at an agreed frequency.
- 6.6.2 The contractor shall need to adhere to any site-specific noise and vibration monitoring related conditions imposed by the local authority.
- 6.6.3 Noise and vibration monitoring will take the form of:
- off-site noise and vibration monitoring to demonstrate compliance with levels in the Section 61 consent application
 - on-site noise and vibration monitoring to demonstrate compliance with plant levels in the Section 61 consent application
 - on-site surveillance monitoring to demonstrate that the noise and vibration mitigation, methods and assumptions in the Section 61 consent application are being adopted on site.
- 6.6.4 Consent from landowners will be required for the erection of any monitoring equipment.
- 6.6.5 Any incidents of noise limits being exceeded will be reported by the contractor to the employer to forward to the local authority as soon as is practical.

6.7 Suitably qualified persons

- 6.7.1 The person(s) responsible for the development of Section 61 applications and variations, and for the associated noise and vibration calculations and/or monitoring, will demonstrate:
- a summary of training and education relevant to the management of construction noise and vibration
 - experience of the Section 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'.

6.8 References

Relevant acts of parliament/regulations

- a. Control of Pollution Act 1974, Section 61
- b. Construction Plant and Equipment (harmonisation of noise emission standards) Regulations (1989)
- c. Control of Noise (Codes of practice construction and open sites) (England) Order (2002)
- d. Hazardous Waste (England and Wales) Regulations 2005, as amended
- e. Environment Act 1995, as amended
- f. Environmental Protection Act 1990, as amended
- 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
- j. Environmental Permitting (England and Wales) Regulations 2010, as amended
- k. Railways and other guided systems Regulations 1996
- l. Public Health Acts 1936 and 1961.

British standards

- a. BS 5228: 2009 (Parts 1 and 2) Code of Practice for Noise and Vibration Control on Open Construction Sites, British Standards Institution
- b. BS 4142: 1997 Method for rating industrial noise affecting mixed residential and industrial areas, British Standards Institution
- 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

- a. GLA 2004. 'Sounder City'. The Mayor's Ambient Noise Strategy. Greater London Authority (March 2004).

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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.
- 7.1.2 The contractor shall prepare and implement an Air Quality Management Plan for each worksite. The air quality management plans will include an inventory and timetable of emission and dust-generating activities, details of appropriate control measures and arrangements for dust monitoring, with particular regard to the location of sensitive receptors, and including monitoring equipment to be used. The air quality management plan shall be approved by the relevant local authority and the employer prior to construction works commencing.
- 7.1.3 The air quality management plans must include all the appropriate dust and emissions mitigation measures, from the Best Practice Guidance (BPG), *The Control of Dust and Emissions from Construction and Demolition* published by the Greater London Authority and London Councils in November 2006 (BPG, 2006, or the Supplementary Planning Guidance (SPG) when published) for the worksite to which it relates.

7.2 Vehicle and plant emissions

- 7.2.1 The contractor shall ensure that the adverse effects of vehicle and plant emissions are controlled utilising the measures contained within the BPG/SPG. Measures to be employed for limiting emissions and avoiding nuisance will include the following as a minimum:
- a. ensuring that the engines of all vehicles and plant onsite are not left running unnecessarily
 - b. using low emission vehicles and plant (so as to comply with particle emission limits)
 - c. minimising movement of construction traffic around the site in both site layouts and routine operations
 - d. implementing operational procedures for tugs and other river transport that consider emissions and include methods to reduce them where practical.

7.3 Dust emissions

- 7.3.1 The contractor shall 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 there

under, including the Control of Substances Hazardous to Health Regulations (SI 2002/2677).

- 7.3.2 The contractor shall design and implement appropriate measures to limit the impact of dust.

7.4 Dust control

- 7.4.1 The contractor shall 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 required, with the techniques used in line with the BPG/SPG 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, or complaint arising from dust. This will include appropriate liaison with the relevant local authority, and will be consistent with relevant legislative requirements.

- 7.4.3 The contractor's dust control procedures need to consider periods of drought.

Standard dust control procedures on all sites

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

- a. measures to reduce dust formation
- b. measures to reduce dust re-suspension
- c. measures to control dust present
- d. measures to reduce particulate emissions
- e. measures to ensure road cleanliness (refer to Section 5.4)
- f. monitoring and recording of dust-generating activities
- g. site based training (eg, induction and toolbox talks to raise skill level and competence of staff and labour)
- h. measures to control dust from demolition.

Additional dust control procedures on main drive sites

- 7.4.5 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 BPG for the most high risk sites (high risk refers to the likelihood of dust generation).

- 7.4.6 The additional dust control procedures will include, as appropriate measures such as:

- a. additional screening of dust-generating activities
- b. sealing of dust-generating surfaces
- c. full time road sweepers

- d. any specific monitoring requirements (and will be confirmed in the relevant *CoCP* Part B).

7.4.7 Techniques such as total enclosure of certain operations to protect vulnerable receptors will 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 and particulate monitoring

7.5.1 The contractor shall ensure that dust and particulate monitoring will be carried out on project 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 local authority. Where works are near to more than one local authority boundary, the monitoring locations will be agreed with each local authority for their respective areas.

7.5.2 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 all sites. This will be determined, where specifically required, for a twelve-month period (or for a shorter period if agreed with the employer in consultation with the relevant local authority), derived from data sourced from local background PM₁₀ concentrations measured by the Automatic Urban and Rural Network (AURN) monitoring sites, and appropriate local authority automatic monitoring sites.

7.5.4 The contractor shall 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/local authority sites.

7.5.5 During construction, continuous particulate monitoring will be undertaken using appropriate survey instruments at locations agreed with the local authority.

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 practicable investigate activities on the site to ascertain if any visible dust is emanating from the site, or activities are occurring that are not in line with dust control procedures.
- b. Any identified causes will be rectified where practicable. Actions will be recorded in the site logbook and the relevant local authority notified

of the event and actions by telephone or email, as soon as practicable, after or during the dust event.

- c. If no source of the dust event is identified, other project sites and local authority or AURN monitoring sites will be contacted to establish if there is a wider area increase in particulate concentrations.
- d. If the cause of the alert is not related to site operations, the outcome of any investigation will be recorded in the site logbook and reported to the relevant local authority at an appropriate time.

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 with the local authority in whose area the worksite is situated and agreement with the employer.

7.6 Odours

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

7.6.2 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.

7.7 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, as amended
- d. Clean Air Act 1993
- e. Pollution, Prevention and Control Act 1999
- f. Environmental Permitting (England and Wales) Regulations 2010, as amended
- g. Department for the Environment Food and Rural Affairs. Air Quality Strategy for England, Scotland, Wales and Northern Ireland (July 2007)
- h. The Control of Substances Hazardous to Health Regulations 2002 (SI 2002/2677)
- i. Buildings Research Establishment. Controlling particles, vapour and noise pollution from construction sites, parts 1 to 5 (2003)
- j. Greater London Authority and Mayor of London's guidance. The Control of Dust and Emissions from Construction and Demolition – Best Practice Guidance (2006)
- k. Control of Asbestos Regulations 2006 (SI 2006/2739)

- i. Asbestos (Licensing) Regulations 1983 (SI 1983/1649), as amended in 1998 (SI 1998/3233)
- m. *Asbestos: The survey guide* (HSG 264), 2010. Health and Safety Executive
- n. Hazardous Waste (England and Wales) Regulations 2005, as amended.

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8 Water resources

8.1 General

- 8.1.1 The contractor shall undertake the works and implement working methods to protect surface water and groundwater from pollution and other adverse impacts, including change to flow, flood storage volume, water levels and quality. The contractor shall protect the integrity of the flood defences. This will be completed in accordance with relevant legislative requirements and industry guidance.
- 8.1.2 The contractor shall, within its CEMP, include detailed arrangements in accordance with relevant legislation (including, but not limited to the Water Resources Act 1991, the Environmental Permitting Regulations 2010 and the Land Drainage Act 1991) to obtain EA approval for works which could affect any surface water or groundwater resource or any flood defences. These arrangements will need to include the discharge of waters from construction sites to any water courses as well as any works that are required within 16m of a flood defence asset.
- 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. This will be approved by the employer in consultation with the EA. 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 emergency preparedness plan and pollution incident control plan, detailed in Sections 4.9 and 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 Sustainable methods for discharges including site drainage, surface runoff, and dewatering discharges will be utilised. This includes discharge to water courses subject to water quality and rate of discharges and scour assessments. For discharges to mains foul or combined sewers relevant permissions will be obtained from the statutory undertaker. Discharge to watercourses will insofar as not dealt with in the DCO will only be permitted where permits or other relevant approval has been obtained. Sufficient time will be made for the EA to issue permits in accordance with relevant legislation.
- 8.2.2 The contractor shall ensure that the site drainage meets the effluent and flood risk standards required by the sewerage undertaker and 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 shall ensure that access is provided to the undertaker and EA so that samples of discharge can be obtained and analysed, and the flows verified as required.

- 8.2.3 All temporary hardstanding, as far as reasonably practicable, on non-foreshore sites will incorporate permeable surfacing unless there is a risk of ground/water pollution from contaminates.
- 8.2.4 Any discharge to sewers and controlled waters will be required to be in accordance with the DCO provisions, having regard to the relevant licensing body's requirements.
- 8.2.5 Water flows from sites will be limited during construction to existing runoff rates, unless otherwise agreed with the EA in accordance with relevant legislation.
- 8.2.6 The relevant sections of British Standard 6031: Code of Practice for Earthworks for the general control of site drainage will be followed.

Relevant Requirements

- 8.2.7 In addition to those noted above, site-specific Requirements are proposed to secure the detailed design of the surface water drainage proposal. [eg, ACTST10 and HAMPS7 (Surface Water Drainage)].

8.3 Protection of watercourses

- 8.3.1 The contractor shall seek to control flood risk to appropriate levels set by the EA, using mitigation, compensation and/or monitoring where required. Insofar as it is not dealt with in the DCO, approval will be obtained in advance for all crossings of, diversions to, and work affecting watercourses from the EA. Sufficient allowance will be made for the EA to issue land drainage consents. Insofar as it is not dealt with in the DCO, appropriate protective provisions will be agreed with the EA for works under, over or within a river channel and within 16m of a tidal river and 8m of a non-tidal river.
- 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.
- 8.3.4 Measures will be taken to prevent the deposition of silt or other material in 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 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 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 PLA controlled water bodies, where the PLA guidelines will be applied, sediment plumes from dredging in inland waterways, including

those under control of the Canal & River Trust, 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. In addition, relevant EA guidance will be followed, including the following:

- a. General guide to the prevention of pollution: PPG 1
- b. Pollution prevention guidance for working at construction and demolition sites: PPG 6
- c. Vehicle washing and cleaning: PPG 13
- d. Dewatering of underground ducts and chambers: PPG 20
- e. Incident response planning: PPG 21
- f. Storage and handling of drums and intermediate bulk containers: PPG 26.

8.3.6 Measures will be taken with regard to 'in-river' works to limit the release of suspended sediment and solids into the water column.

8.3.7 For works where materials are being loaded and unloaded on the river, the contractor is required to establish suitable management arrangements and mitigation measures so as to prevent spillage of transferred materials. This includes design of conveyor systems, enclosures, conveyor belt scrapper locations and selection of other loading equipment. Monitoring methods and contingency arrangements are to be included in the river transport management plan (Section 5) and emergency preparedness plan (Section 4.9).

Relevant Deemed Marine Licence conditions

8.3.8 The following sets out the Deemed Marine Licence conditions proposed that have relevance to the protection of watercourses. They are as follows:

- a. Condition 5: Notification of commencement of works
- b. Condition 13: Construction Environment Management Plan
- c. Condition 14: Concrete and Cement
- d. Condition 15: Coatings and Treatment
- e. Condition 16: Spills (protection and procedures).

8.4 Control of pollution of surface water

8.4.1 The contractor shall ensure that protection measures to control the risk of pollution to surface water will be adopted and will include:

- 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 (or drip trays for small containers) with a capacity of 110% of the maximum stored volume.

Areas for transfer of contaminating substances (including refuelling areas) will be similarly protected.

- b. Any permanent oil storage tanks and temporary storage of over 200 litres of oil in drums and mobile bowzers, and ancillary pipe work, 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 or SPZ 2 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.
- d. Above-ground pipework will be properly supported, and underground pipework will be protected from physical damage and have adequate leakage detection; and all mechanical joints on oil pipes must be easy to inspect. Oil and hydrocarbon underground pipes will not extend into the groundwater saturated zone, unless approval is obtained from the employer, with risk acceptably mitigated.
- e. All refuelling, oiling and greasing will take place above drip trays or on an impermeable surface (eg, plant nappy) 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 and plant 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 (including wheel washing) and equipment will take place in designated areas, and wash water will be prevented from passing untreated into watercourses and groundwater and will comply with PPG 13.
- h. PPG 23 will be followed when carrying out maintenance of structures over water. Where 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 shall ensure that protection measures to control the risk of pollution to groundwater are included within the CEMP; these will, in particular, be consistent with the Environmental Permitting (England and Wales) Regulations 2010. The CEMP will address the items in Section 8.4.1 as well as 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 contractor shall 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. Measures will be put into place to prevent contaminated run off reaching open ground.
- 8.5.2 The contractor shall 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 (England and Wales) Regulations 2009 (*“The input of hazardous substances to groundwater will be prevented, and the input of non-hazardous pollutants will be limited to ensure that they do not pollute groundwater”*).
- 8.5.3 The materials to be used for construction within the lower aquifer will be agreed with the EA.
- 8.5.4 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 on-going 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 and adverse impact on water resource. However, at any particular abstraction, there will be a residual risk that the water quality may deteriorate, such that the abstractor may no longer use the water for the current or licensed purposes. The following precautionary actions will be applied, where applicable, 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 will 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 shall arrange any 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 shall contact the

relevant abstractor (licence holder and operator) and the EA as soon as practicable. The contractor shall put in place appropriate emergency measures to overcome the adverse impact where this has resulted from the project 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 will be arranged as appropriate.

- 8.6.2 The contractor shall 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 (refer to Section 8.8). The Environmental Permitting (England and Wales) Regulations 2010, as amended, apply to discharges of water to surface waters that are controlled waters. Discharges to groundwater are generally excluded from these regulations.

8.7 Flooding

- 8.7.1 The contractor shall be responsible for obtaining from the EA updated modelled water levels (for the 1 in 200 year return period event including climate change) as well as updated information on the required standard of protection of the flood defences.
- 8.7.2 The contractor shall ensure that flood risk is managed safely throughout the construction and implementation period, and that all designs are compliant with the Flood Risk Assessment included in the *Environmental Statement*, and include the provision of a safe refuge during a flood event. 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.
- 8.7.3 The contractor shall 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 Flood Risk Assessment. This is a requirement of the Metropolis Management (Thames River Prevention 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 appropriate protective provisions will be agreed with the EA, in accordance with relevant legislation, for any works within 16m of the Thames tidal defence alignment, under the Water Resources Act 1991 and Thames Region's Land Drainage Bylaws. The existing standard protection will not be reduced even if it is above the statutory defence level.
- 8.7.4 The contractor shall 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 Flood Risk Assessment. This will 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 will be located within elevated parts of the site, away from potential flow paths. If this is not possible, other appropriate protection measures will be incorporated.

- 8.7.5 The existing flood defences are required to be monitored for stability for surface construction works, tunnelling, dewatering, filtration and river works. Reference should be made to Section 13 on third-party impact and settlement.
- 8.7.6 The contractor shall assess potential build-up of groundwater on the upstream side of below ground structures, as this may lead to rise in groundwater levels and in severe occurrences of groundwater flooding, and mitigate where appropriate. At the end of construction where temporary support, such as sheet piling and secant piles, do not form part of the operational structure, pile walls where required will be removed, cut-down or piped through routes provided to prevent the potential build-up of groundwater.

8.8 Dewatering

- 8.8.1 The following provisions will apply to groundwater dewatering activities:
- a. Records of water pumped (volume and quality to sewer and/or watercourse) will be kept at all dewatering sites where wells are constructed in the lower aquifer, or as required under the terms of a permit.
 - b. Water quality at all dewatering sites will be monitored, applying a risk-based check and audit sampling approach appropriate to the location of operation. Monitoring will comprise laboratory testing and field tests required under the conditions of a permit. Monitoring may need to be agreed at locations where a permit is not required. Any contamination observed will be recorded, notified and proposals for disposal agreed.
 - c. Visual inspection at an agreed frequency of the discharged water will be carried out to ensure excessive suspended solids are not present in the discharge. Pumping will cease immediately (without risk to site personnel and equipment) if polluted discharge is noted. The frequency will be approved by the employer and will be included within the water management plan.
 - d. Discharge rates and location of discharge point to be approved by the employer and the EA, and in consultation with the PLA, to minimise impact of scour within the receiving watercourse.
- 8.8.2 Monitoring arrangements for dewatering will be in accordance with the Groundwater monitoring strategy included in the employer's *Environmental Statement*, which is secured by DCO requirement PW14.
- 8.8.3 Any site-specific monitoring arrangements outside of the limits of land to be acquired or use will be approved by the employer in consultation with relevant parties.

- 8.8.4 Dewatering operations for cofferdams and in-river structures need to consider fish rescue arrangements. To the extent that it is not dealt with in the DCO, prior written consent from the EA is required under the Salmon and Freshwater Fisheries Act, 1975, to net or trap fish, or introduce fish into a water course.

8.9 Ground treatment

- 8.9.1 The ground conditions at sites principally in the central and eastern parts of the proposed development may require ground treatment techniques. Ground treatment may be required at both main tunnel 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 The effects of ground treatment on the stability and integrity of adjacent structures, such as river walls, is required to be assessed.
- 8.9.3 Any materials and methods used for ground treatment will be approved by the EA before being used. The contractor shall maintain a list of the products authorised for use.
- 8.9.4 Site-specific monitoring proposals for those sites where ground treatment will be used, will be approved by the EA in consultation with relevant parties. This includes groundwater quality monitoring around grouting areas and visual inspection of adjacent watercourses, where relevant.

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 employer's *Environmental Statement* or site investigation work will be adopted.
- 8.10.2 Where discharge to water courses is permitted monitoring of groundwater levels and groundwater quality at appropriate down hydraulic gradient locations will be undertaken.
- 8.10.3 The dewatering activities and other construction 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.

- 8.10.4 The contractor shall provide monitoring details defined within the design, the scope of works and construction method submissions for approval by the EA.

8.11 Dredging

- 8.11.1 Dredging will be undertaken in accordance with any dredging licences and required permissions (Port of London Act 1968, Marine and Coastal Access Act 2009) from the PLA, the MMO and EA to ensure stability of defence walls is not affected, and for ecological requirements and compliance with the Water Framework Directive.
- 8.11.2 To the extent that it is not dealt with in the DCO, appropriate protective provisions will be agreed with the EA for works within 16m of a tidal river and 8m of a non-tidal river.
- 8.11.3 The contractor shall follow PLA guidance for dredging in the Thames Tideway and its tributaries. The critical period of June to August for dredging when juvenile fish are using nursery habitats will be avoided, unless agreed otherwise with the employer in consultation with relevant stakeholders. This will be achieved through programming capital dredging outside this period, and implementing a monitoring programme to identify future maintenance dredging. There will be sufficient monitoring of the river morphology and maintained depth at any berths will be in place to avoid emergency dredging requirements within the critical period. Where practicable, the contractor shall undertake a single maintenance dredge prior to the critical period.
- 8.11.4 The contractor may need to undertake emergency dredging within the critical period of June to August. Emergency dredging is defined as 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.
- 8.11.5 Dredging will be undertaken using techniques that limit the dispersal of intertidal sediments, such as a back hoe dredger. Where dredging could lead to exceedence of the Probable Effects Level, dredging will be undertaken using a method, such as with an enclosed bucket on the backhoe, to minimise sediment loss and thus mobilisation of contaminants.
- 8.11.6 Where sites that may require dredging lie within the stretch of the river known to support spawning habitat for smelt and dace, careful regard will be given so as to limit any impact on biodiversity within the river and the Salmon and Freshwater Fisheries Act 1975.
- 8.11.7 The restricted period for dredging (ie, June to August) may need to be extended to include the spring period (ie, March to May) at sites lying close to known spawning areas or areas with fresh water riverine species. These sites are listed within the *Environmental Statement*.
- 8.11.8 Dredging works excludes local bed levelling for installation and maintenance work on or around temporary campshed areas. However, the contractor shall assess these activities for the potential to release

sediment, and the construction method will be required to control this, otherwise a dredging license will be required in accordance with relevant legislation (Port of London Act 1968, Marine and Coastal Access Act 2009).

Relevant Deemed Marine Licence conditions

- 8.11.9 Condition 8 states that prior to dredging activities starting, details of that activity shall be submitted to and approved by the the MMO, following consultation with the PLA and the EA.

8.12 References

- a. Water Framework Directive
- b. Water Resources Act 1991, as amended by the Environment Act 1995
- c. Water Resources Act 1991
- d. Water Act 2003
- e. British Standard: Code of Practice for Earthworks. BS 6031:2009
- f. 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
- g. CIRIA C532 Control of water pollution from construction sites: Guidance for consultants and contractors
- h. CIRIA/EA Joint Guidelines: Concrete Bunds for Oil Storage Tanks
- i. CIRIA/EA Joint Guidelines: Masonry Bunds for Oil Storage Tanks
- j. EA Guidance Note: Piling into Contaminated Sites
- k. The Groundwater Regulations 1998 (SI 1998/2746). Control of Pollution (Oil Storage) (England) Regulations 2001 (SI 2001/2954)
- l. The Control of Substances Hazardous to Health Regulations 2002 (SI 2002/2677)
- m. The Groundwater (England and Wales) Regulations 2009, No. 2902
- n. The Environmental Permitting (England and Wales) Regulations 2010, as amended
- o. The Water Resources (Environmental Impact Assessment) (England and Wales) Regulations: Statutory Instrument 2003/164
- p. The Environmental Protection (Prescribed Processes and Substances) Regulations: Statutory Instrument 1991/472

- q. Environmental Protection Regulations 2010
- r. Thames Region Land Drainage Bylaws, 1981, as amended 1991
- s. Salmon and Freshwater Fisheries Act 1975.

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9 Land quality

9.1 General

- 9.1.1 The contractor shall 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 shall develop mitigation measures in accordance with these regulations and the HSE requirements for contractors.
- 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 local authority. 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 shall assess for invasive plants, and use associated guidance as detailed in Section 11.4.
- 9.1.4 The contractor shall review information available within the *Environmental Statement* relating to contaminated land.

9.2 Site assessment and remedial practice

- 9.2.1 The contractor shall 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 including Model procedures for the Management of Land Contamination, Contaminated Land Report 11, in accordance with DCO Requirements on contaminated land. Any necessary measures will be approved by the employer, the EA, and the relevant local authority.
- 9.2.2 Where appropriate, specialist site surveys will also include Unexploded Ordnance Surveys which as a minimum would include a site-specific desk study and recommendations for safe methods of work during construction.
- 9.2.3 A set of criteria for site investigation will be developed by the contractor in consultation with the local authority and the EA, 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 will include the following:
- a. The contractor shall liaise with the local authority, the EA and other relevant statutory bodies with a view to addressing their requirements,

and will approve control or protection measures necessary to provide appropriate mitigation with the employer. This may involve the sealing, excavation and disposal of soil or onsite remedial works.

- b. The consolidated European Waste Catalogue 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 this catalogue. This means that contaminated soils may be classified as either hazardous or non-hazardous, 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 shall 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 non-hazardous waste. Onsite remedial works will be carried out under the Environmental Permitting (England and Wales) Regulations 2010, as amended. Re-use of excavated soils will follow the guidance given in the Definition of Waste Industry Code of Practice.
- d. Contamination issues will be recorded in the project health and safety plans, in accordance with the Construction (Design and Management) Regulations 2007, 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 Construction Phase Plan.
- f. The contractor shall undertake specific precautions if materials containing asbestos are present or encountered during works, in order to comply with the Control of Asbestos Regulations 2012 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 shall 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. The Contractor shall provide a watching brief by an appropriately qualified person, throughout the investigation and remediation works.
- i. 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 the employer, EA and the local authority.

9.3 Site works

- 9.3.1 During the site works, and in particular during the initial below-ground works, the contractor shall 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 An on-site watching brief will be undertaken during potentially high risk activities and an 'on call' watching brief for all other activities. Specialist watching brief may include: UXO, contaminated land, occupational health, archaeological and ecological.
- 9.3.3 In the event of such contamination being suspected, works in the immediate area will be made safe and secured, and the event reported via the defined reporting procedure (including the employer and the contractor). The contractor's contaminated land specialist will inspect the site and, where deemed necessary, arrange for further sampling and laboratory testing of soils or liquids. Further risk assessments to receptors will be undertaken as necessary and reported to the employer, the local authority and/or EA.
- 9.3.4 Should unacceptable risks be identified, a revised remediation method statement will be submitted and agreed with the local authority in consultation with the EA.
- 9.3.5 The site induction for construction workers (and visitors if necessary) will 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 will 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.
- 9.3.6 All staff and visitors will be made aware of the requirement to adopt the appropriate personal protective equipment, eg, dust masks, respirators, gloves, etc, and also the observation of good hygiene practices and the avoidance of hand to mouth contact.
- 9.3.7 All staff will be made aware of regulations governing the storage, handling, treatment and disposal procedures for all wastes. In particular, staff will 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.

- 9.3.8 Occupational monitoring, such as gas or vapour monitoring (either personal or work area) and health surveillance will be undertaken. This would include consultation with health and safety/occupational health specialists.
- 9.3.9 Dust and air/vapour monitoring will be carried out to provide a check that volatile contamination or construction dusts do not affect off site receptors. Where appropriate this will include a combination of on-site and boundary monitoring, which would provide either real time measurements or collect samples for subsequent analysis. See air quality section for further guidance on measures to be undertaken.

Relevant Requirements

- 9.3.10 Site specific Requirements have also been proposed for each worksite that would bring forward details of any necessary remediation strategy [eg, ACTST3, HAMPS2 and BAREL3 (Contaminated Land)].

9.4 References

Contaminated land

- a. Environmental Protection Act 1990
- b. The Contaminated Land (England) Regulations 2006 (SI 2006/1380)
- c. CIRIA *A guide to safe working on Contaminated Sites*, Report 132 (1996)
- d. CIRIA *Contaminated Land Risk Assessment: A Guide to Good Practice*, Report C552 (2001)
- e. BSI. *Investigation of Potentially Contaminated Sites. Code of Practice BS 10175* (2011)
- f. Defra/EA *Model Procedures for the Management of Land Contamination* (Contaminated Land Report 11) (September 2004)
- g. CIRIA *Unexploded Ordnance (UXO): A guide for the construction industry (C681)* (2009)
- h. Defra Environment Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (April 2012)
- i. C665 2007, Assessing risks posed by hazardous ground gases to buildings (revised).

Asbestos

- a. Control of Asbestos Regulations 2012 (SI 2012/2675)
- b. Asbestos (Licensing) Regulations 1983 (SI 1983/1649), as amended in 1998 (SI 1998/3233)
- c. Asbestos: Exposure Limits and Measurement of Airborne Dust Concentrations (EH10 and MDHS 39/4). Health and Safety Executive, 1996.

Duty of care

- a. Waste (England and Wales) Regulations 2011.

Waste

- a. The landfill (England and Wales) Regulations 2002 (SI 2002/1559), including Schedule 1: Waste Acceptance Criteria (WAC)
- b. The Hazardous Wastes (England and Wales) Regulations 2005 (SI 2005/894)
- c. EA Technical Guidance WM2: Interpretation and Classification of Hazardous Waste (April 2011)
- d. CLAIRE. Definition of Waste: Redevelopment Industry Code of Practice (2011).

EA 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

- a. Environmental Permitting (England and Wales) Regulations 2010
- b. EC Landfill Directive 1999 (Council Directive 99/31/EC)
- c. Landfill Tax (Qualifying Material) Order 2011 (SI 2011/1017)
- d. The landfill (England and Wales) Regulations 2002 (SI 2002/1559), The Construction (Design and Management Regulations) 2007 (SI 2007/320)
- e. Water Resources Act 1991(WRA 1991)
- f. The Groundwater (England and Wales) Regulations 2009 (SI 2009/2902)
- g. The Animal Health Act 2002, Notifiable Disease Burial Sites
- h. The Control of Substances Hazardous to Health Regulations 2002 (SI 2002/2677)
- i. The Environmental Permitting (England and Wales) Regulations 2010.

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10 Waste management and resource use

10.1 Excavated material options assessment and Excavated material and waste strategy

10.1.1 The employer's excavated material options assessment and excavated materials and waste strategy provides a framework for the management of materials and waste that will be produced throughout the construction and operational phases of the project. The commitments within these documents are set out in the *Excavated Material and Waste Strategy Commitments* document, which is secured by DCO requirement PW13.

Site waste management plan requirements

10.1.2 The contractor shall 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 Site Waste Management Plan Regulations 2008.

10.1.3 An overarching project-wide plan will be produced by the employer and used to ensure a consistent approach to managing the excavated materials and waste at individual construction sites. The project-wide plan will provide a central location for all project waste information. The project-wide plan will:

- a. record the employer's responsible person, as well as the responsible person for each site, provided by the contractor
- b. record the waste types generated by the entire project – initially generated by the employer and, once the contracts are let, by the contractor
- c. provide the details of all waste minimisation actions – initially generated by the employer and, once the contracts are let, by the contractor
- d. provide project-wide waste forecasts for each waste type – initially generated by the employer and, once the contracts are let, by the contractor
- e. contain a complete register of all approved waste carriers and receptor sites for the project, provided by the contractor
- f. contain a summary of the information relating to waste transactions from each site provided by the contractor.

10.1.4 The contractor is required to produce a site waste management plan for each site using the template given in the excavated materials and waste strategy. These plans will feed into the project-wide plan and provide a framework to facilitate and ensure good practice on construction sites and that excavated material and waste is effectively managed, as well as recording and monitoring environmental performance, meeting regulatory control requirements and reducing waste disposal costs.

- 10.1.5 The project-wide plan and the site-specific plans ensure that waste will be managed in accordance with the waste hierarchy.
- 10.1.6 The site-specific plans will identify:
- a. the approach taken to excavated material and waste management taking account of:
 - i the waste hierarchy
 - ii the CL:AIRE code of practiceⁱⁱⁱ, to determine when treated excavated waste can cease to be waste for a particular use
 - iii waste and resource action programme aggregate quality protocol for construction and demolition material
 - iv the potential to reuse material from other projects in London to infill the cofferdams on foreshore sites subject to meeting the delivery requirements in the *Transport Strategy*
 - v using local permitted and exempt sites that can accept, process and recycle construction materials
 - b. a dedicated area at each construction site for the handling and storage of excavated materials
 - c. where the practicable opportunities for the use of material with recycled content during construction will be adopted
 - d. the types of excavated material and waste removed from site, its description and estimated quantities of waste generated
 - e. the authorised waste carrier details and waste carrier registration number
 - f. through segregation, maximise opportunities for the potential for reusing and recycling
 - g. the types of training that will be provided to all site workers on waste management and recycling procedures
 - h. disposal routes and permitting requirements
 - i. details of the site that the waste and/or material will be and was taken to
 - j. details of the environmental permit or exemption held by the receptor site where excavated material will be and was taken.
- 10.1.7 The contractor shall ensure that waste materials are sorted into separate waste groups, as defined in the project-wide plan (according to the waste streams generated by the scope of the works), either onsite or offsite through a licensed contractor for recovery.

ⁱⁱⁱ The voluntary CL:AIRE *Definition of Waste Code of Practice* (CoP) provides a regulator approved framework to determine on a site by site basis whether excavated materials are classified as waste or not and determine when treated excavated waste can cease to be waste for a particular use.

- 10.1.8 On-site hazardous excavated material or waste will be kept separate from other materials and will be removed and managed in accordance with legislation requirements.
- 10.1.9 The contractor shall produce an end of life plan to be agreed with the employer six months before practical completion for all temporary site infrastructures to maximise reuse and recycling opportunities. Information on where temporary site infrastructures have been reused and/or recycled will be included in the site-specific plans.
- 10.1.10 The site-specific plans will be updated (within three months of practical completion of the works) 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 site-specific plans.

Demolition requirements

- 10.1.11 Where demolition forms a part of the works the contractor shall comply with the following:
- a. a review of the existing buildings will be carried out to establish if asbestos is present (refer to Section 10.3)
 - b. complete a demolition reuse plan before demolition to maximise the recovery of material for subsequent high-grade/value applications
 - c. information from the demolition reuse plan will be detailed in the site waste management plan 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.

10.2 Duty of care

- 10.2.1 The contractor shall comply with all legal 'duty of care' requirements 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 March 1996) (except where superseded by changes in waste law made since issue of this Code of Practice in 1996) will be followed, in addition to the obligations under the Waste (England and Wales) Regulations 2011.
- 10.2.2 The site waste management plan 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 site waste management plan.

- 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 management

- 10.3.1 Managing the risk from release of asbestos during alteration and demolition works and excavation work will be carried out in compliance with the regulations and codes of practice. This will be in accordance with the *HSSE Standard*.
- 10.3.2 The Control of Asbestos Regulations 2012 (SI 2012/632) and associated approved codes of practice will be complied with, and asbestos inspection, survey sampling and analysis will be carried out in accordance with *Asbestos: The Survey Guide Health & Safety Executive guidance*, HSG264 (2010).
- 10.3.3 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. a procedure for dealing with potentially suspect materials exposed requiring sampling and analysis by an independent specialist consultant
 - c. all locations of asbestos containing materials will be clearly labelled
 - d. formal exchange of information before start of work, including relevant information from the Asbestos Register to clearly identify location of asbestos containing materials
 - e. method statements for any works in the vicinity of asbestos containing materials, to avoid any disturbance to such materials.
- 10.3.4 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. all locations of asbestos containing materials will be clearly labelled
 - c. ensuring any work with asbestos containing materials is notified to the Health and Safety Executive

- d. ensuring any work with asbestos containing materials is carried out by licensed specialist asbestos treatment contractors in accordance with the Control of Asbestos Regulations 2012 (SI 2012/632)
 - e. method statements defining detailed control measures to be produced by the specialist asbestos treatment contractor and approved by the employer
 - f. air sample monitoring of work to ensure required air quality standards are achieved.
- 10.3.5 Transport of asbestos containing materials will be undertaken in accordance with Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009/1348). Disposal of asbestos containing materials to licensed waste sites in accordance with Hazardous Waste (England and Wales) Regulations 2005, as amended (SI 2005/894).

10.4 Resource use

General

- 10.4.1 Resource will be controlled by the contractors through the use of the following management plans.

Water use

- 10.4.2 The contractor shall produce a water management plan (refer to Section 8), which will include measures to manage and where possible minimise water usage during construction. The water management plan will include:
- a. measuring potable water consumption
 - b. setting targets and reporting water consumption arising from construction activities
 - c. measures for improving water efficiency of site facilities.
- 10.4.3 Alternatives to potable water use on site will be considered.

Energy and carbon

- 10.4.4 The contractor shall produce an energy management plan, containing measures to minimise energy consumption and carbon emissions during construction. The energy management plan will also include ways to:
- a. measure and reduce energy usage
 - b. monitor, report and set targets for carbon dioxide arising from site activities and from transportation to and from the site.
- 10.4.5 The procurement, maintenance and use of construction plant will be shown to have considered energy efficiency.
- 10.4.6 There will be consideration and assessment of energy from renewable and/or low emission sources that has been used during construction.

Material use

- 10.4.7 The contractor shall produce a materials management plan, which will include measures to manage material usage during construction. The material management plan will include ways to:
- a. use sustainably sourced materials (eg, Forest Stewardship Council or PFEC certified timber)
 - b. use recycled or secondary materials
 - c. minimise use of unhealthy materials, which have the potential to harm human health or the natural environment.

10.5 References

Waste

- a. Environmental Protection Act 1990
- b. Waste (England and Wales) Regulations 2011
- c. The Environmental Permitting (England and Wales) Regulations 2010
- d. The Site Waste Management Plans Regulations 2008, Statutory Instrument 2008 No. 314
- e. Site Waste Management Plans – Guidance for Construction contractors and Clients - Voluntary Code of Practice, Department of Trade & Industry (July 2004)
- f. Hazardous Waste (England & Wales) Regulations 2005, Statutory Instrument 2005 No. 894
- g. Waste Management – The Duty of Care, Code of Practice, Her Majesty's Stationery Office (March 1996)
- h. CIRIA guidance
- i. The London Plan, Spatial Development Strategy for Greater London, July 2011.

Asbestos

- a. Control of Asbestos Regulations 2006 (SI 2006/2739)
- b. Asbestos: The Survey Guide Health & Safety Executive guidance, HSG264 (2010)
- c. Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009/1348)
- d. Hazardous Waste (England and Wales) Regulations 2005, as amended (SI 2005/894).

11 Ecology (aquatic and terrestrial)

11.1 General

- 11.1.1 The contractor shall ensure that procedures are implemented to control and limit disturbance and damage to areas of conservation interest, and legally protected and notable species in accordance with the *Environmental Statement*, the ecology and landscape management plan and legislation.

11.2 Procedures

- 11.2.1 The contractor shall prepare a site-specific ecology and landscape management plan using a suitably qualified ecologist, in consultation with the relevant stakeholders, and for approval by the employer. This document will incorporate mitigation measures as set out in the *Environmental Statement* and the *CoCP* Part B where relevant, which give consideration to relevant legislation, and nature conservation policy and guidance, including the Mayor's Biodiversity Strategy and local biodiversity action plans.
- 11.2.2 Where species are protected by specific legislation, approved guidance will be followed and sufficient time will be allowed to obtain the required licences or consents.
- 11.2.3 The contractor shall use a suitably qualified ecologist to undertake site supervision works during activities that would affect sensitive habitats and species, to ensure that the procedures and provisions in the ecology and landscape management plan and the *CoCP* in respect to terrestrial and aquatic ecology are followed. The ecologist will also identify any potential new ecological constraints on site.
- 11.2.4 Site checks for notable and protected species will be undertaken by a suitable qualified ecologist immediately prior to site clearance. The contractor shall implement watching briefs, to be undertaken by the ecologist, during site clearance activities. This is to ensure that any unanticipated discoveries of notable flora and fauna are appropriately dealt with and to ensure legal compliance. In the event that an unanticipated discovery is made, the ecologist/contractor shall seek advice from Natural England, and agree a mitigation strategy to be implemented with the employer.
- 11.2.5 The contractor shall 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. The programme will be included in the ecology and landscape management plan.
- 11.2.6 The contractor shall be responsible for reporting to the employer on any incidents conflicting with agreed procedures.

11.3 Detailed provisions

- 11.3.1 The contractor shall protect habitats including terrestrial, foreshore and river wall, as detailed within the *Environmental Statement*. This includes measures such as site fencing/hoarding to prevent encroachment of works into sensitive habitat areas. The contractor shall undertake landscaping at the end of construction in line with the relevant DCO Requirement, in accordance with the Site works parameter plan and design principles. Landscaping includes measures to reinstate or restore habitats that have been lost during construction, and provide habitat enhancements as described in the *Design Principles*.
- 11.3.2 For provisions relating to the control of potential effects on aquatic ecology, see Section 6.4.

11.4 Habitat and species considerations

Invasive and noxious plants

- 11.4.1 Construction may involve works within areas containing invasive species, and may result in the disturbance and potential spread of these. Invasive species are listed on Schedule 9 of the Wildlife and Countryside Act 1981, such as Japanese Knotweed, Himalayan Balsam and Russian Ivy making it illegal to cause it to grow or spread.
- 11.4.2 The contractor shall undertake detailed surveys to determine and map the extent of invasive species for each of the sites where present (with reference to baseline surveys within the *Environmental Statement*). A subsequent site-specific management and eradication plan as part of the ecology and landscape management plan, will be produced and implemented, dependent on proposed works at the site and the timescale for these works. For this activity the contractor's ecologist will be present.
- 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 invasive species 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 shall follow this approach to ensure that the spread of Japanese knotweed is controlled. The EA will be notified for operations to use herbicide alongside any watercourses.

Birds

- 11.4.5 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. It is 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.

- 11.4.6 The contractor shall undertake clearance of bird nesting habitats on site, such as trees, scrub, buildings and grassland, between October and February inclusive, which is outside of the bird nesting season. This will ensure that no birds are nesting on site at the start of construction. If clearance is not possible outside of the bird nesting season, then suitable nesting habitat to be removed will be checked by the contractor's ecologist immediately prior to its removal. Where active bird nests are present, no works to or in the vicinity of the bird nests will be undertaken until the nest becomes inactive. If no active nests are present then the clearance can continue under the watching brief of the ecologist. For any clearance activities the contractor's ecologist will be required to gain the employer's acceptance.

Schedule 1 Bird species

- 11.4.7 Certain uncommon species of bird are given additional protection from disturbance, in that it is also an offence to intentionally or recklessly 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 and barn owl are the most likely to be encountered in association with the project. Protection measures specific to the Schedule 1 species present on site will be proposed by the contractor's ecologist and will be included in the ecology and landscape management plan for the site.
- 11.4.8 To minimise the risk of disturbing a Schedule 1 bird species (eg, Black Redstart) nest, the following approach, in accordance with The Conservation of Habitats and Species Regulations 2010, will be taken:
- Those habitats with the potential for use by Schedule 1 bird species (in particular, structures that are to be demolished) will be identified and surveyed by the contractor's ecologist prior to site clearance.
 - In the event that Schedule 1 bird species are found during the nesting season, consultation with Natural England will be undertaken in order to identify and agree the appropriate measures to be undertaken in respect of this species.

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 (refer to para. 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.

- 11.4.9 The contractor should note that there is no legal provision under the Wildlife and Countryside Act 1981 (as amended) to obtain a licence to facilitate development which would disturb a Schedule 1 species.

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 *Environmental Statement*. The contractor's ecologist will undertake an updated bat roost potential survey of the buildings and trees on site, and undertake any necessary detailed surveys for bats to determine whether a bat roost is present. No site clearance works or construction activities that could affect a potential bat roost can be undertaken until the ecologist confirms that no bat roost is present. Where a bat roost is present or suspected, the ecologist will prepare a method statement for the works to protect bats and ensure the works are legally compliant. Where required, Natural England will be consulted to agree the method statement, and to obtain licenses for works that may affect bat roosts, in accordance with relevant legislation (The Conservation of Habitats and Species Regulations 2010), and gaining a European Protected Species Licence - Bat licence.
- 11.4.12 The *Environmental Statement* will identify areas used by bats for commuting and foraging, therefore, lighting will be implemented in accordance with prescribed guidance where these areas are to be lit. The contractor shall consider lighting levels during night time activities and where required minimise lighting in line with Section 4.6. Where practical the lighting will be positioned as low to the ground as possible, will be capped, cowled and directional, with the light directed away from transit routes and foraging habitat.

Reptiles

- 11.4.13 Where construction works take place in areas that have potential to support (refer to the *Environmental Statement* 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 *Environmental Statement* to establish the presence of reptiles will be referenced. In order to ensure that no unlawful activities take place during site clearance and construction in respect of reptiles, the contractor shall 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 in accordance with relevant legislation (The Conservation of Habitats and Species Regulations 2010), before works in that area can continue.

Animal welfare

- 11.4.15 Badgers are protected under the Protection of Badgers Act 1992 against damage or destruction to their setts (underground tunnel and chamber network), disturbance while occupying their sett, death and injury. The contractor is required to undertake specific measures to manage the risk of impacts to badgers from the works. Such measures are likely to include details of site hoarding that prevents badgers from accessing the site.
- 11.4.16 Construction works will take place in areas where wild mammals, such as foxes, hedgehogs and rabbits, may be present. The Animal Welfare Act 2006 protects such animals against unnecessary suffering. Where pest control measures are to be undertaken, the contractor shall appoint an appropriate qualified person to undertake this work. Hedgehogs are of conservation interest, although not legally protected, and they are likely to be present in the vicinity of some of the construction sites. Measures to prevent hedgehogs from falling into open excavations will be implemented at those sites where the need for this has been identified in the *Environmental Statement*. Such measures are likely to include the provision of site hoarding that prevents hedgehogs from accessing the site.

11.5 Aquatic ecology receptors (marine mammals, fish and invertebrates)

- 11.5.1 The following section highlights the measures to control impacts on aquatic ecology receptors.
- 11.5.2 All aquatic ecology receptors are vulnerable to the effects of water pollution. Measures to protect watercourses from pollution, including sediment deposition, are described in Section 8.3 and include following the EA's PPGs. General measures to control the risk of pollution to surface waters are described in Section 8.4.
- 11.5.3 The following control measures relate to specific aquatic ecology receptors.

Habitats

- 11.5.4 In constructing temporary cofferdams the contractor shall avoid any mixing of fill material with the underlying substrate. This will be achieved by installing a membrane between the existing river bed and the back fill material.
- 11.5.5 The measures described in Section 8.2 to 8.4 in relation to site drainage, protection of watercourses and control of pollution to watercourses will be adopted to ensure that surrounding habitats are protected from contaminated surface runoff and dewatering effluents.
- 11.5.6 The location of barges resting on the foreshore and river bed will be controlled to reduce extent of potential environmental impacts. The design of facilities such as campsheds will consider the need to minimise environmental impacts and will consider the use of lattice structure barge grids where appropriate.

- 11.5.7 In-river structures, including campsheds, will be removed on completion of the works unless otherwise agreed with the employer in consultation with relevant stakeholders, in accordance with relevant legislation (such as Port of London Act 1968, Marine and Coastal Access Act 2009, The Conservation of Habitats and Species Regulations 2010). Where concrete is used, such as campsheds, a membrane will be required to protect the underlying riverbed.
- 11.5.8 The method for reinstatement of the temporary works area will be subject to a method statement that will consider requirements for impact on aquatic ecology. The EA and the PLA will be consulted on any method statements for reinstating the foreshore. The method statements for approval by the employer will include, but will not be limited to, details of the following:
- timing of the works
 - measures to be used in order to minimise the environmental impact of the works
 - the materials or substrates used for the reinstatement
 - methods of reinstatement
 - any necessary pollution protection measures

Fish

- 11.5.9 Measures to control the impacts of underwater noise and vibration on fish are described in paras. 6.4.5 to 6.4.10.
- 11.5.10 Provision for protection and rescue arrangements for fish are detailed in para. 8.8.4.

11.6 Protection of trees

- 11.6.1 Tree protection measures will be included within the ecology and landscape management plan. Trees will be removed or pruned as approved in the site demolition and clearance plan. Where trees require pruning or removal which are not shown on the plan, this will require approval from the local authority. The method for undertaking these works is detailed below.
- 11.6.2 The contractor shall be required to submit a request for removal or alterations to protected trees for approval by the employer in consultation with the relevant stakeholders. 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: Trees in relation to design, demolition and construction: recommendations, and where in a conservation area or park, shall be approved by the relevant local authority (and in consultation with TfL in respect to street trees).

- 11.6.3 All tree surgery will comply with BS3998: Tree Work: Recommendations, 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 will 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 contractor's arboriculturalist
 - i. any works to the tree canopies will be undertaken by a qualified tree surgeon.
- 11.6.4 Works within the root protection area of trees will 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 local authority's tree officer agrees) to use cellular confinement systems to minimise/avoid compaction to the ground. Protection will 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 will be noted that the length of time of the impact will also be limited.

11.7 Reinstatement landscape scheme

- 11.7.1 The contractor shall undertake landscape work at the end of the construction, in line with the details approved pursuant to relevant DCO Requirements, and where relevant, in accordance with the DCO article on temporary use of land (article 34) [eg, requirements ACTST4 and BAREL5 (Landscape Scheme)].

11.8 References

- a. Wildlife and Countryside Act 1981
- b. Habitats and Species Regulations 2010
- c. Protection of Badgers Act 1992
- d. The Animal Welfare Act 2006
- e. Guide for trees in relation to construction: BS5837
- f. Recommendations for Tree Works: BS3998.

12 Historic environment

12.1 General

- 12.1.1 The contractor shall carry out the works in accordance with the DCO Requirements relating to listed buildings and archaeology. For work outside the DCO the contractor shall comply with all relevant legislation, and have regard to guidance and best practice, as outlined below and at the HBMCE Historic environment: local management web site (<http://www.helm.org.uk>).
- 12.1.2 The historic environment includes all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.
- 12.1.3 Procedures apply to all heritage assets as detailed in the *Environmental Statement* and *Heritage Statement*, whether or not subject to statutory or other designation.
- 12.1.4 If significant heritage assets are to be retained *in-situ*, they will be suitably protected from the contractor's plant and operations during construction.
- 12.1.5 Works directly affecting listed buildings and structures will be undertaken in accordance with approved details and method statements. Archaeological works will be carried out in accordance with the *Overarching Archaeological Written Scheme of Investigation (OAWSI)*.

12.2 Procedures

- 12.2.1 Procedures apply to all heritage assets, whether or not subject to statutory or other designation.
- 12.2.2 The contractor shall prepare a site-specific heritage management plan, indicating how the historic environment is to be protected in a consistent and integrated manner, co-ordinated with all other relevant environmental topics. Protection for heritage assets on site may take form of both physical protection and working practices. This will be provided for information to HMBCE and the relevant local authority.
- 12.2.3 The plan will set out how the contractor shall discharge the requirements of the DCO in relation to heritage in consultation with HBMCE and the local authority. The plan will be submitted to the employer for approval.
- 12.2.4 The plan will address all construction related temporary and permanent works, including demolition, utility diversions, access routes, works compounds and dredging. It will also address potential effects on heritage assets from third-party impacts, vibration, ground settlement and dewatering.
- 12.2.5 The contractor shall provide HBMCE and the local authority with sufficient contact, programme, site access, and safety information to facilitate inspections.

- 12.2.6 The plan will indicate how the *OAWSI*, which accompanies the application, and site-specific written schemes of investigation where applicable will be implemented defining (in general terms) the procedures and mitigation measures to be applied under preservation *in situ* and preservation by record.
- 12.2.7 The plan will include detailed methodology for the dismantling, removal and storage of any identified historic elements of heritage assets removed during construction, and details of reinstatement.
- 12.2.8 The contractor shall define procedures for unexpected archaeological discoveries during the works in the heritage management plan and emergency preparedness plan. These are to include ceasing work in the vicinity, making safe, and notifying the employer, HBMCE and the local authority, so that suitable mitigation may be implemented as per the site-specific schemes.

12.3 Detailed provisions

- 12.3.1 Works affecting statutorily protected assets will be undertaken in accordance with the requirements within the DCO. In the event that works are proposed outside the consent granted by the DCO they will 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 Mitigation will be detailed in full within the *OAWSI* and site-specific schemes. This will include as appropriate, archaeological investigation, excavation and, or a watching brief during the works.
- 12.3.3 Mitigation measures for the permanent removal or demolition of heritage assets will include an appropriate level of analysis, reporting, publishing and public dissemination of the results. The resulting archive of records, data and finds will then be transferred into the public domain with a suitable receiving body, such as a local museum. The Greater London Historic Environment Record will also be updated. The full approach to recording and dissemination will be detailed within the *OAWSI*.
- 12.3.4 During the works, the contractor shall also give HBMCE and the local authority adequate notice before implementing measures defined in the site-specific schemes. Their representatives may wish to monitor the works for compliance.
- 12.3.5 Methods for protection of the historic environment will 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. Care will be taken when jack-up barges; piling or borehole rigs; mechanical excavators or other plant is operating over areas of the river channel or foreshore known to be particularly archaeologically-sensitive (including within cofferdams). In exceptional cases (eg, nationally-significant remains) exclusion zones may apply. In the remaining cases safeguards may include appropriate methods for installing and operating such plant. Subject to any necessary consent, suitable protective materials may also need to be added onto the foreshore during construction in order to prevent damage (eg, mats, blinding or aggregate to spread the load).
- e. 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.
- f. Procedures under the emergency preparedness plan for the emergency repair of damage to listed buildings. Where there is damage that does not require emergency repair, repair will be affected as making good as part of the construction process. Final repairs to significant finishes will be 'like for like'.
- g. 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.
- h. Procedures in the event of the discovery of human remains.
- i. Procedures under the Treasure Act Code of Conduct 1997, to address the discovery of any artefacts defined in the Treasure Act 1996.

12.4 Relevant Requirements

- 12.4.1 Relevant Requirements would include the details approved pursuant to PW9 (Monitoring of, and Protective Works to Listed Buildings and Structures), PW10 (Built Heritage Recording) and the relevant site specific Requirement [eg, ACTST5 and HAMPS3 (Archaeology)].

12.5 References

- a. Planning (Listed Buildings and Conservation Areas) Act 1990
- b. Ancient Monuments and Archaeological Areas Act 1979
- c. The Burial Act 1857
- d. Treasure Act Code of Conduct 1997
- e. Treasure Act 1996.

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13 Third-party impact and asset protection process

13.1 Protection of existing infrastructure and buildings

General provisions

- 13.1.1 The employer's consultants have undertaken assessments of existing infrastructure and buildings potentially impacted by construction of the works as part of the development of the scheme for planning purposes. Assessment reports and 'approval in principle' documents have been prepared and submitted to the relevant third-parties for discussion and acceptance where possible.
- 13.1.2 The contractor is responsible for reviewing and validating the identified interfaces and assessments and undertaking any necessary calculations, documentation and revisions to take account of the contractor's proposed method of construction. The contractor shall be responsible for undertaking the impact assessment, designing any mitigation works and obtaining final approval to proceed, where required, at the interface from the asset owner. The contractor shall comply with the infrastructure asset protection agreements put in place.
- 13.1.3 For listed building and structures located within the zone of influence, the contractor's design will ensure that the works do not cause damage that is materially worse than that identified and assessed in the Environmental Statement for those buildings and structures.
- 13.1.4 Any third party impact and asset protection processes, methods, and condition surveys that involve flood defence structures (ie, flood defence consent) will also be approved by the EA.
- 13.1.5 A pre-construction condition survey of the relevant infrastructure and buildings within the zone of influence will be undertaken prior to commencing any works that could potentially create an adverse impact upon them. For buildings this will be carried by an independent chartered building surveyor, and for infrastructure by a suitably qualified engineer agreed with the asset owner. Where the building or infrastructure is listed, the surveys for buildings will be undertaken by an independent chartered building surveyor and for infrastructure by an independent professional both of whom will be conservation accredited or will have had at least five years' experience in surveying historic buildings or infrastructure.
- 13.1.6 Post condition surveys, which may be in the form of an exception report where agreed, will be undertaken, where possible, by the same parties as the pre-condition surveys for infrastructure and buildings impacted by construction of the works to determine any issues and establish the level of impact associated with the project.
- 13.1.7 A condition survey of highway access routes immediately adjacent and connecting to the Strategic and Transport for London Road Networks, will

be undertaken by the contractor/employer before works commence and prior to completion (refer to Section 5.5).

Protection measures

- 13.1.8 The contractor shall design and carry out construction of the project in a manner that will minimise the impact on third-party infrastructure and buildings as a result of ground movement and other construction related activities. The contractor shall utilise best practice methods to reduce, control and limit ground movement, including the selection of suitable tunnelling techniques and the selection and operation of modern tunnel boring machines.
- 13.1.9 The contractor shall design and undertake necessary protective and mitigation measures to buildings and infrastructure. The design and method of implementation of these measures will be agreed with the asset owner and/or relevant consenting body prior to the works being carried out.
- 13.1.10 The contractor shall prepare assessment reports and pre-construction condition survey reports for any listed structures within the zone of influence. The contractor shall liaise with HBMCE to agree a list of vulnerable buildings. The contractor shall also prepare method statements for any works to be carried out, including any works to listed structures. Copies of the assessment reports, pre-construction condition survey reports and method statements that relate to listed structures will be provided to HBMCE for review and the employer will take reasonable account of HBMCE's responses.

13.2 Monitoring and action plans

- 13.2.1 The contractor, in consultation with the employer, will design and install instrumentation and monitoring to confirm that ground movements and construction impacts are as predicted and acceptable and to provide advance warnings where significant deviation from this occurs. Where appropriate, and when potentially affecting any nationally designated heritage asset, monitoring will be carried out prior to commencement of construction work to enable base-line values to be established and monitoring will continue until settlement due to the works, as shown by the monitoring, has effectively ceased.
- 13.2.2 The contractor shall develop an emergency preparedness plan for London Underground Ltd assets and an emergency preparedness plan or emergency response plan (depending upon their requirements) for other asset owners, where necessary, to deal with any residual risks. Where this requires any actions to be undertaken on behalf of the asset owner it will be agreed with the asset owner. The emergency preparedness plans and the emergency response plans will include relevant contingency plans and trigger levels for action, and will be agreed or approved, as appropriate (ie. if the stakeholder is a regulatory body, this will be for approval, else it will be for agreement), with relevant stakeholders.

Glossary

Term	Description
abnormal load	This is also known as 'Abnormal indivisible load vehicles' (AILV) and is defined in para. 2 of Schedule 1 (abnormal indivisible load vehicles) to the Road Vehicles (Authorisation of Special Types) (General) Order 2003" (S.I. 2003/1998), and is one which cannot be divided for the purpose of being carried on a road without undue expense or risk of damage
ambient	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.
ancient monument	A monument protected under the Ancient Monuments and Archaeological Areas Act 1979.
aquifer	A permeable geological stratum or formation that is capable of both storing and transmitting water in significant amounts.
Automatic Urban and Rural Network (AURN)	The AURN is the UK's largest automatic monitoring network and is the main network used for compliance reporting against the Ambient Air Quality Directives.
baseline	The situation against which the potential impacts due to the proposed development are assessed.
Best practicable means (BPM)	<p>BPM is the use of best practicable means to achieve a particular objective. The component words of BPM are further explained as (definition as per that given in the CoPA 1974):</p> <p>"Best" – means the most effective techniques for achieving a particular objective.</p> <p>"Practicable" – indicates that the "means" under consideration should only be selected following an optimisation process that includes consideration of the technical viability including comparable processes, facilities or methods of operation which have recently successfully tried out and takes into account social and economic costs and benefits.</p> <p>"Means" – includes technology, the design, build, maintenance, operation and wider management arrangements.</p> <p>Regard will be had, in construing references to "best practicable means" to any relevant provision of a code of practice.</p>
biodiversity	<p>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:</p> <p>"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</p>

Term	Description
	part; this includes diversity within species, between species and of ecosystems.” – CBD Article 2. UNEP 1992.
borehole	A hole driven into the ground to obtain geological information.
bund	An embankment which acts as a visual or noise screen or impermeable structure around an oil tank to contain oil if it should spill or leak.
Chalk	In the project area, chalk is firm, white, fine-grained limestone with conspicuous semi-continuous nodular and tabular flint seams.
<i>Code of Construction Practice (CoCP)</i>	Document setting out control measures to be adopted during the project construction period.
combined sewer overflow (CSO)	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.
condition survey	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.
conservation area	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.”
contractor	Any contractor carrying out works associated with the construction of the Thames Tideway Tunnel.
Development Consent Order (DCO)	An order under the Planning Act 2008 approving a development that is or forms part of a Nationally Significant Infrastructure Project. The order can grant planning permission and compulsory purchase powers. The order is granted by the Secretary of State.
dewatering	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.
drive site	A site containing the shaft from where the TBM is ‘driven’ forward. Excavated material is removed from and segments are fed into the tunnel via the shaft at the drive site.
dust	Coarse particulate matter (between 1µm and 75µm in diameter) produced as a result of abrasive activities during the construction phase of the development/project.
ecology	The relationship between organisms and their environment.

Term	Description
effect	The result of an impact on a particular resource or receptor.
effluent	The treated wastewater discharged from the sewage treatment works.
emergency preparedness plan	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.
environmental impact assessment (EIA)	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.
<i>Environmental Statement</i>	A document to be prepared following an EIA which provides a systematic and objective account of the EIA's findings.
excavated material	The earth/soil/ground material removed when the shafts, other structures and tunnels are excavated. Excavated material can be either topsoil, subsoil or other material, such as rock, etc.
flood risk assessment	An assessment of the likelihood of flooding in a particular area so that development needs and mitigation measures can be carefully considered.
fluvial	The processes associated with rivers and streams and the deposits and landforms created by them.
foreshore	Ground uncovered by the river when the tide is low.
greenfield sites	Land not previously developed, can include agricultural land.
ground treatment	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.
groundwater	Water located beneath the ground surface in soil pore spaces and in the fractures of rock formations.
groundwater body	A column of water beneath the water table or a unit volume of ground that is saturated.
haul roads	Temporary roads provided within the contractor's site area to allow the transportation of material around the site.
impact	A physical or measurable change to the environment attributable to the project.
impermeable surface	Surfaces or ground unable to absorb rainfall, eg, concrete, most tarmac surfaces and hardstanding.
L _{Aeq(T)}	Equivalent continuous sound level is a notional steady sound level which would cause the same A-weighted sound energy to

Term	Description
	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.
L _{Amax}	The maximum sound level measured on the A-weighted scale occurring during an event.
listed buildings	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.
London Plan 2011	The London Plan 2011 is the strategic spatial planning document for London, produced by the Mayor of London.
main tunnel	The tunnel from Acton Storm Tanks to Abbey Mills Pumping Station.
main tunnel site	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.
method statement	Under Health and Safety at Work Act and Management of Health and Safety 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.
mitigation measures	Actions proposed to moderate adverse impacts and to enhance beneficial impacts arising from the whole or specific elements of the development.
modelling	Simulation of the proposed design (eg, hydraulic modelling of the drainage network, physical modelling of drop shafts or odour modelling, etc).
monitoring	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).
oil interceptor	Underground tank, split into sections and connected into the drainage system, which contains oil and prevents it being discharged into rivers and streams, etc.
Piezometer	A small-diameter observation well used to measure the hydraulic head of groundwater in aquifers; a standpipe, tube,

Term	Description
	vibrating wire piezometer or manometer used to measure the pressure of a fluid at a specific location in a column.
PM ₁₀	PM ₁₀ is any particulate matter with an aerodynamic diameter equal to or less than 10µm. Particulate matter of this size can be respired.
protective provision	provisions for protection of specified undertakers containing specific safeguards
receptors	People (both individually and communally) and the socio-economic systems they support.
reception site	A 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.
recreational water users	People who use the river for leisure, eg, rowers.
relevant stakeholder	This means any of the following organisations which may be relevant in the opinion of the local planning authority depending on the nature of any proposed amendment to the Code of Construction Practice, to be considered for approval by the local planning authority: the EA, the local highway authority, Transport for London, the Port of London Authority, the Marine Management Organisation or the Historic Buildings and Monuments Commission for England.
sewerage undertaker	The statutory undertaker for sewerage – responsible for sewerage maintenance.
shaft	Duct/pipe/vertical tunnel; a vertical normally circular chamber.
silt	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.
sites and monuments record	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.
Source Protection Zone (SPZ)	A Source Protection Zone is an area designated by the Environment Agency to show the risk of contamination from potentially polluting activities around groundwater sources such as wells, boreholes and springs used for public drinking water supply.
sound level meter	An instrument for measuring the sound pressure level.
special loads	This is defined in para. 10, Part 2 (Part 2 Vehicles and Part 2 vehicle-combinations: recognised categories and defined terms) to the Road Vehicles (Authorisation of Special Types)

Term	Description
	(General) Order 2003 (S.I. 2003/1998).
Strategic road network (SRN)	This is the strategic network of roads used to move people and freight around the country, and includes motorways and major trunk roads.
suspended solids	The small solid particles that remain in suspension within a liquid.
temporary works	All works required to facilitate the execution of the design, including any left in place after completion, as required under Construction (Design and Management) Regulations 2007.
Thames Tideway Tunnel project	The Thames Tideway Tunnel project including all associated works undertaken by the contractor or members of its supply chain. It is intended to capture and store unacceptable discharges from combined sewer overflows (CSOs) along the route of the tidal Thames.
topography	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).
Transport for London Road Network (TLRN)	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.
tree preservation orders	The designation of trees that contribute significantly to the amenity value of an area. A tree preservation order designation requires an application is made before any works are carried out to them, including routine maintenance.
trigger level	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 will 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.
tunnel boring machine (TBM)	A machine used to excavate and line tunnels with a circular cross-section through a variety of ground conditions.
ventilation shaft/column	A vertical pipe or conduit which allows air to move in or out of the system.
works	All construction work associated with the construction of the Thames Tideway Tunnel.
zone of influence	An area contained by a 1mm vertical movement contour defined in the Environmental Statement that supports the application.

Appendix A: Section 61 application guidance

A.1 Guide to making a Section 61 application

- A.1.1 The *CoCP* requires that Section 61 applications under the CoPA are made to relevant local authorities for all construction activities which may generate noise effects. This appendix provides guidance on the process of application for a Section 61 consent, and gives recommendations on liaison with the local authority.
- A.1.2 For clarity, and consistency with the CoPA, the term 'noise' includes vibration.
- A.1.3 This appendix provides a sample form for making a Section 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 Section 61 application.

Section 61 application

- A.1.4 contractors will be required to submit applications for Section 61 consents, variations and dispensations under the CoPA for all construction activities which may generate noise effects, including tunnelling, unless the relevant local authority requires otherwise. Activities that typically do not require a Section 61 consent include those which do not have significant noise and vibration impact, such as utility connections, existing sewer modifications, footpath crossovers, and traffic management schemes.
- A.1.5 The required level of information in the Section 61 application will be dependent on local circumstances, ie, the proposed work and the area in which it is to be carried out.
- A.1.6 The Section 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.
- A.1.7 The *CoCP* Part B defines which of the different types of working hours (Table 4.1) apply to the different activities at each site. Except for continuous working hours (including river and rail transport hours), all other categories of working hours outside of standard working hours are intermittent or are required for defined periods of time. The period of application of these types of working hours will be notified within the Section 61 application.
- A.1.8 Noise calculations and development of steps to minimise noise will be focussed on the significant noisy activities; this will be of relevance for both applications. The quiet activities will simply be listed as items in the

method statement. Quiet and noisy activities will be defined in consultation with the local authority before submission.

- A.1.9 The screening process will also consider the extent of each consent application. Coverage of a very large number of activities or a small number of activities will 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 local authority. It may be applicable for the standard working hours Section 61 application to run for a longer period than the application covering works outside of standard working hours.
- A.1.10 The duration of consents will 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 local authority in agreeing subsequent amendments. It will also be noted that some local authorities might wish to time limit consents on large projects (eg, six months) to allow for regular review (eg, complaints).
- A.1.11 Consideration will 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.
- A.1.12 The contractor shall keep a list of the activities and durations for separate Section 61 applications, which will routinely be reviewed and updated.
- A.1.13 Early discussions between the contractor and the local authorities will be required 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 Section 61 application will be submitted to the relevant local authority 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 local authority with respect to the works, and the need for any alteration of the information provided in the Section 61 can be identified, with sufficient time for changes to be implemented.
- A.1.14 In advance of the formal submission of the first Section 61 application, the contractor shall provide to the local authorities information on the personnel authorised on behalf of the contractor to sign off Section 61 applications and requests for changes to Section 61s. The contractor shall provide the names of the personnel and sample signatures. In the event that the authorised signatories change, the contractor shall inform the local authority as soon as possible.
- A.1.15 The draft Section 61 consent 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 receptors identified for which noise predictions will be made

- d. predicted noise levels (and vibration where required) for the noise-and/or vibration-sensitive receptors identified above
- e. sufficient information for the local authority 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 receptor 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 spread sheet 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 receptors.

A.1.16 For packages of works which are required to be undertaken outside of standard 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 (refer to *the 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 will 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 standard working hours, full justification for why these works cannot be completed within standard working hours.

A.1.17 Following discussion of the draft Section 61 consent with the relevant local authorities and the implementation of any necessary changes, the formal application will be made. Submission of 'standard 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 standard 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 Section 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}

- A.1.18 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 will 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 A.1 L_{Aeq} period hours of work

Day	Works between these hours	Period for L_{Aeq} (hours)
Mon-Fri	7am – 8am	1
	8am – 6pm	10
	6pm – 7pm	1
	7pm – 10pm	1
Sat	7am – 8am	1
	8am – 1pm	5
	1pm – 10pm	1
Sun/Bank/Public holidays	7am – 10pm	1
Any day	10pm – 7am	1

- A.1.19 Where works outside of standard 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 will 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 will be discussed with the local authority as part of consultation prior to the application.

Maximum noise levels

- A.1.20 In the event that percussive operations are required near receptors that could be sensitive to noise and/or vibration maximum noise level (L_{Amax}) and peak particle velocity, vibration predictions will be made. If percussive operations are planned, this will 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

- A.1.21 It is recognised that there may be changes to planned works between the time at which the Section 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

A.1.22 The dispensation procedure is to be used when a change in works is required that was not foreseen at the time the Section 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 receptors. Examples would be changes resulting in different noise levels, working hours or duration of works.

A.1.23 An application for a dispensation must be made to the relevant local authority 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 will normally be made seven days (but at least two working days) before the commencement of the work.

Minor change (variation)

A.1.24 Minor changes may be required to the scheme of works described in the Section 61 application. The contractor may apply to the local authority 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 local authority 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.

A.1.25 It is intended that the application for variation would be filled out by the contractor and e-mailed to the local authority. If the local authority is satisfied that the variation will not give rise to additional effects on local noise/vibration-sensitive receptors, a nominated officer (normally the EHO) will sign and return the e-mail. The local authority may attach conditions to the variation.

Overrun

A.1.26 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 urgently completed. It is intended that a notification will be e-mailed to the local authority by the contractor. The local authority would then acknowledge its receipt, and return it to the contractor. The notification system for overruns is not an approval process.

A.1.27 The local authority 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 local authority may pursue this with the contractor.

Emergency deviation

- A.1.28 In the event that an occurrence onsite requires an emergency change to works set out in the Section 61, the contractor must notify the relevant local authorities within one hour of the event. The notification must include details of:
- a. when and where the occurrence happened and its duration
 - b. mitigation measures used to control noise and vibration
 - c. reason for the deviation
 - d. who is in control of the works onsite for the contractor and contact details
 - e. any notification to the public
 - f. how the incident will be prevented from reoccurring.

Appendix B: Construction Environmental Management Plan Template

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Construction Environmental Management Plan

B.1 Part 1 – General Issues

- B.1.1 Amendment Record
- B.1.2 Policy Statements
- B.1.3 Project profile and scope of works
- B.1.4 Project duration
- B.1.5 Management structure and responsibilities
 - a. Responsibilities of the Environmental Team
 - b. General Environmental Responsibilities
- B.1.6 Points of contact
- B.1.7 Environmental aims, Key Performance Indicators and Targets
 - a. Objectives and targets
 - b. Key Performance Indicators
- B.1.8 External permission or notification to residents
- B.1.9 Identification & Management of Environmental Requirements and Legislative Constraints
 - a. Environmental (eg. Ecology) constraints
 - b. Permits/ Consents/ Licences
- B.1.10 Contractors/Designers selection and appointment
- B.1.11 Coordination, communication and liaison
 - a. Internal Communication
 - b. External Communication
 - c. Environmental Records
 - d. Community relations
- B.1.12 Induction, Competence and Training
 - a. Training of the Environmental Team
 - b. Specific Training and Awareness

B.2 Part 2 – Environmental Management

- B.2.1 Environmental condition of site
- B.2.2 Aspects and Impacts Register
- B.2.3 Environmental Notices
- B.2.4 Thames Tideway Tunnels Site Rules
- B.2.5 Identification of materials to be used

- B.2.6 Environmental Incident Reporting and Investigation
 - a. Environmental Incident Recognition/Characterisation
 - b. Emergency Plan
 - c. Emergency Procedures
 - d. Notification and Reporting
 - e. Arrangements to mitigate environmental incidents
- B.2.7 Environmental Monitoring and Reporting
- B.2.8 Performance Monitoring and Reporting
 - a. Monthly reports
 - b. Considerate Constructor Scheme
- B.2.9 Inspection and audits
 - a. Responsibilities
 - b. Schedule, Frequency and Planning
 - c. HSE Leadership Tours
- B.2.10 Procedures in the event of failure to comply with this plan
- B.2.11 Review and close out reports
- B.2.12 Record keeping and Archiving
- B.2.13 Management Review

B.3 Part 3 Appendices - Supporting Documentation

- B.3.1 Appendix 3.1 – Topical Environmental Management Plans
 - a. Pollution incident response plan
 - b. Lighting management plan
 - c. Traffic management plan
 - d. River transport management plan
 - e. Noise and vibration management plan
 - f. Air quality management plan
 - g. Water management plan
 - h. Land quality
 - i. Site Waste Management Plan
 - j. Ecology and landscape management plan
 - k. Heritage management plan
 - l. Materials Management Plan
 - m. Community liaison plan
 - n. Resource management plans (water, energy, materials)

- B.3.2 Appendix 3.2 - Additional Environmental Guidance/Supportive documentation
- B.3.3 Appendix 3.3 - Schedule of Permits, Licenses and Consents
- B.3.4 Appendix 3.4 - Policies
- B.3.5 Appendix 3.5 – Environmental aspects layout drawings
- B.3.6 Appendix 3.6 - Legal Register

B.4 Part 4 – Site-Specific Construction Environmental Management Plan (SSCEMP)

- B.4.1 This section shall include the site specific matters and could be supported by the Contract wide Topical Management Plan, and includes:
 - a. Introduction
 - b. Key regulators: LA, EA, HBMCE, PLA, MMO, NE, etc
 - c. Site activities (1 year look ahead)
 - d. Key issues and sensitive receptors
 - e. Licences and consents schedule
 - f. Environmental aspects and mitigation measures
 - g. Location of the key sensitive receptors in relation to the environmental aspect
 - h. Specific mitigation measures implemented
 - i. Compliance checks for all environmental aspects
 - j. Resources
 - k. Environmental resources for the worksite
 - l. Emergency procedure/contacts for the worksite

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