Thames Tideway Tunnel
Thames Water Utilities Limited

Application for Development Consent

Application Reference Number: WWO10001

Sustainability Statement

Doc Ref: **7.07**

Appendix B.13

Albert Embankment Foreshore

APFP Regulations 2009: Regulation **5(2)(q)**

Hard copy available in

Box **48** Folder **B**
January 2013

Thames Tideway Tunnel

Creating a cleaner, healthier River Thames

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Appendix B: Site-specific appraisal

B.13 Albert Embankment Foreshore

Type of site:	CSO site, short connection tunnel drive site
Description of proposals:	The site is located within the London Borough of Lambeth on the foreshore to the west of Albert Embankment between St George's Wharf and Tintagel House. The site would intercept the Brixton Storm Relief Sewer and the Clapham Storm Relief CSOs and would serve a short connection tunnel drive site. The DCO will include two access options, Lacks's Dock and via Tintagel House – both options have been assessed during completion of the sustainability appraisal.

Water quality

Maintain and enhance river water quality

Appraisal

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- The site is located within a source protection zone 2. The drop shaft would penetrate the upper and lower aquifer. Dewatering of the lower aquifer would be required and would create a contamination pathway into the tidal Thames. There is a risk for ground contamination of foreshore sediments to be present at the site; however, it is assumed that the majority of pollutants have been leached from the sediment. Settlement of suspended soils and treatment of effluent before discharge into the river would allow for the contamination pathway to eliminated and river water quality to be maintained.
- Piling activity during operation would release up to 187t (93.5m^3) of sediment into the river. The River Thames is a high sediment environment with up to 40,000t (20,000m^3) of suspended sediment passing the site four times per day during spring tide. The amount of sediment released at the site is considered to be negligible in comparison to natural fluctuation and would not lead to deterioration of water quality.
- Surface water run-off from the site could create a potential pathway for pollutants into the river. Measures set out in the *CoCP* would ensure appropriate site drainage and eliminate the risk of water quality deterioration.
- Discharge volume and frequency at the Brixton Storm Relief Sewer CSO would be reduced from 265,000m^3 over 29 spill events per year to 5,700m^3 at one spill event per year through interception. The Clapham Storm Relief CSO currently discharges 6 times per year with a total volume of 13,000m^3. Discharge frequency would be reduced to one spill event per year with a discharge volume of 7,900m^3. Currently 70t of sewage derived litter are entering the tidal Thames from these CSOs per annum. This amount would be reduce to 3.5t. Consequently river water quality would be enhanced through operation.

In summary, the proposals would support the objective as measures set out in the *CoCP* would ensure that pollution pathways are eliminated and river water quality maintained

during construction. Interception of the CSOs at the site would enhance water quality during operation.

Further information can be found in the *Environmental Statement* and the *CoCP.*

Biodiversity

Maintain and enhance biodiversity

Appraisal

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- For both access options vegetation of low ecological value (introduced shrub, trees and amenity grassland) would need to be cleared. Replacement planting would be provided for vegetation removed after completion of the construction.
- Tree protection measures as detailed in the *CoCP* would be in place for trees adjacent to the site.
- Disturbance caused by noise and vibration, lighting and loading/unloading of barges is not anticipated to affect local numbers of notable species.
- Resulting from the construction on the foreshore there would be a temporary and permanent loss of resting and foraging habitat for wintering birds.
- The loss of habitat would not lead to decreased population numbers of notable species during construction or operation, as it is expected that would displace to alternative habitat adjacent to the site or the wider area.
- Construction of the cofferdam and campshed would result in a temporary loss of 6,965m^2 of mostly intertidal habitat. This represents 0.03% of River Thames and Tidal Tributaries SINC. Further habitat would be affected through disturbance and consolidation of sediment. Overall there would loss of feeding, resting and nursery habitat for fish and a loss of feeding/burrowing habitat for invertebrates during the construction period.
- In operation there would be a permanent loss of 2,505m^2 of intertidal habitat. 1,105m^2 of intertidal and 410m^2 of subtidal habitat would be modified as a result of the development. Compensation for loss of habitat on a project wide level is described in Volume 3 of the *Environmental Statement.* A permanent loss of feeding, resting and nursery habitat for local fish populations would be associated with the development at the site. Construction of new intertidal terraces would offer refuge from tidal currents to juvenile fish as well as feeding and nursery habitat.
- New intertidal terraces and the associated intertidal habitat would be beneficial to invertebrate and algae populations.
- Reduced amounts of sewage and sewage derived litter entering the ecosystem would improve dissolved oxygen concentrations and lower sediment nutrient levels. Aquatic habitat would be enhanced through operation at the site and would be beneficial to aquatic diversity.

In summary, terrestrial ecology would be maintained during construction and operation. Replacement planting for cleared venation and tree protection measures would be in place. The temporary loss of mostly intertidal habitat during construction would lead to loss of habitat for fish and invertebrate populations. Further there would be a permanent habitat loss associated with the development which would be compensated on a project wide level. Interception of the CSOs during operation would be beneficial to aquatic biodiversity. Consequently, the proposals would support the objective, albeit with some restriction associated with temporary and permanent loss of habitat.

Further information can be found in the *Environmental Statement* and the *CoCP.*

Climate change mitigation

Maximise energy efficiency and minimise the carbon footprint of the project

Appraisal

This objective is most appropriately appraised at the project level, as opposed to the site level. This is because whilst there are variations in energy and CO_2 emissions between sites, in general, these are representative of the different types of site proposed (eg, drive site, CSO interception). The individual sites do not provide an appropriate measure of how far this sustainability objective has been achieved. This is detailed within the *Energy and Carbon Footprint report*.

Procedures to maximise energy efficiency and minimise the carbon footprint of the scheme would be implemented through project-wide initiatives, and not specifically at the site level. Energy Management Plans would be implemented through the CoCP, which, alongside Thames Water's proposals to account for carbon emissions throughout the construction process, would assist in the management of emissions arising from the sites.

Energy and emissions are discussed in the thematic appraisal within the climate change mitigation section (see Appendix A). Additional details are also provided within the *Energy and Carbon Footprint report*.

Whilst predominantly addressed at the project-wide level, at the site level it is anticipated that the proposals would broadly support the objective. The following broad issues are anticipated to arise at the site:

- Greenhouse gas emissions resulting from construction materials at the site would be approximately 9,000 CO_2e. During the construction phase approximately 660t CO_2e and 1,200t CO_2e would result from logistics and construction (TBM, plant and machinery operation, lighting and welfare facilities) respectively.
- The use of river services for the transport of materials to and away from the site would reduce the necessity for HGV transport. This would reduce the carbon footprint by 380t CO_2e at the site level.
- During operation the site would make use of passive ventilation. Consequently it would support the objective by minimising the energy requirements for venting and maximising the efficiency of ventilation points.

In summary, the proposals would support the objective as they minimise the carbon footprint at a site specific level through the use of river services. Energy efficient ventilation would be in place during construction.

Further information can be found in the *Environmental Statement* and the *Energy and Carbon Footprint Report.*

Change adaptation and flood risk

Maximise resilience and adaptability to change;
Take account of flood risk in the design of sites

Appraisal

The objective on resilience and adaptability to climate is predominantly considered at a project- wide level due to relevant changes in population and climate occurring at regional level rather than specifically at a site level (see Appendix A).

However, at the site level the proposals would support the objectives to maximise resilience and adaptability to climate change, and take account of flood risk in design. Particular

issues of relevance to the site appraisal include:

- The site is at very high risk from tidal and fluvial flooding from the tidal Thames. Existing flood defences would be maintained and new defences would be built around the site. Monitoring of flood defences and scour would be in place to maintain existing crest levels. Consequently there would be no increase in tidal and fluvial flood risk resulting from the development.
- Appropriate site drainage as outlined in the *CoCP* would ensure that there would be no increase in surface water flood risk.
- The proposed development would not increase the flood risk associated with groundwater as dewatering and depressurisation would take place within secant piling walls. Monitoring of groundwater levels would be monitored during construction and operation.
- Existing outfalls would be extended through the cofferdam to allow the sewer system to be maintained during construction. Surface water outfalls would be extended past the proposed river walls and terrace structures. Sewage would be diverted to the main tunnel during operation. There would consequently be no increased risk of sewer flooding.
- The site is located within the Central Activity Zone and within an area deficient of open space. The proposals would result in an increase in hard standing; however, the site is located adjacent to the River Thames which would alleviate the effects of urban heat. Resilience and adaptability to future changes in temperature would therefore be given.

In summary, there would be no increase in flood risk from any source resulting from the development as the proposals have taken flood risk into account in the design of the site. Resilience and adaptability to future temperature changes would be maximised as the site is located adjacent to the river. The proposals would therefore support the objective.

Further details can be found in the *Environmental Statement, Site Selection Report* and the *CoCP.*

Excavated materials and waste management

Minimise waste arisings and its impacts on the environment and communities and to promote re-use, recovery, recycling and beneficial use

Appraisal

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- A drop shaft with an internal diameter of approximately 16m and a depth of 47m would be excavated at the site. Further, a connection tunnel would be excavated which would connect the shaft to the main tunnel. This would in approximately 125,000t of excavated material consisting mainly of imported fill (82,000t) and London clay (24,700t). The material would be managed in accordance with the *Excavated material and waste strategy* (see *Environmental Statement* Vol 3 Appendix A) which seeks to maximise beneficial re-use of excavated material.
- The total estimated construction waste during tunnel construction would be 3,000t and would be managed through measures outlined in the *CoCP* to promote re-use, recovery, recycling and beneficial use in accordance with the waste hierarchy.
- It is estimated that 13t of welfare waste would arise annually during the construction at the site. This would also be managed in accordance with the waste hierarchy.
- Excavated material would be transported from site by barge minimising impacts on the local community associated with road transportation.

In summary, the proposals would promote re-use, recovery, recycling and beneficial use in accordance with the waste hierarchy. This would divert large amounts of waste from

landfill. The use of river services would minimise impacts on the environment and communities associated with the transport of material.

Further information can be found in the *Environmental Statement, Excavated material and waste strategy* (see *Environmental Statement* Vol 3 Appendix A) and the *CoCP.*

Resources and raw materials

Promote the sustainable use of resources

Appraisal

The objective to promote the sustainable use of resources is most appropriately appraised as a project-wide issue, rather than specifically at the site level. Whilst it will be important to work towards the objective through ongoing considerations towards the further design of sites, the major opportunities will arise by taking interventions across the project as a whole.

A significant volume of materials would be required to support construction. The materials required are central to the durability of the tunnel and therefore the scope for promoting the sustainable use of resources is limited by engineering requirements. A range of measures are proposed at the project level which support the objective and which would assist to promote the sustainable use of resources. Further details are available within the resources and raw materials section (Appendix A).

Whilst largely addressed at the project-wide level, at the site level, the proposals would support the objective. The following considerations are relevant to the sustainability at the site level:

- It is estimated that 31,500 litres of water would be used every 24 hours during the peak construction period between 2018 and 2019. This is largely accounted for by water need for shaft and tunnel grout/ concreted (20,000L/d) and for mitigation measures such as dust suppression and washdown (8,000L/d). The amount of water needed during construction is shown to lie within the available water for London, as estimated in Thames Water's water resources management plan and is therefore considered to be sustainable.
- The operation of the site is not anticipated to present a large demand for materials, with the exception of those required in routine maintenance.

In summary the proposals would make use of sustainable supplies of water and would not require large amounts of resources and raw materials during operation.

Further information can be found in the *Environmental Statement* and the *CoCP.*

Population, human health and equality

Ensure health and safety, and support the well-being of communities in which the project operates;
Encourage equality and sustainable communities

Appraisal

The proposals would support the objective as they ensure health and safety within the community. However, well-being of some receptors could be affected. The proposals would encourage equality and sustainable communities. Particular issues of relevance to the site appraisal include:

- The construction at the site would last for approximately 3.5 years, with standard and continuous working hours in place. The *CoCP* sets out measures that to ensure the health and safety and support the well-being of the local community.
- Measures embedded in the *CoCP* seek to minimise effects arising from noise and vibration. However, some receptors in the surrounding area of the site would

experience significant adverse effects relating to noise and vibration. The use of low vibration techniques would be considered to manage this. As no further on-site mitigation would be feasible, measures such as double glazing and compensation would be available where applicable to offset this. Whilst this would ensure health and safety, it could reduce well-being should relocation be necessary.

- The site is located within the London Borough of Lambeth AQMA. Mitigation measures set out in the *CoCP* would ensure that air quality is not affected in a manner that would compromise health and safety within the community.
- The Thames Path runs within the site boundary and would be diverted during construction. The diversion would result in a shorter journey distance but increase journey time due to increased crossings. This could affect the well-being of pedestrians. However, appropriate signage would ensure health and safety is not compromised.
- Interception of the CSOs would lead to a reduction of days recreational river users are exposed to pathogens from 140 days to 8 days per year, ensuring and supporting health, safety and well-being.
- The number of risk days in which river-users would be exposed to pathogens would also see a significant reduction during operation, by approximately 132 days to 8 days per year, ensuring enhanced river water quality.
- Encouraging equality and sustainable communities is predominantly addressed at the project-wide level. However, extensive public consultation has been undertaken to take into account the community's views on the proposals at the site. This has been considered in conjunction with engineering, environmental, planning and cost issues to achieve a balance between vying interests. Consequently, it is considered that the proposals support the objective of equality and sustainable communities.

In summary, health and well-being within the community would be ensured. The well-being of some receptors could be affected resulting from noise and vibration effects as no further on-site mitigation would be possible and relocation could be required. Diversion of the Thames Path could reduce well-being of pedestrians as it would lead to a longer journey time. Health, safety and well-being of river users would be ensured during operation as pathogen exposure would be reduced. The proposals would consequently support the objective of ensuring health and safety, albeit some restrictions apply in regard to well-being.

Further information can be found in the *Environmental Statement* and the *CoCP.*

Economy

Promote a strong and stable economy

Appraisal

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- A maximum of 65 workers would be employed at any one time during the construction. This would create opportunities and consequently support the objective.
- The proposals would ensure that the business of Duck Tours would not be reduced through construction vehicles under both access options.

In summary, the proposals would support the objective through creation of employment opportunities at the site during construction and would minimise economical effects Duck Tours.

Further information can be found in the *Environmental Statement.*

Environmental protection and enhancement:

Minimise significant adverse environmental effects relating to air quality, noise and vibration and lighting from construction and operation of the Thames Tideway Tunnel;
Protect and enhance the character of landscapes and townscapes;
Protect and conserve the historic environment.

Appraisal

The proposals would support the objective relating to environmental effects, albeit with some restriction relating to noise and vibration. The proposals would partly support the objective relating to the townscape and the historic environment. Particular issues of relevance to the site appraisal include:

Environmental Effects

- The proposals seek to minimise significant adverse environmental effects through measures outlined in the *CoCP.* However, the embedded measures would not eliminate significant effects relating to noise at all receptors. The *CoCP* proposes the use of low vibration techniques to reduce vibration effects. Compensation would be available where applicable as no further on-site mitigation would be feasible.
- The site lies within the London Borough of Lambeth AQMA. Mitigation measures and the use of barges would minimise effects on air quality arising from the construction. Consequently, no significant adverse effects would result from the development.
- Lighting principles outlined in the *CoCP* would reduce light spills and mitigate against significant effects.
- Consequently, the proposals would support the objective as they seek to minimise significant adverse environmental effects relating to air quality, noise and vibration and lighting. However, significant adverse effects relating to noise would remain at some receptors. Further, it is possible that receptors would experience significant adverse environmental effects relating to vibration should low vibration techniques not be applicable.

Landscape and Townscape

- The character of the site and the surrounding townscape would be altered during construction. This is due to the introduction of the cofferdam and the temporary presence of construction activity and equipment such as site hoarding and welfare facilities.
- Permanent changes to the site and the townscape would result from the introduction of a new foreshore structure and above ground structures. These changes are considered to have adverse effects where development has taken place on previously undeveloped parts of the river.
- Demolition of dilapidated buildings and the introduction of new public realm and well designed above ground structures would be beneficial to the site and parts of the surrounding area.
- Construction at the site would consequently lead to temporary alterations in the setting of the site and surrounding townscape. In operation the site and townscape would be enhanced. However, alterations through the introduction of the foreshore structure on undeveloped parts of the river would lead to permanent changes in the townscape.

Historic Environment

- The site lies within the Albert Embankment Conservation Area with parts located underneath the Grade II listed Vauxhall Bridge. The surrounding area includes the 19th century embankment river wall and Lack's Dock slipway.

- Presence of construction activity and equipment would detract from views of historic buildings and conservation areas in the surroundings of the site. However, this would be of temporary nature and restricted to the construction period.
- Some above ground heritage assets such as post-medieval river outflows, dolphins and storm flaps as well as unlisted river wall sections would need to be removed for the construction. A programme of archaeological surveying, recoding and photography would ensure that assets would not be removed without record.
- Targeted investigation and recording as well as archaeological watching briefs would ensure conservation of buried heritage assets. In particular there is high potential for Mesolithic timber structures to be present at the site.
- The historic environment and the setting of Vauxhall Bridge would be slightly altered through the proposed scheme and changes in the river wall.
- The proposals would support the objective by protecting and conserving historic assets but would lead to temporary changes of the historic townscape during construction. Further, slight alterations to the townscape would remain during operation.

In summary, the proposals have minimised significant adverse environmental effects relating to air quality, noise and vibration, and lighting wherever possible. Despite extensive mitigation some receptors would be affected through and noise and potentially through vibration. Presence of construction activity and equipment would temporarily alter the setting of the site, townscape and the historic environment. The introduction of new public realm and permanent structures would lead to permanent changes in the townscape. This would be beneficial to the site and the surrounding area with the exception of previously undeveloped parts of the river. The proposals would support the objective by ensuring protection and conservation of above ground and buried historic assets. However, slight changes to the historic environment and the setting of the Grade II listed Vauxhall bridge would remain during operation.

Further information can be found in the *Environmental Statement* and the *CoCP.*

Land use

Efficient and sustainable use of land and buildings

Appraisal

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- Part of the site is located on previously developed land eliminating the need for development on greenfield land.
- The area over the drop shaft would be landscaped after the construction has been completed and incorporated into the public realm. This would make sustainable and efficient use of land.
- However, it must be noted that development would take place on previously undeveloped parts of the River Thames.

The proposals would support the objective as they make sustainable and efficient use of land. Some development would, however, take place on previously undeveloped parts of the river.

Further information can be found in the *Environmental Statement* and the *Site Selection Report.*

Sustainable transport

Minimise the detrimental impacts associated with the transport of construction materials and waste on communities and the environment, by prioritising the use of sustainable transport

Appraisal

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- Approximately 90% of materials would be transported to and away from the site via barge. Making use of river services would minimise detrimental impacts associated with construction transport on the environment and communities.
- It is estimated that 16 HGV movements would be required on average during the construction period. Approximately 38 HGV movements per day would be generated during the peak construction period, which would last two months. Measures outlined in the *CoCP* such as provision of a traffic management plan would ensure that detrimental impacts on the environment and communities are minimised.
- The PTAL for the site has been classified as level 6b, denoting an excellent accessibility level via public transport. Measures set out in the *CoCP* such as only allowing vehicles necessary for construction works on site would promote public transport. Consequently it is not anticipated that workers would travel to site by car.
- The objective refers to impacts associated with transport during the construction period and is therefore not applicable during operation.

In summary, the proposals would support the objective by promoting sustainable transport such as the use of river services and public transport. Necessary road traffic would be managed in a manner that would minimise detrimental impacts on the environment and communities.

Further information can be found in the *Environmental Statement* and the *CoCP*.

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DCO-DT-000-ZZZZZ-070700