22.9 Construction Methods

22.10 Environmental and Planning

22.10.1 General

Where the *Contractor* is responsible for design of Temporary Works, the *Contractor* shall:

- firstly avoid, and secondly minimise, landtake from habitats and sites of nature conservation or geological importance, and from public open space and best and most versatile agricultural land;
- locate Temporary Works areas on previously used sites or amenity grassland of low conservation value;
- avoid the loss of trees;
- incorporate mitigation measures into the design to firstly eliminate, or secondly reduce, or thirdly control, any adverse environmental impacts;
- reduce fire risk and potential fire load and specify non-combustible materials, products and packaging;
- minimise the generation of waste by, but not limited to: keeping the size of tunnels and shafts to a minimum;
- undertake design in a manner to minimise the damage to land and property as a result of ground movement;
- follow the guidance in Planning Policy Statement 5: Planning for the Historic Environment (published by The Stationery Office);
- avoid interference with surface water features and existing drainage patterns, including, but not limited to, important subterranean flows to wetland. Where surface features or existing drainage patterns must be interfered with, (including, but not limited to, new or extended culverts, stream diversions and balancing ponds) position and design works to:
    - minimise impacts in terms of flow, flood risk, water quality, erosion, sedimentation;
    - maintain continuity of surface flows to mitigate environmental impacts, including, but not limited to, by means of stream diversions, creation of natural banks and features and, where unavoidable, culverts;
    - mitigate any ecological impacts;
    - take opportunities to enhance nature conservation benefits resulting from drainage works;
    - provide compensation for loss of flood storage on an equivalent basis within the limits of land to be acquired under the Crosssrail Act 2008; and
    - use sustainable drainage principles in preference to other forms of drainage where agreed by the relevant statutory undertaker;
    - produce a site restoration plan as required; and

- address sustainability principles in design, taking opportunities for enhancement and compensation.

The *Contractor*'s archaeologist shall update the existing site-specific Written Scheme of Investigation to include any additional archaeological works required including but not necessarily limited to:

- construction impact summary and outline design identifying the likely impacts on the archaeological deposit sequence from the Equipment and temporary works and any mitigation proposed;
- scope of the investigation and field methodology including type of mitigation survey/investigation required and quantification describing type of investigation propose, sequence of works and any decision making milestones; and
- programme for the investigation describing the order and sequence of works.

The update shall reflect design development, outcomes of any field evaluation and take account of comments from consultation with the relevant statutory authorities. The *Contractor* shall submit the updated Written Scheme of Investigation to the *Project Manager* for acceptance.

During the preliminary design stage, the *Contractor*'s design ecologist shall undertake ecological surveys to identify any ecological issues (such as protected species or invasive species), and where such issues are present, develop and implement mitigation measures (such as relocation of protected species) prior to commencing works on working areas.

22.10.2 Environmental Impact

The *Contractor* shall assess the environmental impacts of the Temporary Works and produce an environmental design compliance statement checklist in the format set out in Appendix 22A insofar as it is applicable to the design and implementation of the Temporary Works. Where a potential new significant environmental impact is identified the *Contractor* shall notify the *Project Manager*. A potential new significant environmental impact is one over and above the significant impacts already assessed in the Crossrail Environmental Statement (including all Additional Provisions Environmental Statements and Supplementary Environmental Statements).

The *Contractor* shall modify the Temporary Works to remove the potential new significant impact where practicable. Where this is not practicable, the *Contractor* shall carry out a detailed assessment to establish if there is a new significant environmental impact and notify the *Project Manager* whether there is a new significant environmental impact or not. The *Project Manager* may then instruct the *Contractor* to undertake further assessments, such as a full environmental impact assessment to accompany a planning application.

For all impact assessments the *Contractor* shall use the same assessment methodology, including significance criteria, as used in the Crossrail Environmental Statement.

22.10.3 Environmental Impact Assessment Specialists

The *Contractor* shall appoint environmental impact assessment specialists to manage and undertake environmental input to the Temporary Works, including but not limited to, environmental impact assessments where necessary to provide the Temporary Works. These environmental impact assessment specialists shall include but not be limited to the following, as far as is necessary for the design and implementation of Temporary Works:

- town planner to prepare planning applications and supporting documentation under the Town and Country Act 1990 where required;
- environmental coordinator to manage input from the environmental impact assessment specialists and interface with the design team;
- noise and vibration specialists to undertake noise and vibration assessments, undertake modelling of airborne and groundborne noise and vibration; assess noise from Equipment and temporary works, develop mitigation (e.g. noise barriers, acoustic enclosures, attenuators for fans); undertake surveys; scope, commission and manage surveys where required;
- waste management specialists to undertake waste assessments, produce the worksite specific Site Waste Management Plan, identify waste sources and develop waste avoidance and reduction solutions;
- air quality specialists to undertake air quality assessments, develop mitigation, undertake surveys, scope, commission and manage air quality monitoring where required;
- land contamination specialists to undertake land contamination assessments, scope, commission and manage ground investigation works, assess contamination, develop remediation and mitigation where required;
- surface and groundwater specialists to undertake water assessments, produce flood risk assessments, develop mitigation and pollution prevention measures, and scope, commission and manage groundwater and water quality monitoring, and analyse monitoring results where required;
- archaeologists to undertake archaeological assessments, develop mitigation; update the Written Scheme of Investigation; and scope, commission and manage survey and field work where required;
- built heritage specialists to undertake built heritage (listed and non-listed) assessments, develop mitigation; undertake surveys and RCHME recording; prepare heritage method statements, commission and manage survey work where required;

- socio-economist to undertake socio-economic assessments, develop mitigation and undertake surveys where required;

- ecologists to undertake aquatic and terrestrial ecological assessments, develop mitigation (e.g. translocation of protected species); undertake surveys, scope, commission and manage survey and field work where required;

- landscape architects to undertake townscape, landscape and visual impact assessments, develop mitigation through landscape design, produce landscape restoration plans and undertake surveys where required;

- traffic specialists to undertake traffic assessments, develop mitigation and undertake surveys where required.

All environmental impact assessment specialists shall:

- attend meetings with the *Project Manager*, the *Employer* and consent granting bodies as required;

- have appropriate experience of environmental impact assessments and incorporating environmental requirements into design.

The *Contractor* shall submit the curriculum vitae of all proposed environmental impact assessment specialists to the *Project Manager* for acceptance. Environmental personnel shall not be appointed until the *Project Manager*'s acceptance has been obtained, at any time during the duration of the contract.

The *Contractor* may use its existing resources provided in accordance with other parts of the Works Information where they are competent to provide this input to the Temporary Works design.

22.11 Assurance