Thames Tideway Tunnel
Thames Water Utilities Limited

Application for Development Consent

Application Reference Number: WWO10001

Planning Statement

Doc Ref: **7.01**

Appendix D

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

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Thames Tideway Tunnel

Creating a cleaner, healthier River Thames

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Thames Tideway Tunnel

Planning Statement
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Appendix D: Putney Embankment Foreshore

D.1 Introduction

D.1.1 In an average year, the Putney Bridge combined sewer overflow (CSO) discharges on average a total of 68,000m^3 of untreated sewage in 33 events into the tidal Thames. On the basis that litter tonnages are proportional to discharge volumes, it also discharges approximately ten tonnes of sewage derived litter in a typical year. A worksite is required to connect the Putney Bridge CSO to the main tunnel. The proposed development site is known as Putney Embankment Foreshore, which is located in the London Borough of Wandsworth.

D.1.2 The Environment Agency identified the Putney Bridge CSO as a CSO that needs to be controlled, and Thames Water's solution to deal with this CSO is full interception. The CSO discharges have multiple impacts on water quality at the outfall location. This includes a localised effect of rapidly dropping dissolved oxygen levels, released pollutants and of sewage litter and effluent.

D.1.3 Catchment modelling suggests that if the project is constructed as proposed, the annual discharge of untreated sewage into the tidal Thames would be reduced to 1,600m^3, and that the number of discharges would be reduced to one event per year. The sewage derived litter from the CSO can be expected to reduce by approximately 98 per cent to less than half a tonne in a typical year. The frequency, duration and volume of spills at Putney Bridge CSO would therefore be reduced by approximately 98 per cent as a result of the operation of the project. A site location plan is included in Annex D.

D.1.4 This assessment is structured as follows:

a. Section D.2 provides a brief description of the Putney Embankment Foreshore site.

b. Section D.3 sets out the planning context for works in this location.

c. Section D.4 describes the site-specific development for which consent is sought and the way in which the proposals evolved in response to consultation

d. Section D.5 provides an analysis of the principal site-specific planning considerations and how the proposals comply with relevant planning policy

e. Section D.6 provides an overall conclusion of the site-specific assessment.

D.2 Site description

D.2.1 The site itself comprises of two areas of the foreshore of the River Thames, the main site is known as Putney Embankment Foreshore and the secondary site known as Putney Embankment Temporary Slipway.

The main and secondary sites are defined by the limits of land to be acquired or used and cover areas of approximately 1.6 ha and 1.2 ha, respectively. An aerial photo of the main Putney Embankment Foreshore site is provided in Figure D.1 below.

Figure D.1 Aerial photograph of Putney Embankment Foreshore

D.2.2 The main site is bounded by the River Thames to the north, the Grade II* listed St Mary's Church to the east, the Embankment carriageway and Lower Richmond Road to the south and Putney Pier to the west. The main site also includes the area beneath the Grade II* listed Putney Bridge, Waterman's Green and the historic Putney public slipway immediately to the west of Putney Bridge. The secondary site, for the temporary replacement slipway, is located approximately 300m northwest of Putney Bridge, and lies between Thames Place and Glendarvon Street, close to Chas Newens Marine and 1 to 15 Ruvigny Mansions. The secondary site is bounded by the Embankment carriageway to the south and the River Thames on all other sides. Photographs of the location of the temporary replacement slipway are shown below.

Figure D.2 Photograph of the temporary slipway site from Embankment looking east

Figure D.3 Photograph of the temporary slipway site from the foreshore looking east

Existing access to the main site is via the Embankment carriageway. The main site is located close to both Putney High Street (A219) and the A205 Upper Richmond Road, which is part of the Transport for London Road Network. Putney public slipway is used by a variety of river users, including recreational and commercial operators, to launch and recover vessels.

D.2.3 There are a number of heritage assets and listed buildings in the vicinity of the site, which contribute to the character and setting of the area. On the northern bank of the River Thames, opposite the site, lie the Grade II* listed Parish Church of All Saints, the Grade I listed Fulham Palace and the Grade II* registered Bishop's Park. To the east of the site is the Grade II listed Putney Bridge and Grade II* listed St Mary's Church, also known as the Church of St Mary the Virgin.

D.2.4 The surrounding area to the east and south of the main site comprises residential, commercial and retail uses, including Putney town centre. Residential properties lie to the south of Lower Richmond Road, including Richmond Mansions, the six-storey blocks of flats of Kenilworth Court, University Mansions. To the southwest of the site is the modern, two-storey Thai Square restaurant and the six-storey Star and Garter public house, which comprises a restaurant, function rooms and staff residences. The closest residential properties are two residential houseboats which are moored to the west on the historic (not listed) Putney Pier.

D.2.5 The surrounding area to the west of the main site and secondary site comprises residential properties and a commercial river boat business, Putney Pier, and several rowing clubs. Fourteen rowing clubs operate within the area and other clubs further along the river also operate around Putney. Sailing activities take place on most days around Putney, and race programmes are scheduled most weekends during the summer and winter, and on some evenings in summer, depending on the tide and weather conditions. An existing site features plan is attached in Annex D.

D.3 Planning context

D.3.1 In developing the proposals and mitigation measures for the development at Putney Embankment Foreshore, Thames Water[1] had regard to the policies set out in the NPS, and to local development plan designations where these are relevant to the application.

D.3.2 In this case the local development plan comprises the *London Plan (*2011) *(*Examination in Public on proposed minor alterations commenced on 19 November 2012*)*, the London Borough of Wandsworth's *Core Strategy*, (October 2010), and the London Borough of Wandsworth's *Development Management Plan Document* (February 2012) and the *Site Specific Allocations Document* (February 2012).

[1] Thames Water Utilities Ltd (TWUL). The Draft Development Consent Order (DCO) contains an ability for TWUL to transfer powers to an Infrastructure Provider (as defined in article 2(1) of the DCO) and/or, with the consent of the Secretary of State, another body

D.3.3 The River Thames is designated as the River Thames and Tidal Tributaries Site of Importance for Nature Conservation and the site itself falls within the Putney Embankment Conservation Area. The site also falls within the Wandsworth Thames Policy Area in the *Core Strategy*, which supports and protects Putney's special character as an area for river-based recreation and river sports.

D.3.4 There are a number of heritage assets within the vicinity of the site, which contribute to the character and setting of the area:

a. Five Grade II listed bollards are located within the western side of the site.

b. Putney Bridge is Grade II listed and located to the east of the site, St Mary's Church also located to the east and adjacent to Putney Bridge is Grade II* listed.

c. The Putney Bridge listing includes a wing wall facing Waterman's Green on the raised edge of Lower Richmond Road. Putney public slipway is separated from Embankment by Grade II listed decorative iron bollards. Although not listed, it is an historic slipway located on the west side of Putney Bridge and forms part of the temporary CSO working area.

d. On the northern bank of the River Thames, opposite the site, lie the Grade II* listed Parish Church of All Saints, the Grade I listed Fulham Palace and the Grade II* registered Bishop's Park.

D.3.5 Mature trees protected by Tree Preservation Orders are located along the river frontage around St Mary's Church and are a key component of the wider townscape.

D.3.6 An application for full planning permission was received on 21st December 2012 (reference 2012/6004) for an extension to Putney Pier which is located within the Putney Embankment Foreshore limits of land to be acquired or used by the project. The application proposes the provision of 11 additional residential mooring berths and 2 visitor mooring berths. The extension will comprise pontoon units, mooring piles and access brows. A mono-pile with fender is also proposed on the upstream end of the existing pontoon for river bus use, and a platform on the deck of the main pontoon.

D.3.7 The Thames Tideway Tunnel including part of the Putney Embankment Foreshore site is subject to a Safeguarding Direction served on the council by the Secretary of State for the Department of Communities and Local Government on 21 December 2012. The Direction prevents the council from granting planning permission in respect of any development on any land to which the Direction relates without his specific authorisation. The Direction will remain in force until 31 March 2013.

D.3.8 There are several relevant extant planning permissions and listed building consents relevant to the vaults located beyond the river wall and beneath Lower Richmond Road, immediately adjacent to Waterman's Green and the proposed site. Details of these permissions and consents are summarised below:

a. A non-material amendment application was granted permission on 16 July 2010 (reference no. 2010/1974) at 4 to 6 Putney High Street for *"Amendment to planning applications (ref. 2007/5387 and 2005/4060) for alterations in connection with use of basement and ground floors as restaurant/café and bar (Class A3/A4) and use of upper floors as 1 x 3-bedroom and 1 x 2-bedroom flat and 1 x 1-bedroom flat. Rebuilding of rear with extensions at all levels to the rear and side. Removal of roof and proposed mansard roof extension to the front with a modern glass roof extension to the rear and retention of front façade"*.

b. An application was granted Listed Building Consent on 1 October 2012 (reference no. 2012/1998) for 4 to 6 Putney High Street for the *"formation of arched openings in listed river wall with flood barrier for each vault in connection with the use of the basement as a restaurant/ cafe and bar (Class A3/A4) to provide access onto Waterman's Green. Formation of new opening between vaults and installation of cavity membrane system (Listed Building Consent). Details of requirements of the Environment Agency pursuant to Condition 12 of planning permission (ref: 2001/4311)''*.

c. An application for planning permission (reference no. 2010/3543) and Listed Building Consent (reference no. 2010/3584) was granted consent on 7 January 2011 for 2 Putney High Street for *"Alterations to existing restaurant (Class A3) including extension at rear of ground and basement floors; alterations to the shop front, provision of additional floorspace within existing basement vault and provision of an opening in the river wall with flood barrier to provide access onto Waterman's Green''.*

D.3.9 The relevance of these planning applications is assessed in the Land use subsection below.

D.4 Site-specific description of development

Overview

D.4.1 The proposed development at Putney Embankment Foreshore is to intercept flows from the Putney Bridge CSO. The works would convey flows from the existing outfalls located beneath the southern arch of Putney Bridge into the main tunnel.

D.4.2 The work would require the construction of a CSO interception chamber, hydraulic structures (including chambers, culverts and pipes), two ventilation columns and two electrical and control kiosks. Flows would be transferred from the existing outlet pipework on the foreshore to the deeper level of the main tunnel via a CSO drop shaft and associated connection tunnel. The CSO shaft would be approximately 36m deep.

D.4.3 The majority of the permanent works would be located within the foreshore of the River Thames and enclosed within a new permanent, above-ground foreshore structure. This structure would provide an operational area to facilitate vehicle access during maintenance activities.

The structure would be finished at flood protection level to prevent the ingress of river water. This level would be up to approximately 1.1m above the existing carriageway level, with a series of tapered steps accommodating the level difference. The area would be hard landscaped on completion and be accessible to the general public.

D.4.4 The interception chamber would be located beneath the southern shore arch of Putney Bridge. It would be partly beneath the foreshore and the upper section of the chamber would be visible at certain tidal states.

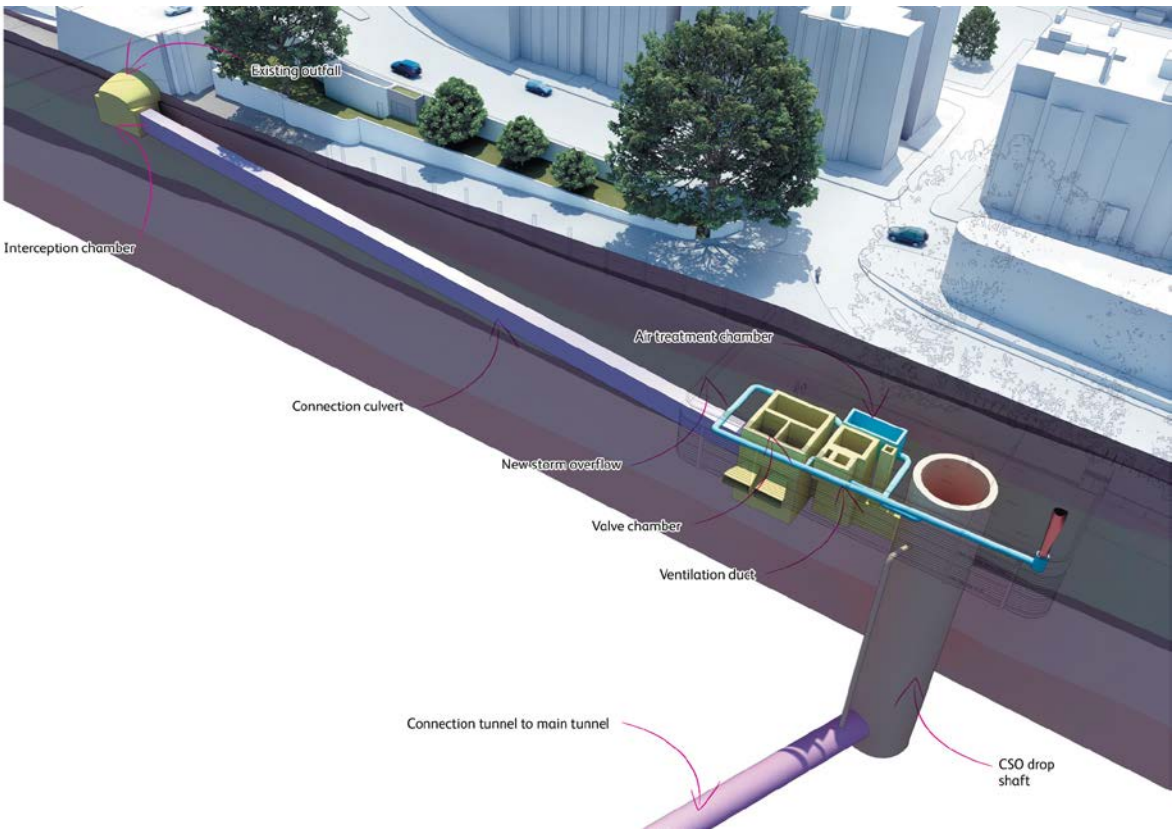
D.4.5 The primary electrical and control kiosk would be located on Waterman's Green adjacent to the stairway to the disused public conveniences beneath Lower Richmond Road. The secondary electrical and control kiosk would be located on the foreshore structure.

D.4.6 The main ventilation column would be located on the foreshore structure. A secondary ventilation column serving the interception chamber would be located in the footway on the downstream side of Putney Bridge.

D.4.7 The formation of the construction site would result in the temporary unavailability of Putney public slipway. An alternative temporary slipway is therefore proposed to maintain public river access.

D.4.8 All works would be contained within the relevant zones as indicated on the Site works parameter plan. The functional components of the proposed works are illustrated in the diagram below.

Figure D.4 Functional components diagram



Application for development consent

D.4.9 The geographic extent of the proposals for which development consent is sought is defined by the limits of land to be acquired or used and the drawings listed in Table D.1.

Table D.1 Putney Embankment Foreshore: Drawings that define the proposed development

Drawing title	Status	Location
Proposed schedule of works	For approval	Schedule 1 to the *Draft Thames Water Utilities Limited (Thames Tideway Tunnel) Development Consent Order* (the '*Draft DCO'*)
Access plan (2 sheets)	For approval	*Book of Plans*, Section 8
Demolition and site clearance (3 sheets)	For approval	*Book of Plans*, Section 8
Site works parameter plan	For approval	*Book of Plans*, Section 8
Permanent works layout (various)	Illustrative	*Book of Plans*, Section 8
Temporary slipway layout	Indicative	*Book of Plans*, Section 8
Proposed landscape plan (2 sheets)	Indicative except the above-ground structures, which is illustrative	*Book of Plans*, Section 8
Section AA (2 sheets)	Illustrative	*Book of Plans*, Section 8
Section BB	Illustrative	*Book of Plans*, Section 8
As existing and proposed elevation (various)	Illustrative	*Book of Plans*, Section 8
Proposed listed structure interface: Kiosk	Indicative	*Book of Plans*, Section 8
Foreshore kiosk design intent	Indicative	*Book of Plans*, Section 8
Listed structure interface: Interception chamber	Indicative except for maximum extent of loss of listed structures, which is for approval	*Book of Plans*, Section 8
Typical river wall design intent	Indicative	*Book of Plans*, Section 8
Existing and proposed listed bollard location plan	Indicative	*Book of Plans*, Section 8
Construction phases plans (various)	Illustrative	*Book of Plans*, Section 8
Highway layout during construction (phases)	Illustrative	7.10.4 *Transport Assessment*: Putney Embankment Foreshore

Drawing title	Status	Location
		Figures
Permanent highway layout (phases)	Illustrative	7.10.4 *Transport Assessment*: Putney Embankment Foreshore Figures
River foreshore zones of working	For information	*Navigational Issues and Preliminary Risk Assessment Putney Embankment Foreshore*

D.4.10 The Nationally Significant Infrastructure Project works (Work No. 5a) comprise the construction of a CSO drop shaft with an internal diameter of approximately 6m and depth of 36m and (Work no. 5b) the Putney Bridge connection tunnel works between Putney Embankment Foreshore CSO drop shaft (Work No. 5a) and the main tunnel (Work No. 1a).

D.4.11 Associated development includes dredging and construction of a temporary cofferdam and a campshed; partial demolition of the existing river wall and construction of a new river wall; removal of the existing CSO apron in the foreshore; construction of an interception chamber, CSO overflow structures and apron including scour protection; works to the listed Putney Bridge including attaching the interception chamber (Work No. 5(c)(iv) to the bridge abutment, installing ventilation ducts through the listed bridge, and attaching ventilation column through the bridge structure; relocation and replacement of listed bollards; construction of electrical kiosks; construction of structures for air management plant and equipment including filters and ventilation columns and associated below ground ducts and chambers; works to protect and reinstate the Putney public slipway; construction of a new permanent access off Embankment; temporary relocation of existing houseboats to the west of the existing Putney Pier; and works to provide a replacement temporary slipway (Work No. 5d). The full description of the proposed development can be found in Schedule 1 to the *Draft DCO*, and further details of the temporary construction works and permanent operational structures are set out below.

D.4.12 At this site, approval is sought for the works shown on the Works plan showing Work no. 5a and Work No. 5b, and the Site works parameter plan, which shows the relevant zones and limits of land to be acquired or used in which the associated development works would be undertaken, the Access plans, and Demolition and site clearance plans. The plans for approval are contained in the *Book of Plans* along with other plans that show the construction phasing and permanent works plans relevant to this site. These other plans are marked either for approval, for information, indicative or illustrative depending on the level of detail they are providing. Section 2 of the *Planning Statement* explains in more detail the overall approach to the level of detail and how the plans for approval were developed. The Good design subsection of this appendix explains the level of detail with regard to the proposed above-ground structures at this site and the need to obtain further approvals.

Construction

D.4.13 The construction is programmed to take approximately three and a half years and would involve the following main activities:

a. site preparation (approximately 12 months)

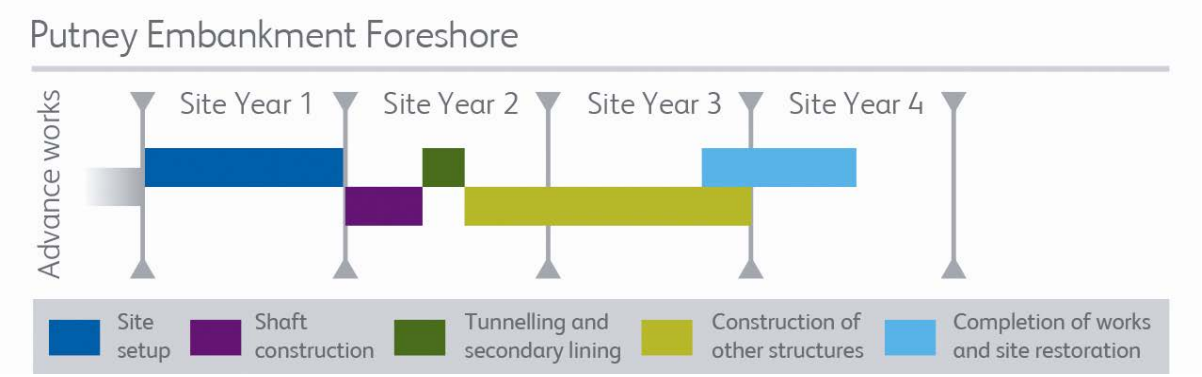
b. shaft construction (approximately six months)

c. tunnelling and secondary lining (approximately two months)

d. construction of other structures (approximately 16 months)

e. completion of works and site restoration (approximately ten months)

Figure D.5 Construction timeline



D.4.14 Additional construction works would be required in advance and after the main CSO site works for the provision, and subsequent removal, of the temporary slipway. Each of these additional works would be approximately three months in duration but are accounted for within the total approximate three and a half year construction period.

D.4.15 The majority of construction at the main site would occur from 8am to 6pm Monday to Friday and 8am to 1pm on Saturdays. Construction may occasionally be required outside of these hours during key construction activities. A short period of 24-hour working would be required for the connection tunnel and secondary lining; however these activities would be predominately below ground, with support activities at ground level. Heavy goods vehicle (HGV) movements would be limited to daytime hours. Further information in relation to working hours and site-specific restrictions are contained within the *Code of Construction Practice (CoCP)* Parts A and B, which accompany the application.

D.4.16 Construction vehicles would access the main site from the A3 travelling along Putney Bridge Road (A3209) and Putney High Street (A219). Traffic would then turn onto Lower Richmond Road and access the site off the Embankment carriageway.

D.4.17 It is proposed to suspend a short section of the one-way system along Embankment and a number of existing parking bays to enable construction vehicles to exit the site via the same route and limit the number of vehicles travelling westbound along Embankment.

D.4.18 It is anticipated that an average of six HGVs would access the main site per day for the majority of the construction period. This would rise to

approximately 21 HGVs per day over an estimated one-month period. This would be during the sewer connection works and the construction of the various hydraulic chambers. There may be additional periods during key construction activities when these HGV numbers would be exceeded.

D.4.19 In order to minimise HGV movements, river transport would be used for bulk materials, such as excavated material, where practicable. It is anticipated that an average of two barges would access the site per day. Barge movements would be focused on the site preparation, shaft and tunnel construction and site restoration phases. Further details regarding the number and breakdown of anticipated HGVs and barges accessing the site is contained in the *Transport Assessment,* which accompanies the application.

D.4.20 Potential layouts of the construction site are shown on the Construction phases plans, included in Annex D. It should be noted that these layouts are for guidance only. The contractor may arrange the site in a different way depending on the chosen construction method, provided that any environmental effects are appropriately managed and that main construction activities are contained within the appropriate zones.

Temporary slipway

D.4.21 A temporary slipway would be constructed approximately 300m upstream of Putney Bridge. This would maintain access to the river while Putney public slipway is unavailable.

D.4.22 A modified vehicle access route would be utilised for the construction and dismantling of the temporary slipway. Vehicles would turn off Lower Richmond Road into Glendarvon Street, before turning onto Embankment. Vehicles exiting the site would turn from Embankment onto Thames Place, before turning left onto Lower Richmond Road. Construction vehicles associated with the main Putney Embankment Foreshore site would not use Glendarvon Street

D.4.23 It is anticipated that an average of three HGVs would access the temporary slipway site per day while it is constructed and subsequently dismantled. HGVs would only access the temporary slipway site between 10am to 3pm Monday to Friday to minimise the impact on the local community. This is covered in the *CoCP* Part B.

D.4.24 The temporary slipway would be constructed and made available for public use before commencing construction at the main CSO site. The temporary slipway would be constructed from prefabricated steel sections and assembled on-site. Circular steel supports or piles would be drilled or augured into the foreshore to provide a vertical frame for the structure. Steel sections would then be assembled between the piles to provide the shape and decking.

D.4.25 It is possible that either elevating/floating platforms or jack up barges would be used to install the piles and enable the assembly of the steel sections. Alternatively, the work would be conducted via inter-tidal working.

D.4.26 Appropriate traffic management and the provision of office and welfare facilities would be required to facilitate construction. These would be situated on the Embankment carriageway. A number of parking bays would be suspended in order to facilitate this. The existing boat slipway located outside the Marine Chandlery would be temporarily closed during the construction and dismantling of the temporary slipway.

D.4.27 A number of the existing eight moorings close to the proposed temporary slipway location may need to be temporarily relocated during its construction and removal. Discussions were held with affected parties and the Port of London Authority to achieve a mutually agreeable solution.

Site preparation

D.4.28 The landside site boundary would be established by erecting timber hoarding up to 3.6m high along the approximate alignment of the existing hand railing. Site office and welfare facilities would then be provided using stacked mobile cabin-style units.

D.4.29 The riverside boundary would then be established with vertical sheet piles installed from a jack up barge to form a temporary river wall or cofferdam. This would isolate the enclosed site area from the river. Sections of the cofferdam may be installed from foreshore level using inter-tidal working.

D.4.30 Barges would bring in granular material to fill the enclosed site area to create a dry working area above the highest tide level. Mechanical plant would be used to transfer the material from the barge into the cofferdam area. The site area that extends beneath Putney Bridge would not be filled and would remain at the lower level of the existing foreshore.

D.4.31 Barges would be moored along the river face of the working area and sit on a flat granular bed, or campshed, during periods of low tide. It is anticipated that one of the houseboats moored at Putney Pier would need to be temporarily relocated as part of this phase.

D.4.32 Temporary and permanent utility supplies also would be provided to the site at this stage. Appropriate trees would be selectively pruned.

Shaft construction

D.4.33 The 6m internal diameter CSO drop shaft would then be constructed. This would be excavated in approximately 1m increments and a sprayed concrete lining would form the shaft walls to the required depth.

D.4.34 Excavated material from the shaft would be lifted to ground level using a mobile crane and deposited in a material handling area within the site. Excavated material would then be transferred into barges by mechanical excavator and towed away from the site by tug.

D.4.35 The concrete required on the site might either be batched on site with imported aggregate, or delivered ready-mixed as required.

Tunnelling

D.4.36 The connection tunnel between the CSO drop shaft and the main tunnel would then be constructed. It would be approximately 2.2m in internal

diameter. It would be excavated in 1m increments and a sprayed concrete lining would be applied to form the tunnel walls.

D.4.37 Excavated material from the tunnel would be removed via the drop shaft, lifted to surface level by a mobile crane and transported off-site by barge.

Secondary lining of connection tunnel and shaft

D.4.38 A secondary concrete lining would then be applied to the drop shaft and connection tunnel. This is required to improve the durability, watertightness and structural integrity of the shaft and tunnel.

D.4.39 The process would involve casting an *in situ* concrete lining using a curved mould, or shutter, to form the internal face of the tunnel and the drop shaft. The secondary lining would be progressed by continuously pouring concrete to the shutter as it is advanced either horizontally along the length of the tunnel or vertically up the wall of the shaft.

D.4.40 The concrete for the secondary lining would either be batched on-site, or delivered ready-mixed. It would be pumped from surface level to the connection tunnel or drop shaft.

Construction of other structures

D.4.41 Other below-ground hydraulic structures, including the interception chamber, valve chamber and air treatment chamber would also be constructed. These chambers would be constructed from *in situ* concrete poured into shuttered excavations to provide the structure's shape.

D.4.42 The interception chamber would be located beneath the arch of Putney Bridge. A temporary protective deck may be installed beneath the arch to prevent any damage to the listed bridge during the construction of the chamber. The connection culvert between the interception chamber and the foreshore structure would then be constructed using open cut techniques.

D.4.43 The electrical and control kiosk would then be constructed on Waterman's Green. Its external appearance would match the adjacent granite wall to minimise its visual intrusion. Subject to the owner's agreement, the existing stairway to the disused public conveniences beneath Lower Richmond Road would be opened to maintain an emergency egress point during the construction works along the eastern section of the green.

D.4.44 Ductwork would then be laid beneath the footway of Lower Richmond Road between the primary kiosk and the foreshore structure. The ventilation column for the interception chamber would be located on the eastern footway of Putney Bridge.

D.4.45 Temporary open mesh fencing would surround these shorter duration working areas to provide a safe working area and segregate adjacent pedestrians. Local pedestrian and traffic management would be required.

Completion of works and site restoration

D.4.46 On completion of the permanent structures, the external face of the permanent river walls would be constructed by removing areas of the

temporary infill between the new wall and the temporary cofferdam. Mechanical plant would transfer the infill to barges to be removed by river.

D.4.47 Sheet piling used for the cofferdam would then be removed from the foreshore. This might be undertaken by a jack up barge and a combination of inter-tidal working. Scour protection would then be installed and the foreshore reinstated.

D.4.48 The foreshore structure would then be landscaped and mechanical plant and equipment gradually removed from site. The foreshore structure would be finished in a hard landscape material to facilitate safe operational access.

D.4.49 The tapered steps would be constructed to accommodate the varying level difference between the foreshore structure and the adjacent Embankment footway. The surface finish of the footway would be landscaped to match the foreshore structure.

D.4.50 As the landscaping is progressed, the hoarding around the construction site would gradually be removed. Temporary weld mesh fencing would be used to surround any final landscaping works to maintain separation from pedestrians. Further details of the landscaping proposals are located on the associated drawings within the *Book of Plans*.

D.4.51 The system would then be commissioned. Temporary weld mesh fencing would surround the vehicles and equipment to provide a segregated safe working area. Once all works are finished, the temporary fencing would be removed and any final landscaping requirements completed. All vehicles and equipment would then be removed from site.

Operation and maintenance

D.4.52 For the purposes of the application, each of the main operational structures is shown within a defined zone in which the structure would be located. The operational structures and the relevant plans form part of the application. The defined zones for the structures are shown on the Site works parameter plan.

CSO drop shaft

D.4.53 The shaft would be constructed within the foreshore structure and finished approximately 5m above the existing foreshore level. It would have an approximate internal diameter of 6m and be approximately 36m deep. A connection tunnel would be constructed to connect the shaft to the main tunnel.

D.4.54 Combined sewage flows diverted from the existing CSO would be conveyed to the drop shaft via an interception chamber and connection culvert, and from there into the main tunnel via the connection tunnel.

D.4.55 A number of access covers would be incorporated at the top of the shaft for inspection and maintenance purposes.

Chambers and culverts

D.4.56 The interception chamber would be located beneath the southern shore arch of Putney Bridge. The upper section of the interception chamber

would protrude above the existing level of the foreshore, and at low tidal events, the interception chamber would be visible above the water line.

D.4.57 It was assumed that the connection culvert would be constructed beneath the foreshore to convey flows from the interception chamber to the valve chamber and drop shaft. Other hydraulic and valve chambers would be constructed adjacent to the shaft to manage the flow of CSO discharges between the interception chamber and drop shaft. Access covers would be incorporated on the chambers for inspection and maintenance purposes.

Ventilation structures

D.4.58 A ventilation column with an approximate internal diameter of 0.65m would be constructed on the foreshore structure, adjacent to the drop shaft and valve chambers. It would stand between 4m and 8m high. The ventilation column would allow air inflow and infrequently release air from the tunnel. A smaller ventilation column, approximately 6m high would be constructed on Putney Bridge to serve the interception chamber.

D.4.59 Below-ground structures would contain passive filters and connect the ventilation columns to the structures that they would ventilate. The below-ground structures would have ground level access covers for inspection and maintenance purposes.

Electrical and control kiosks

D.4.60 Electrical control and monitoring equipment would be located within two electrical control kiosks. The first would be located on Waterman's Green, adjacent to the existing stairway to the disused public conveniences. The secondary electrical and control kiosk would be located on the foreshore structure adjacent to the CSO shaft.

Permanent restoration and landscaping

D.4.61 The proposed landscape plan is presented in the *Book of Plans* (Vol 5, Section 8). Thames Water proposes a Requirement as part of the *Draft DCO* to require the submission of detailed design proposals for the final external appearance and landscaping details for approval prior to commencing the development. The final design of the landscape and restoration proposals would be subject to both the generic and site-specific design principles.

D.4.62 The area around the shaft, valve chamber, passive ventilation chamber and ventilation column would be finished in hardstanding to enable access for maintenance equipment and vehicles. It would also provide a usable new area of public realm. However, during maintenance, public access would be restricted and temporary fencing would be installed for health and safety reasons.

Access

D.4.63 The foreshore structure would provide an area of hardstanding for access purposes. The area would provide access to the drop shaft, valve chambers, air treatment chamber and louver chamber access covers. It

would also provide access to the main ventilation column and the electrical and control kiosk.

D.4.64 During operation, maintenance vehicles would access the site from Lower Richmond Road and a new permanent access created off the Embankment. It is possible that access to Putney public slipway may be restricted during maintenance periods.

Typical maintenance regime

D.4.65 Once the project is operational, it is anticipated that Thames Water personnel would visit the site approximately every three to six months to inspect and carry out maintenance of the electrical and control, ventilation and below-ground equipment. This would likely involve a visit by personnel in a small van during normal working hours and may take several hours.

D.4.66 It is anticipated that a major internal inspection of the tunnel system and underground structures would be required once every ten years. This process would likely involve a small team of inspection staff and support crew and two mobile cranes to lower the team into the CSO drop shaft. The inspection would be carried out during normal working hours and would likely take several weeks.

D.4.67 Thames Water may also need to visit the site for unplanned maintenance or repairs, for example, in the event of a blockage or an equipment failure. Such a visit may require the use of mobile cranes and vans.

Scheme development

D.4.68 The proposed interception of the Putney Bridge CSO was subject to over two years of extensive consultation and engagement through a variety of methods including formal and informal consultation events, stakeholder and public meetings, including meetings with local resident and interest groups such as the Putney Society hosted by Justine Greening MP. Meetings were held regularly with the London Borough of Wandsworth, the Environment Agency, the Port of London Authority and English Heritage to discuss the siting, design and layout of the proposed temporary and permanent works. Throughout this period, the scheme evolved in response to consultation, engagement with key stakeholders, and on-going design development. The *Consultation Report*, which accompanies the application, contains detailed information on the consultation process.

D.4.69 All potential interception and construction sites identified during the site selection process were located within the foreshore, since the built-up nature of the surrounding area and the location and alignment of the Putney Bridge CSO meant that no viable land-based sites were available. No viable land-based alternatives were identified by stakeholders during consultation.

D.4.70 The preferred worksite presented at phase one and phase two consultation was located upstream (to the west) of Putney Bridge. However, potential sites downstream (to the east) of Putney Bridge were also assessed and considered throughout the site selection and back-

check appraisal process. These sites are situated close to Putney Bridge and in the area of foreshore at the end of Brewhouse Lane close to St Mary's Church, the Boathouse public house and Putney Wharf Tower.

D.4.71 These sites were assessed by the engineering, planning, environment, community and property disciplines having regard to the considerations set out in the *Site selection methodology paper* and *Final Report on Site Selection Process,* as explained in Section 4 of the *Planning Statement*. Based on these assessments, it was collectively determined by all disciplines that sites downstream (to the east) of Putney Bridge would be less suitable for the proposed works for the following reasons:

a. There is no direct access off a public highway; construction traffic would have to travel via the narrow Brewhouse Lane and across a pedestrianised area of third-party land.

b. There would be greater adverse effects on the multiple sensitive heritage receptors including St Mary's Church.

c. Putney Wharf Tower and the Boathouse public house would experience more direct disruption from construction-related impacts such as noise, dust and transport compared to residential properties and businesses in close proximity to sites on the western side of the bridge, which are separated by a public highway.

d. Higher numbers of residential properties and commercial premises would be directly affected.

e. More sensitive community receptors and equality groups would experience disruption, such as users of the church and the children's nursery group.

D.4.72 The main site-specific characteristics that were considered particularly relevant in arriving at the decision to use a site on the western side of Putney Bridge included:

a. It has better direct access off the public highway.

b. It is located further from the Grade II listed Putney Bridge and Grade II* listed St Mary's Church, which would reduce the impact on the setting of these historic assets.

c. There would be fewer construction amenity impacts on nearby residential properties and other sensitive receptors.

D.4.73 The proposed site was identified and then assessed through a robust, qualitative, and iterative site selection process and was subject to over two years of extensive consultation and engagement. The site selection methodology was subject to consultation with local authorities and key stakeholders. The use of the site to intercept the Putney Bridge CSO was supported by the London Borough of Wandsworth. The location and layout of the permanent works were refined through consultation with key stakeholders.

D.4.74 No preferable alternative sites, including the shortlisted sites, were put forward by stakeholders and the site selection process did not identify any alternative sites that would be more suitable for the required works.

D.4.75 The site layout of the temporary construction works and the location of the foreshore structure continued to evolve and were subject to significant design development in response to consultation and on-going engagement.

D.4.76 At phase one consultation, which ran from September 2010 to January 2011, the preferred site was Putney Bridge Foreshore. Following extensive analysis of consultation responses received and design development, the preferred site was moved further west away from the Grade II listed Putney Bridge, as illustrated in the figures below. The westward relocation of the shaft increased the separation from the bridge and made it possible to retain Putney public slipway on its existing alignment. This was in response to key comments English Heritage, the Port of London Authority and the local community.

Figure D.6 Location of the preferred site at phase one consultation

Figure D.7 Location of the preferred site at phase two consultation

D.4.77 Further design developments at this stage included:

a. removing the terracing scheme proposed along the foreshore structure in order to maintain the existing location and alignment of the Putney public slipway

b. removing Waterman's Green from the temporary construction and permanent worksite area in order to reduce the impact on the open space

c. reducing the area and optimising the shape of the permanent hardstanding in order to reduce encroachment into the River Thames, impacts on aquatic ecology and flood storage levels (in response to comments from the Environment Agency), and to reduce the visual impact on the wider Putney Embankment Conservation Area and the impact on the setting of heritage assets (in response to comments from English Heritage)

d. re-designing the CSO interception chamber beneath the shore arch of the Grade II listed Putney Bridge to be as low as possible to reduce the visual impact on the bridge in response to comments received by the Design Council CABE

e. relocating the main ventilation column onto the foreshore structure to reduce its proximity to Putney Bridge

f. providing a temporary, replacement slipway for the duration of the CSO construction works approximately 300m to the west of Putney Bridge and close to the premises of Chas Newens Marine.

D.4.78 A detailed explanation of the design development changes and illustrations of the proposed design are provided in the *Design and Access Statement*, which accompanies the application.

D.4.79 Phase two consultation ran from November 2011 to February 2012 and the preferred site was Putney Bridge Foreshore. The London Borough of Wandsworth commented that the foreshore structure would juxtapose a 1m high wall with Putney public slipway and create a visually intrusive and uncomfortable relationship between the two. It also noted that the projection of the foreshore structure may inhibit tidal flows and accumulate debris. Thames Water's design again responded to the comments received at phase two consultation and further design development.

D.4.80 The changes to the proposals were presented at targeted consultation, which ran from June 2012 to July 2012. However, due to the further movement of the location of the preferred site and shaft to the west of Putney Bridge, the site was renamed Putney Embankment Foreshore in order to better reflect the new shaft location. The location of the preferred site and shaft presented at targeted consultation is illustrated below Modifications to the scheme and the reasons for those changes comprised:

a. changing the location and layout of the temporary works and permanent design, including moving the shaft approximately 30m to the west of the phase two location in order to avoid the juxtaposition between the permanent hardstanding area and Putney public slipway

b. modifying the structural form and construction site layout for the temporary slipway in response to comments to minimise the size of working area and duration of the construction and removal of the temporary slipway

c. routing construction traffic associated with the construction of the temporary slipway via Glendarvon Street due to the reduced working area for the temporary slipway

d. widening the limits of deviation at the end of the connection tunnel junction with the main tunnel to optimise the location of the junction once the main tunnel is driven through.

Figure D.8 Location of the preferred site at targeted consultation and the proposed site at Section 48 publicity

D.4.81 The key advantages of the location of the Putney Embankment Foreshore site are that it avoids visual and operational conflicts with Putney public slipway. The foreshore structure in this location is also closer to the University Boat Race starting line, which created an opportunity to use the structure as public space during the annual race and other key river events. It would also provide a high quality new area of public realm for use throughout the year, subject to closure during maintenance periods.

D.4.82 Following site design improvements and the identification of mitigation measures, the Putney Embankment Foreshore site was considered the most appropriate site to intercept the Putney Bridge CSO and connect to the main tunnel. It was publicised as Thames Water's proposed site at Section 48 publicity, which ran from July 2012 to October 2012.

D.4.83 The principal issues that arose from consultation and Section 48 publicity are identified below. These are addressed in the planning assessment that follows:

a. Object to the selection and proposed use of the site – a site to the east of Putney Bridge would be more suitable: this issue is addressed above in the Scheme development subsection and set out in more detail the *Final Report on Site Selection Process*.

b. Concern regarding the impact and proximity of the construction works on residential amenity and local businesses: this issue is addressed

in the Noise, Air quality, Landscape and visual, Traffic and transport and Socio-economic subsections.

c. Concern regarding the effect on the historic environment including the historic slipway, the setting of Putney Bridge, Putney Pier, the Star and Garter and the Victorian character of the area: this issue is addressed in the Landscape and visual and Historic environment subsections.

d. Object to the proposed route to the temporary slipway works via Glendarvon Street: this issue is addressed in the Traffic and transport subsection.

e. Concern regarding the impact on loss of parking, access routes and diversion of the Thames Path: this issue is addressed in the Traffic and transport subsection.

f. Concern regarding the design and appearance of the permanent above-ground structures: this issue is addressed in the Design and Historic environment subsections and set out in more detail the *Design and Access Statement*.

g. Suggest that the permanent design should integrate Putney Pier, the embankment and the foreshore structure into a 'Master plan' for the area: this issue is addressed in the Design subsection.

D.4.84 Thames Water continued to liaise with local amenity groups, residents and businesses. In response, Thames Water made a number of small but significant amendments to the design following Section 48 publicity, including:

a. curving the outermost corners of the foreshore structure to reduce scour and facilitate river navigation

b. applying timber cladding to the short elevations of the foreshore structure to minimise the effect of vessel impacts

c. re-designing the mooring facilities on the foreshore structure to discourage long-term mooring of vessels near the CSO

d. omitting one of the alternative zones for the ventilation column on Putney Bridge.

D.5 Site-specific planning considerations

D.5.1 This section provides an analysis of the key planning considerations associated with the proposed works at Putney Embankment Foreshore. It considers the issues and factors identified in the NPS and other relevant issues set out in para. D.4.83 above.

Meeting the need

D.5.2 The proposed works at Putney Embankment Foreshore would successfully meet the need to intercept the Putney Bridge CSO and make an important contribution to meeting the wider need for the project identified in the NPS.

D.5.3 Currently, in an average year, the Putney Bridge CSO discharges approximately 68,000m^3 of untreated sewage into the River Thames beneath the south bank shore arch of Putney Bridge in the London Borough of Wandsworth. The CSO discharges approximately 33 times a year and releases approximately 17 tonnes of sewage derived litter.

D.5.4 The CSO was identified by the Environment Agency as a requiring control and Thames Water's solution for this CSO is full interception. The CSO discharges have multiple impacts on river water quality in this location, including a localised effect of rapidly dropping dissolved oxygen levels, the release of pollutants and the discharge of sewage derived litter and effluent.

D.5.5 Each discharge increases the risk of exposure to harmful microscopic organisms within the untreated sewage for river users who come into contact with the water. An assessment of health impacts on recreational users of the River Thames concluded that the risk of infection can remain for two to four days following a spill as the water containing the sewage moves backward and forward with the tide.

D.5.6 Fourteen rowing clubs operate within the area and other clubs further along the river also operate around Putney. Sailing activities take place on most days around Putney and race programmes are scheduled most weekends during the summer and winter, and on some evenings in summer, depending on the tide and weather conditions. A River Usage Survey undertaken by Thames Water from 10 to 13 May 2012 inclusive, counted 530 vessels that arrived, departed and passed Putney Pier over the four-day period.

D.5.7 Assuming the average 33 spills per annum from the Putney Bridge CSO occur on separate days, there could be up to a maximum of 132 days per year when recreational users are at risk of exposure to untreated sewage in the vicinity of the outfall as a result of the Putney Bridge CSO spills alone.

D.5.8 It is predicted that the CSO discharges will continue to worsen both in terms of volume, frequency and content. By the time the proposed works at Putney Embankment Foreshore are operational, the CSO is predicted to discharge approximately 33 times in an average year including approximately 71,000m^3 of untreated sewage and approximately 18 tonnes of sewage derived litter.

D.5.9 Modelling suggests with the project in operation, the discharges of untreated sewage in an average year would be reduced to one spill of 1,600m^3, with approximately less than half a tonne of sewage derived litter. This would have a direct beneficial effect on river water quality by reducing the frequency, duration and volume of spills from the Putney Bridge CSO by approximately 98 per cent. The reduction in CSO spills would significantly reduce health risks to recreational river users.

D.5.10 The benefit to river users is particularly significant at this location due to its recreational river heritage, the volume of daily river users and its association with nationally significant river events such as the Oxford and Cambridge University Boat Race.

D.5.11 The specific need for the works proposed at Putney Embankment Foreshore is urgent and justified. The site is well-suited to that need and is consistent with the NPS and *London Plan* Policy 5.14.

Good design

D.5.12 The proposals for Putney Embankment Foreshore were carefully developed through a collaborative process of design review and extensive consultation. The amount, layout and scale of the proposed structures are primarily dictated by the function they need to perform in transferring flows from the Putney Bridge CSO and directing flows into the main tunnel.

D.5.13 Early site analysis and subsequent engagement identified that it was important for the design to respond to the following key opportunities and constraints.

D.5.14 The site-specific design opportunities included:

a. Create a new area of public realm in the foreshore.

b. Enhance the relationship between the site and its historic surroundings.

c. Celebrate important local river events.

d. Maintain and enhance existing moorings.

D.5.15 The site-specific design constraints included:

a. The Grade II* listed Putney Bridge is in close proximity.

b. The visual impact of works beneath the shore arch of Putney Bridge must be kept to a minimum.

c. The impact on views and the setting of the conservation area must be kept to a minimum.

d. The location and alignment of Putney public slipway must be protected.

e. The number of permanent structures on Waterman's Green must be kept to a minimum.

f. The site is in close proximity to Putney Pier, and commercial and residential premises along Embankment.

g. Environment Agency policy seeks to minimise encroachment into the river.

D.5.16 An illustrative proposed aerial view of the site is shown in Figure D.8 above.

D.5.17 The design life of the major civil engineering components of the project, including buildings, is 120 years. The details of the external finishes of the ventilation columns and kiosks are not specified in the application and would be submitted to the local planning authority for subsequent approval. These details must be in accordance with the design principles, which require materials to be high quality and long lasting. The project was designed to be durable and resilient to change.

D.5.18 The stakeholder consultation on the design of the proposals for the site included three rounds of design review with the Design Council CABE. Refer to the *Consultation Report* and the *Design and Access Statement* for further details.

D.5.19 The Design Council CABE reviews for Putney Embankment Foreshore were attended by the London Borough of Wandsworth and other strategic pan-London stakeholders. The Design Council CABE panel was supportive of the design developments undertaken at the site and welcomed the decision to site the new permanent structure upstream of Putney Bridge in order to retain Putney public slipway. The panel also commented that it is important for the design of the permanent works to reflect the simplicity and quality of the setting with a simple, orthogonal geometry, and the foreshore structure has the potential to extend the public realm for informal use. The panel discouraged trying to conceal the ventilation column on the foreshore structure and recommended that its position, height and design should create a feature to signpost and promote the project.

D.5.20 The design solution at Putney Embankment Foreshore sought to combine aesthetic and functional requirements to create a useable and attractive space. The principal objectives that influenced the design from the analysis of the opportunities and constraints are:

a. Create a new area of public realm on the river.

b. Celebrate Putney's river heritage.

c. Enhance existing moorings.

Create a new area of public realm on the river

D.5.21 The primary purpose of the foreshore structure is to enclose the majority of the functional operational structures; however, it would also create a new area of useable public realm within the foreshore, accessible from the Embankment. The simple orthogonal shape of the foreshore structure was designed to:

a. clearly mark the end of Putney Embankment

b. mark the start/end point of river races with a projecting platform

c. reference the geometry of other projecting structures such as Putney Bridge and Pier.

D.5.22 The position of the foreshore structure is constrained by the position of proposed and existing below-ground infrastructure. The CSO drop shaft and associated chambers and culverts would be laid out within the structure in accordance with the engineering requirements, and the structure would be surrounded by a new section of river wall. It is also important that the permanent design respects the functional character of this stretch of the River Thames by accommodating the navigational and mooring needs of boat users, in line with *Core Strategy* Policy PL9, which supports and protects the facilities and activities that contribute to the embankment area's special river recreational character.

D.5.23 The shape and configuration of this hardstanding area was designed to reflect its setting and having regard to discussions with the Design Council CABE, the Greater London Authority, the Port of London Authority, English Heritage, the London Borough of Wandsworth, river users and other key stakeholders.

D.5.24 The foreshore structure would create a new area of public realm that would enhance the area's use and appearance. The shape and layout was developed to be a bold marker at the beginning of Putney Embankment. It is modern in design and would incorporate high quality materials and surfacing appropriate to its historic setting.

D.5.25 The amount of street furniture was minimised, in order to maximise the flexibility of the space on the foreshore structure for future uses. Seating would be provided in the form of a simple timber bench.

D.5.26 It would be possible to locate temporary/removable street furniture on the foreshore structure, such as tables and chairs. However, since it would be necessary for Thames Water to carry out occasional inspections and maintenance, such items could not be permanently fixed.

Celebrate Putney's river heritage

D.5.27 The form and location of the permanent structures were developed to celebrate the history of river recreation in the area.

D.5.28 The University Boat Race stone sits on Embankment adjacent to the position of the proposed structure. A corresponding stone on the other side of the river was used to line up the start of the boat race 'by eye'. This visual connection would be lost when the foreshore structure is constructed in front of the stone. Therefore a metal strip is proposed in the paving that would run from the original University Boat Race stone across the foreshore structure and vertically down the river wall. The handrail would break around the strip to increase its prominence.

D.5.29 A full historical interpretation strategy would be developed at a later stage, which would have particular relevance to this site. There is considerable scope to include interpretive material to inform passers-by of its history.

D.5.30 The signature ventilation column and the electrical and control kiosk on the foreshore structure were designed to be inscribed with site-specific information and the proposed brass strip in the paving could feature information on the various rowing races.

Enhance existing moorings

D.5.31 The location of the foreshore structure allows boats to moor safely against the side of Putney public slipway, therefore maintaining existing provision of mooring facilities in this location.

D.5.32 A temporary mooring facility would be provided on the foreshore structure which would increase the existing capacity in the area. It may also be possible in the future and on completion of our works to relocate the Putney Pier onto the permanent structure. Through the layout arrangement of the functional components, provision was made to allow the possible siting of the pier off the western side of the foreshore

structure, without compromising future maintenance requirements. This provision provides potential for a fully integrated design which could incorporate proposals similar to those in the current planning application for Putney Pier.

D.6 Managing construction impacts

D.6.1 Throughout the consultation period and through numerous design developments Thames Water sought to limit construction impacts. Measures within the *CoCP* Part A and site-specific measures within the *CoCP* Part B seek to minimise adverse construction impacts where practicable. Key scheme development changes that would limit construction impacts at this site include:

a. modifying the structural form and construction site layout for the temporary slipway in order to minimise the size of working area and duration of the temporary slipway

b. revising the transport strategy to make further use of the river to transport excavated materials from the shaft and the short connection tunnel away from the site to reduce the number of lorries on local roads

c. restricting HGV access to the temporary slipway site between 10am to 3pm Monday to Friday to minimise the impact on the local community on Glendarvon Street.

Conclusion

D.6.2 The proposed design of the Putney Embankment Foreshore site was significantly influenced by an extensive process of stakeholder engagement and design review. In order to ensure design quality, the design team undertook three rounds of design review hosted by the Design Council CABE. We also held various pre-application meetings with the London Borough of Wandsworth and other strategic and local stakeholders. These are detailed in the *Design and Access Statement*.

D.6.3 The proposed development takes into account both aesthetics and functionality through good design, sensitive materials and appropriate siting, and would enhance the quality of the area. The site-specific design principles which were developed with the borough ensure that the proposal would be visually attractive, sustainable and usable. In addition, the new area of public realm celebrates locally and nationally important river events, and was designed to cater to a range of potential future needs which would enable more people to enjoy the riverside.

Water quality and flood risk

D.6.4 There are no significant groundwater issues for construction or operational development at the site. No significant impact is anticipated at the nearest licensed groundwater abstraction located approximately 0.7km to the east of the site and used for sports ground and facilities supply purposes. There are no known unlicensed groundwater abstractions within 1km of the site.

D.6.5 Measures to protect water quality and resources during construction are detailed in Section 8 of the *CoCP* Part A, and referred to in the Section 8 of the *Planning Statement*. Appropriate measures are incorporated into the design and *CoCP*, including adherence to good pollution prevention practice, so that potential impacts on surface water resources, river flows and groundwater resources are not predicted to be significant.

D.6.6 Each discharge increases the risk of exposure to harmful microscopic organisms within the untreated sewage for river users who come into contact with water. An assessment of health impacts upon recreational users of the River Thames concluded that the risk of infection can remain for two to four days following a spill as the water containing the sewage moves backward and forward with the tide.

D.6.7 Assuming the average 33 spills per annum from the Putney Bridge CSO occur on separate days, there could be up to a maximum of 132 days per year when recreational users are at risk of exposure to untreated sewage in the vicinity of the outfall as a result of the Putney Bridge CSO spills alone.

D.6.8 Once operational, the project would have a direct beneficial effect on water quality in the River Thames at this location by significantly reducing the release of pollutants and the discharge of sewage litter and effluent. This would have a direct positive impact on the recreational use of the river and would contribute to the protection and enhancement of biodiversity by reducing localised effects of rapidly dropping dissolved oxygen levels.

D.6.9 The majority of the site is located within the tidal foreshore of the River Thames and is part of the active floodplain classified as Flood Zone 3b. The adjacent riverside area is within Flood Zones 2 and 3.

D.6.10 A Flood Risk Assessment undertaken in accordance with Section 4.4 of the NPS is included within the *Environmental Statement*. Flood risk would be managed through appropriate design measures and the development would not lead to an increase in flood risk on the surrounding areas. Therefore, no significant flood risk effects are likely.

D.6.11 The temporary works would involve the construction of a cofferdam and temporary flood defences at the main site, built to the statutory flood defence level. This would ensure a suitable level of flood protection and flood risk is maintained during construction. The construction of a temporary slipway to the west of the main site would be constructed in line with the existing river wall to avoid impact on the local flood defences.

D.6.12 In accordance with the *CoCP* (Section 8) all site drainage during construction would be drained and discharged to mains foul or combined sewers and where this is not practicable, the site would be drained such that accumulating surface water would be directed to holding or settling tanks, separators and other measures prior to discharge to the combined or surface water drains. Foul drainage from the site welfare facilities would be connected to the mains foul or combined sewer. This design measure would help manage the risk from this source during construction but would not reduce the level of risk associated with this flood source.

D.6.13 The permanent operational site would be raised to the statutory flood defence level (5.54m Above Ordnance Datum) and was designed to ensure that future flood defence rising can be achieved to meet the Thames Estuary 2100 Plan requirements. The development is at residual risk of tidal flooding in the event of a breach in the local flood defence wall along the edge of the tidal Thames or overtopping of the defence wall as a result of a failure of the Thames Barrier. The residual risk of tidal and fluvial flooding to the operational area would be the same as the current risk behind existing defences, which is considered to be acceptable. The consequence of a breach or failure of flood defences would not compromise the long term operational function of the main tunnel and therefore no additional measures above those outlined in the *CoCP* are proposed. The presence of temporary and permanent structures within the foreshore has the potential to reduce the availability of flood storage within the tidal Thames. The impact of the removal of flood storage was modelled on a project-wide basis and results show that the proposed project-wide works (both temporary and permanent works) are not considered to have a detrimental impact on the flood storage or tidal levels within the tidal Thames.

D.6.14 Flood risk from all sources has been managed as far as possible through design and the measures incorporated in the *CoCP*, so the criteria in NPS para. 4.10 would be satisfied. No significant flood effects are likely from the proposed development.

D.6.15 In agreement with the Environment Agency, surface water runoff from the operational site would be discharged directly to the River Thames. Surface water runoff to the River Thames is not anticipated to increase surface water flood risk to the site or surrounding area due to its tidal nature, and would therefore not require attenuation prior to discharge, or result in a significant affect.

D.6.16 In the event of a storm coinciding with a high tide event, surface water drainage from the site may be restricted and would need to be stored on site. On-site storage would allow attenuation if necessary in the event of tide-locking of the surface water outfall, (which most likely to occur during a storm event coinciding with a high tide).

D.6.17 During construction any scour effects would be monitored and if scour is identified at the agreed trigger values for this site, mitigation would be proposed and implemented, pursuant to a Requirement. Possible mitigation options include riprap or rock fill, articulated concrete blocks, gabion mattresses and grout filled mattresses.

D.6.18 The shape of the permanent operational area within the foreshore was designed to minimise the impact on the flow regime of the tidal Thames. As a proactive approach permanent scour protection would be provided at the toe of the new flood defence river wall.

D.6.19 The site would therefore meet the decision making criteria set out in the NPS in relation to water resources and flood risk, and the Environment Agency has no outstanding concerns.

Air quality, emissions, dust and odour

D.6.20 The London Borough of Wandsworth has declared the whole borough an Air Quality Management Area. Local monitoring data indicates that at present the air quality standard for nitrogen dioxide is exceeded in the vicinity of the site.

D.6.21 The closest sensitive receptors are occupiers of nearby residential dwellings and commercial premises to the south of the Embankment and Lower Richmond Road.

D.6.22 Through the measures included within the *CoCP* all reasonable steps have been taken, and would be taken, to minimise detrimental impact on amenity resulting from air quality, emissions and dust.

D.6.23 The measures incorporated into the *CoCP* to reduce air quality impacts include measures in relation to vehicle and plant emissions including emissions from barges, and measures to reduce dust formation and re-suspension. These would be observed across all construction activities at the Putney Embankment Foreshore site. No site-specific air quality measures are required at this site.

D.6.24 The *Environmental Statement*, which accompanies the application, states that with the implementation of the measures in the *CoCP,* effects from dust and emissions during construction within 20m of the site, would not have any significant effects and could be sufficiently managed. Beyond 20m from the site the expected effects are predicted to be negligible. The project would not lead to significant deterioration of, or substantial changes in, air quality.

D.6.25 The consideration of operational air quality impacts including odour is set out in Section 8 of the *Planning Statement*. The project-wide *Air Management Plan*, which accompanies the application, would ensure that the air in the tunnels is kept fresh, that a low pressure is maintained within the tunnels to prevent unwanted releases and that when air is released it is treated. This would be achieved by a combination of forced or active ventilation and treatment and passive air treatment. In addition, at all sites there are to be ventilation structures which would allow air to enter and leave the tunnel system.

D.6.26 When the tunnels are empty, clean air would be drawn into the tunnels at specific sites by the extraction of air at other specific sites so as to keep the air in the tunnels fresh. This means that odours would not build up while the tunnels are empty. As the tunnels fill, air displaced from the tunnels would initially be extracted and treated at the active ventilation sites before being released and later, depending of the level of filling, would pass through the passive carbon filters. These filters clean the air and remove any odours before it is released.

D.6.27 Putney Embankment Foreshore is proposed as a passive ventilation site. One ventilation column is proposed on the foreshore structure, adjacent to the drop shaft and valve chambers, and a second ventilation column is proposed on Putney Bridge to serve the interception chamber. A passive carbon filter would be installed at both locations within a below ground

chamber. During a typical year this would treat all the air displaced from the particular shaft which would occur only when the shaft is drowned by the rising wastewater in the tunnel. During infrequent, extreme storm events (approximately once in 15 years), the air that is pushed out of the shaft could exceed the capacity of the passive filter and would be released untreated through a pressure relief structure to prevent damage to the passive filter. For 100 per cent of the time during a typical year, all air released would be treated, which means that all regulatory requirements would be met and there would be no nuisance odours or loss of amenity due to odours.

D.6.28 The construction and operational effects of air quality and odour would be consistent with the NPS decision making criteria to minimise detrimental impacts on amenity and the likelihood of nuisance (paras. 4.12.3, 4.11.4 and 4.11.5) at Putney Bridge CSO. Appropriate measures are proposed to ensure that proposals would not lead to any substantial changes in air quality, emissions, dust or odour, or a significant loss of amenity during construction or operation.

Biodiversity and geological conservation

D.6.29 There are no international or national designated ecological sites (Sites of Special Scientific Interest, Marine Conservation Zones) in the vicinity of the site. The River Thames and Tidal Tributaries are a non-statutory Site of Importance for Nature Conservation designated by the Greater London Agency and adopted by London Borough of Wandsworth. Fulham Palace and Bishop's Park Site of Importance for Nature Conservation is located 160m to the north of the site on the opposite bank of the River Thames.

D.6.30 There would be a total of approximately 3,435m^2 of temporary foreshore land take during construction associated with the use of a cofferdam, campshed, and provision of the temporary slipway. The impact of this area of temporary land take is not considered significant since the extent of the areas affected in the context of the overall size of the upper and middle Tideway is small.

D.6.31 Throughout design development, the functional design, footprint, and layout of the proposed new permanent infrastructure, was refined and optimised with the aim of minimising encroachment of structures in the foreshore and minimising harm to foreshore habitats. The loss of foreshore is unavoidable and compensation measures would be provided for the project as a whole. Furthermore, a number of design principles to promote aquatic ecology at Putney Embankment Foreshore are proposed including fendering on the foreshore structure (IRVR.06), low level habitat features to encourage retention of sediment to promote aquatic ecology at the base of the foreshore structure (IRVR.11) and lighting designed to provide a safe environment, reduce light pollution and promote biodiversity (terrestrial and aquatic) (LTNG.04).

D.6.32 Construction effects on aquatic ecology would be managed in accordance with the *CoCP* Part A. Further site-specific measures contained within Part B of the *CoCP* include provision of a membrane to be installed between the existing river bed and temporary back fill material to prevent

contamination of juvenile fish habitat, and areas of foreshore used for temporary works to be restored to similar condition and material prior to the works. As a result of these measures impacts on aquatic ecology would be minimised.

D.6.33 By intercepting the CSO, the project would reduce the occurrence of dissolved oxygen related fish mortalities and improve the quality of the foraging habitat for fish, constituting a significant beneficial effect.

D.6.34 In terms of terrestrial ecology, the site includes hardstanding, and river wall, amenity grassland and mature trees. The site and surrounds have some local value and potential for breeding birds and wintering birds. There is also potential for bats and invertebrates within the site.

D.6.35 Site preparation would result in the loss of a tree, which is of low site value for terrestrial ecology. This would be replaced by new planting after completion of the works. A section of river wall and hardstanding would also be removed as part of the site preparation activities, however this is deemed of low ecological value. However, the terrestrial ecology assessment in the *Environmental Statement* found that the effects of both the temporary and permanent works would be localised and not significant.

D.6.36 Construction effects would be managed in accordance with the *CoCP*. Thames Water sought to take advantage of opportunities to conserve and enhance biodiversity as part of the proposals for this site. Such opportunities include the potential for inclusion of a brown roof on the electrical and control kiosk on Waterman's Green, which would be of benefit to species such as birds and invertebrates (design principle FNCC.09). Bat boxes are also proposed to be attached to trees on and adjacent to the site, subject to the landowner's approval, which would increase the availability of potential roosting opportunities (design principle PUTEF.24). They shall be located to ensure that they would not be disturbed during construction and to avoid disturbance from lighting

D.6.37 The *CoCP* also proposes an ecological management plan for the site, which would detail the approach to management of effects on ecological receptors with reference to the results of the terrestrial ecology assessment.

D.6.38 As required by the NPS (para. 4.5.17), the footprint of the proposals is no greater than it needs to be for construction and operational purposes. The proposals sought to conserve and enhance biodiversity and to minimise any negative impacts in accordance with the NPS, specifically para. 4.5.6.

Landscape and visual impacts (include townscape)

D.6.39 The site does not lie within or in close proximity to any nationally designated landscapes; however, the site is located within a nationally significant historical and cultural stretch of the River Thames, experienced by large numbers of people, particularly during events such as the annual Oxford and Cambridge University boat race. This is a highly sensitive location and the local townscape quality is high and in good condition.

There are numerous listed buildings nearby and the site lies within the Putney Embankment Conservation Area, which is characterised by its riverside location, boathouses, former wharf and some of the oldest existing buildings in Putney.

D.6.40 The local townscape shaped the design development and evolution of the proposed works in this location. Accordingly, the townscape and visual assessment took into account the Putney Embankment, Landford Road, Charlwood Road and Lifford Street, Oxford Road, Parkfields and Deodar Road Conservation Area Appraisal and Management Strategies, produced by the London Borough of Wandsworth, in accordance with para. 4.7.2 of the NPS.

D.6.41 The *Bishops Park, Fulham Reach, Fulham Park Gardens and Putney Bridge Conservation Area Character Profiles* produced by the London Borough of Hammersmith and Fulham were also taken into account in the townscape and visual impacts assessment.

D.6.42 Through robust site selection, extensive consultation and significant design development, the proposed scheme was refined to minimise its impact on the surrounding landscape and views during construction, and to provide a high quality design once completed. Measures incorporated in the *CoCP* would reduce the townscape and visual impacts of the works as far as possible through the protection of existing trees, in accordance with BS5837 Trees in Relation to Construction, protection of listed structures and use of appropriate capped and directional lighting when required. The *CoCP* Part B also requires the installation of well-designed visually attractive hoardings that could incorporate suitable art work and viewing windows.

D.6.43 Despite this, the construction works would be a prominent feature of the local townscape and views due to the scale of construction activity and foreground visibility of the construction works, in particular the presence of a cofferdam, hoardings, welfare facilities and temporary slipway. The townscape assessment in the *Environmental Statement* established that during the construction phase there would be a significant effect on the townscape character of the site and the wider area.

D.6.44 The visibility of the construction works is an unavoidable consequence of the scale of works required to intercept the Putney Bridge CSO and divert overflows into the main tunnel at this location. The NPS recognises in para. 1.4.4 that Nationally Significant Infrastructure Projects are likely to take place in mature urban environments and result in adverse townscape and visual effects, with many possible receptors. The type and scale of construction activities proposed is not uncharacteristic of other major construction projects undertaken throughout central London, such as Crossrail.

D.6.45 The permanent structures in this location were carefully designed to provide a beneficial legacy for the site and local area. While the majority of the proposals are underground, the design principles for the remaining above-ground structures (ventilation columns, control kiosks and river wall) and landscaping were carefully chosen to ensure they are sensitive

to the surrounding townscape and as visually attractive as possible. For example, the proposed ventilation column on the listed bridge would be appropriate to the listed structure and in keeping with the character of surrounding street furniture (design principle PUTEF.13), the ventilation column on the foreshore structure was designed as an architectural statement (design principle FNCC.03), and the design and materials of the main Waterman's Green kiosk would match the existing bridge abutment wall (design principle PUTEF.7). The kiosk on the foreshore structure would be finished in such a way that positively contributes to the public realm with the inclusion of public art, possibly incorporating historic interpretive information on the area and maritime events (design principle PUTEF.12).

D.6.46 The construction works would be a prominent, but temporary feature of the local townscape and views. The proposals are consistent with the approach required in Section 4.7 of the NPS because they were designed taking careful account of the landscape characteristics of the area, to minimise adverse effects during the construction phase and through careful layout and design. The effects of construction have been minimised as far as possible through the measures proposed in the *CoCP*.

D.6.47 A high quality design was developed for the permanent works and this would provide a positive legacy of attractive area of open space from which to enjoy the river in this popular and well used stretch of riverside.

Land use including open space, green infrastructure and green belt

D.6.48 The impact of the proposals on land uses and designations (as identified in the *Core Strategy* and retained policies) was a key consideration in the site selection process and on-going design development. The land uses of the site and its surroundings are illustrated on the Land use plan in Annex D.

D.6.49 A planning application for a proposed extension to Putney Pier including the provision of 11 additional residential mooring berths is pending consideration by the council. The application is located within the boundary of the site. There are several relevant, extant planning and Listed Building Consents applicable to the vaults located in the river wall immediately adjacent to Waterman's Green and the proposed site. Details of these proposals are summarised in Section D.3.

D.6.50 A small parcel of open space to the south of the site known as Waterman's Green is located within the limits of land to be acquired or used. Access to the green may be restricted at certain times during construction and apart from minor works; the green would remain largely unaffected by the proposals.

D.6.51 A further small area of the grounds of St. Mary's Church is also located within the limits of land to be acquired or used. This land would be required temporarily for access to install the ventilation ducts and ventilation column through the listed Putney Bridge structure.

D.6.52 The total area of open space required by Thames Water equates to 0.06ha, is minor and has been minimised as far as practicable. In contrast the area of publicly accessible open space to be created by the project (in the form of the permanent hardstanding area) would be 0.56ha. Refer to the *Open Space Assessment*, which accompanies the application for further information.

D.6.53 Putney Bridge Foreshore has recreational value for pedestrians and water based recreation as Putney public slipway can be used by boats to access the River. The embankment adjacent to the foreshore includes hard landscaping and benches and is used for sitting out and relaxation.

D.6.54 The accessibility of the foreshore was surveyed as part of the *Open Space Assessment*, and revealed that the foreshore is publically accessible via the existing public drawdock/slipway. During construction the project proposals would not permit public access to the foreshore within the area affected by the temporary works, and the existing slipway would be closed. However, a temporary alternative slipway would be provided for the duration of the temporary works in order to allow uninterrupted public access to the areas of the foreshore and river unaffected by the proposed works. Once construction is complete a reduced area would be affected but there would be an unavoidable, permanent loss of foreshore. This loss has been minimised by careful design and the foreshore structure is no larger than it needs to be. The existing slipway would be re-opened but there would be a reduced area of foreshore available for public access.

D.6.55 In addition, the use of the embankment for sitting out and relaxation is likely to be directly and indirectly affected by the temporary works. Impacts on the amenity value of the embankment would be minimised as far as practicable given the scale and nature of the works required in this location. However, such amenity impacts would be temporary and the long term benefit of the permanent works in this location is the creation of a new area of publically accessible open space along the embankment.

D.6.56 Potential conflicts with land use designations and planning application proposals were taken into account through the design and site layout and by minimising the total area of land take for both construction and operation. The temporary and permanent works would be configured in order to ensure that the implementation of the applications for the redevelopment of the vaults within Putney Bridge are not affected and may proceed either in advance of or alongside the proposed CSO interception works.

D.6.57 The majority of the proposed works in closest proximity of the above vaults are temporary and can be reversed within a relatively short timescale (approximately three and a half years).

D.6.58 The removal of temporary works would include the construction site created on the area of the Putney public slipway including the hoardings along the boundary of Waterman's Green. This area closest to the vaults would be returned to its existing condition on the completion of works.

D.6.59 The proposed extended configuration of Putney Pier conflicts with both the temporary and permanent works layout for the Thames Tideway Tunnel. It would not be possible to implement both schemes in their current form. The Safeguarding Direction served on the council by the Secretary of State on the 21st December 2012 prevents the council from granting planning permission for any application within the area covered by the Direction without his specific authorisation. This includes the planning application for an extension to Putney Pier. The purpose of the Safeguarding Direction is to ensure that land is available for use as part of the project and signifies recognition of the national importance the project and the need to safeguard sites in the short term for the construction of the Thames Tideway Tunnel.

D.6.60 It would be possible to extend the Pier following the completion of the works proposed by Thames Water. Although, the configuration of the Pier extension would need to be amended in order to reflect the location and layout the Putney Embankment Foreshore permanent structures. It may also be possible in the future and on completion of the works to relocate the Putney Pier onto the permanent structure. Discussions have been held with Livett's Launches, the owner of Putney Pier to understand their development proposals as they have been emerging. Whilst the works proposed at Putney Embankment Foreshore would prevent the implementation of the pier extension in its current form, an extended and possibly relocated Pier may be implemented upon the completion of the Thames Tideway Tunnel works. Given the absence of more suitable alternative sites, a delay to these redevelopment aspirations should not outweigh the need for the use of the site for the Thames Tideway Tunnel project. Greater weight should be attached to the need for the NSIP, particularly since, once the temporary and permanent works are complete, it would still be possible to implement a revised scheme.

D.6.61 During the operational phase an electrical and control kiosk would be located on Waterman's Green and would result in the permanent loss of a small area of open space. However, the impact would be minor given the limited extent of the area affected and the provision of new additional open space to be created by the project. This kiosk would be sited away from the vaults at 2 to 6 Putney High Street, in order to avoid precluding their future use and redevelopment. The kiosk is also sited away from the other existing vaults adjacent to Waterman's Green and the disused public conveniences, so as not to preclude their future use also.

D.6.62 The proposed works would not prevent the continuation of any existing land uses, although there would be some unavoidable impacts on loss of foreshore and a small area of open space on Waterman's Green. There would also be some impacts on neighbouring land uses during construction. Land use impacts have been reduced as far as possible through careful design and through control of construction activities, in accordance with NPS para. 4.8.19. The wider benefits from the creation of new open space and from environmental and water quality improvements need to be weighed against the loss of foreshore and a small area of open space, in accordance with NPS paras. 4.8.13 and 4.8.14.

Noise and vibration

D.6.63 The noise environment in the vicinity of the site is dominated by road traffic noise. The receptors closest to the site which are sensitive to noise and vibration are the houseboats at Putney Pier and residential buildings on Lower Richmond Road, Embankment, Putney High Street, Star and Garter (staff accommodation), Star and Garter Mansions, and Ruvigny Gardens. The non-residential receptors include Chas Newens Marine premises on Embankment, Thai Square restaurant; Star and Garter Public House, Café 2 and 4 to 6 Putney High Street (possible new cafés within vaults on Waterman's Green) and St Mary's Church. There are other residential and non-residential receptors in the wider area.

D.6.64 Details of potential noise impacts are set out in the *Environmental Statement*, which profiles the variation in construction noise levels across the programme of work with the aim of refining mitigation design and seeking to reduce the adverse effects of construction noise and vibration where possible.

D.6.65 A series of measures are detailed in the *CoCP* Part A and embedded within the project design to reduce noise and vibration effects. These measures include:

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. enclosure or screening of static construction plant including, but not limited to, pumps, compressors, generators and ventilation equipment

d. careful choice of routes and programming for the transportation of construction materials, excavated material and personnel to and from the site

e. careful programming so that activities that might generate significant noise are planned with regard to local occupants and sensitive receptors.

D.6.66 The *CoCP* Part B measures specific to this site are:

a. A 2.4m high noise screen would be located on the western edge of the cofferdam sections perpendicular to the river wall.

b. The loading and unloading of barges would only be carried out during standard working hours.

c. During connection tunnel works outside of standard working hours the use of surface cranes would be minimised. This would involve the stockpiling of materials/ equipment at the bottom of the shaft for use during the evening and night for removal during standard working hours. In addition the work would utilise measures to reduce noise including the use of electric gantry cranes, gas/electric fork lift and measures to reduce noise from skip movements and unloading.

D.6.67 The NPS recognises that Nationally Significant Infrastructure Projects are likely to take place in mature urban environments, and in the short term, lead to noise disturbance during construction. The implementation of the proposed mitigation measures would ensure that there would be no significant vibration effects and that the effects of noise would be minimised as far as practicable. The majority of sensitive receptors within the vicinity of the site would not experience adverse noise effects, including all of the non-residential receptors identified above. However, adverse noise effects are predicted during the construction phase at the Star and Garter Mansions, Star and Garter public house staff accommodation, 10 Ruvigny Gardens and the houseboats moored at Putney Pier.

D.6.68 The Star and Garter Mansions is a four storey residential building located 40m from the main construction site boundary, and 40m from the temporary slipway works. Adjacent to the residences is the Star and Garter public house. The public house contains a bar at ground and basement floor level and a function room on the first floor. The top floors of the building contain staff accommodation for the public house below. The *Environmental Statement* identifies that significant temporary noise impacts during the day would be likely to affect these residences, for two months, as a result of vibro-piling works undertaken during the construction of the cofferdam.

D.6.69 Ten Ruvigny Gardens are three storey residential terraced houses located more than 150m from the main site boundary and 15m from the temporary slipway works. The upper floors would have an unscreened view of the temporary slipway site. The daytime construction of the temporary slipway is estimated to cause temporary significant noise impacts to these properties for a period of two months.

D.6.70 Two houseboats moored at Putney Pier are located adjacent to the main site boundary. During the cofferdam construction, the houseboat on the eastern mooring point would be relocated adjacent to the western mooring point. The daytime construction of the cofferdam is expected to cause temporary significant noise effects for approximately 15 months.

D.6.71 No other residential properties in the vicinity of construction works are located close enough to be subject to significant adverse noise effects. No significant adverse effects arising from road-based or river-based construction traffic were identified. No significant noise or vibration effects as a result of the operation of the site are predicted.

D.6.72 The NPS advises that in situations where other forms of noise mitigation have been exhausted, noise insulation to dwellings or, in extreme cases, compulsory purchase of affected properties may be considered in order to gain consent for what might otherwise be an unacceptable development. In the case of the Thames Tideway Tunnel no extreme cases have been identified at the date of the submission of the application for development consent which would necessitate the compulsory acquisition of properties due to significant adverse effects. The *Thames Tideway Tunnel noise insulation and temporary re-housing policy* and the *Thames Tideway Tunnel project compensation programme* (included within Schedule 2 of

the *Statement of Reasons*, which accompanies the application) have been developed to offset the effects arising from construction related disturbance. The noise insulation and temporary re-housing policy would be implemented where predicted or measured construction noise levels exceed published trigger levels. The compensation programme was established to address claims of exceptional hardship or disturbance. In relation to construction, eligible works would be directed towards mitigation or other required actions to reasonably reduce disturbance from noise or construction activities.

D.6.73 The noise levels predicted at Star and Garter Mansions and public house staff accommodation, and 10 Ruvigny Gardens do not exceed the noise insulation thresholds given in the *Thames Tideway Tunnel noise insulation and temporary re-housing policy* and as such would not be eligible for noise insulation under this policy. However, these properties may be eligible for compensation under the *Thames Tideway Tunnel project compensation programme*.

D.6.74 The construction noise levels predicted at the houseboats moored at Putney Pier do exceed the thresholds for noise insulation provided by the *Thames Tideway Tunnel noise insulation and temporary re-housing policy*. However, the standard noise insulation measures available would not be effective or appropriate for houseboats. The houseboats may, however, be eligible to apply for temporary re-housing, and may also be eligible to apply for compensation under the *Thames Tideway Tunnel project compensation programme*, which was established to address claims of exceptional hardship or disturbance.

D.6.75 Residents of the houseboats who would be eligible for temporary re-housing would be re-housed only during those periods when noise levels exceed the thresholds given in the above policy. It is assumed that residents would return to their houseboats in the intervening period, and therefore, the effects of temporary re-housing would be short term.

D.6.76 Thames Water has employed all possible measures to mitigate the effects of noise at the site. The project demonstrates good design and mitigates and minimises adverse impacts on health and quality of life in accordance with paras. 4.9.8 and 4.9.9 of the NPS. Some residual noise effects still remain, however these would be dealt with through the Tideway Tunnel project compensation programme.

Historic environment

D.6.77 The *Environmental Statement* and *Heritage Statement* both describe the significance of the heritage assets that may be affected by the proposed development and the contribution of their setting to their significance.

D.6.78 There are no internationally designated heritage assets near the site. This site is affected by a number of nationally designated (statutorily protected) heritage assets. Those within the main CSO construction site area comprise the Grade II listed Putney Bridge and a group of five Grade II listed bollards at the western side of the site. There are also a number of listed buildings within close proximity to the site. The Grade II* listed St Mary's Church is located 20m to the southeast and the Grade II listed

White Lion Hotel, 40m to the south. Those listed buildings located closest to the temporary slipway site comprise the Grade II listed Winchester House/Putney Constitutional Club 30m to the northeast; the Grade II listed 37, 39 and 41 Lower Richmond Road situated 60m to the south; and three Grade II listed bollards located 60m to the northwest of the temporary site.

D.6.79 Local authority designations include an archaeological priority area which covers both the main CSO site and temporary slipway area. The site also lies within the Putney Embankment Conservation Area, which is characterised by its riverside location, boathouses, former wharf and some of the oldest existing buildings in Putney.

D.6.80 Locally listed buildings close to the site comprise the Star and Garter Hotel and Star and Garter Mansions which are double fronted onto Lower Richmond Road and Embankment, both approximately 40m to the northwest of the main site. These buildings are both within the Putney Embankment Conservation Area.

D.6.81 The construction of cofferdams, the foreshore apron and campsheds, as well as modifications to the river wall and slipways would remove any buried archaeological remains (primarily post-medieval) which may be present at the main site and temporary slipway area. The *Environmental Statement* identifies a low potential for Roman and early medieval *in situ* remains.

D.6.82 Effects on buried heritage assets are unavoidable and measures would be taken to minimise the land take at the site. Site-specific measures to mitigate effects on buried heritage, would be detailed in the *Site-specific Archaeological Written Schemes of Investigation*, in line with the *Overarching Archaeological Written Scheme of Investigation*, and would be subject to the findings of field evaluation. An approach to recording evidence is proposed which was developed and agreed with English Heritage.

D.6.83 Physical effects on above ground heritage assets include the removal of the existing sewer outfalls and apron, and insertion of the new interception chamber beneath the Grade II listed Putney Bridge. The impact of removal of the existing sewer outfalls and apron beneath the listed bridge would be partially mitigated by an English Heritage Level 3 Standing structure recording and photographic survey in accordance with site-specific design principles, as well as mitigation measures embodied within the design.

D.6.84 Locally there would be major negative temporary effects on the southern bridge abutment from the removal of the apron, the cutting of small areas of stonework and the presence of the cofferdam and worksite. However, the Grade II listed Putney Bridge is a robust structure. It has previously undergone renovation and modernisation works, such as road widening and structural strengthening, which have not affected its significance. Considering the whole structure and the localised and relatively discrete intervention proposed to install the CSO interception chamber, the intervention would result in less than substantial harm, as the bridge's significance would not be substantially diminished.

D.6.85 The works would be harmful to the original fabric of the abutment, the interior vaults and the roadway above. However, the works would improve and utilise the existing 19th century CSO outfalls and therefore would not impact on the character and function of the bridge. They would also not affect the public's appreciation of the bridge or the contribution it makes to Putney's riverside setting.

D.6.86 There could also be an adverse effect on the Grade II listed Putney Bridge due to ground movement resulting from the construction works and tunnelling, leading to some minor cracking. The bridge would experience a maximum vertical movement beneath two piers of less than 8mm and 9mm. The horizontal settlement would not cause significant damage to the bridge structure. The third pier of the bridge and the Putney abutment would experience less than 1mm of settlement. More pronounced vertical and radial movements are concentrated at pier one and two, and the intermediate spans, which would experience hogging. Cracking would therefore be predicted to occur in the intermediate and abutment spans of the bridge; this would be minor cracking of the joints of the voissoirs of the barrel arch. These predicted settlement effects are minor and would not affect the structural integrity of the bridge. Monitoring would give early and prior warning of significant movements and, in accordance with the CoCP, should it be necessary, emergency repairs would be made to the bridge. Damage that would not require emergency repairs would be repaired using appropriate conservation techniques following the conclusion of works and abatement of ground movement in the area of the bridge.

D.6.87 The removal of the Grade II listed bollards within the western boundary of the site is required for the duration of the construction works, however this impact would be temporary and the listed bollards would be protected and reinstated (as detailed in design principle PWH1X.21) as close to their current positions as possible, and in keeping with the layout and access requirements of the new permanent structure. The refurbishment and relocation of the bollards was supported by English Heritage in its phase two response. Any negative effects from the bollards' relocation and altered configuration would be off-set by their improved appearance and continued functionality.

D.6.88 The construction works at both the main site and temporary slipway site would have a temporary adverse effect on the significance, character and appearance of the Putney Embankment Conservation Area due to the nature and activities associated with the temporary works. However, given the temporary nature and the limited extent of the works within the context of the wider designated area (a small proportion of its approximate 1km river frontage), no significant effect to the conservation area as a whole would result.

D.6.89 A series of measures detailed in the *CoCP* are embedded within the project design in order to reduce potential effects on the historic environment and above ground heritage assets. Part B of the *CoCP* contains site-specific measures which include:

a. protecting the University Boat Race stone from damage

b. protecting the Grade II listed Putney Bridge against accidental strike damage with protection barriers installed as required, but not attached to the structure unless otherwise agreed.

D.6.90 The foreshore structure presented the most difficult design challenge; however it also provided the opportunity to provide an enhanced public open space. This space, with its high quality design, would be a positive addition to Embankment and would offer improved views of the surrounding conservation areas, Putney Bridge, and other notable heritage assets. It would also play a significant role in Putney's most high profile public event: the annual University Boat Race.

D.6.91 English Heritage welcomed the acknowledgement that the permanent design needed to have regard to the proximity of the bridge and public slipway, and the location within the Putney Embankment Conservation Area, in its phase two response. Furthermore, English Heritage noted the analysis of its feedback and adaptations made to the design as a result.

D.6.92 Particular attention was paid to the location, height and scale of the foreshore structure, ventilation columns and electrical and control kiosks. The scale and form of the proposed development is considered to be in keeping with the character of the area and the use of high quality materials would ensure the development reflects its special riparian historical setting. The design and materials of the river wall were carefully considered to ensure it is in keeping with Putney Bridge when visible at low tide. Accordingly the following site-specific design principles relevant to this site include:

a. In order to minimise the visual and physical impact on the listed bridge, the top of the interception chamber shall be below the springing point of the bridge arch and be as small as possible. Furthermore the face of the interception chamber would be set back from the main bridge elevations as far as possible to maintain the architectural integrity of the existing bridge (PUTEF.01).

b. The interception chamber shall be finished in fair-faced concrete with a high quality finish that complements the existing finish of the bridge (PUTEF.02).

c. The design and materials of the facades of the main Waterman's Green kiosk shall match the existing bridge abutment wall (PUTEF.07).

d. The design of the interception ventilation column (positioned on the listed bridge) shall be in keeping with the character of surrounding street furniture (PUTEF.13).

e. The river wall shall be finished in natural stone with vertical timber fenders (PUTEF.19).

D.6.93 The overall impact of the proposals would constitute less than substantial harm to the heritage assets in the vicinity. The careful, sympathetic massing and detailing of the permanent above-ground structures would make a positive contribution to the distinctive local character, as required by para. 4.10.12 of the NPS.

Light

D.6.94 The *Daylight/ Sunlight Assessment* assessed the potential impact of the construction works and permanent structures on the daylight and sunlight amenity of surrounding properties. The screening assessment concluded that the construction and permanent works would have no material impact on daylight/sunlight.

D.6.95 The surrounding area is lit in the early evenings by street lighting and by light spill from surrounding buildings. During construction, artificial lighting of the site would be required for evening work during the winter months. For practicality and safety reasons tunnel construction needs to take place over extended periods of time, including working on a 24-hour, seven days a week basis. During this period, the working would mainly take place below ground but artificial lighting would be required for the supporting activity at ground level for extended periods at this site during the tunnel construction and secondary lining phases. Measures are included within the *CoCP* to ensure that all reasonable steps would be taken, to minimise detrimental impact on amenity resulting from artificial light. For example, site lighting during construction would be capped and directional to ensure minimal light spill and lighting only used when necessary and as such there would be no unreasonable effect on residential properties during the construction period. Through the measures included within the *CoCP* all reasonable steps have been taken, and would be taken, to minimise detrimental impact on amenity resulting from Artificial Light as required by the NPS.

D.6.96 The project-wide design principles state that in heritage and sensitive settings, lighting proposals shall respect adjacent historic elements and co-ordinate with wider lighting objectives which include:

a. Light pollution within the sites shall be minimised by using capped, directional and cowled lighting units (LTNG.01).

b. Lighting shall balance the need to provide a safe environment with one that also responds to the need to reduce light pollution and promote biodiversity (terrestrial and aquatic) (LTNG.04).

D.6.97 New lighting to the foreshore structure would be provided in accordance with the project-wide and site-specific lighting principles. The primary purpose of these is to reduce the risk of accidents and provide good amenity lighting to ensure sufficient lighting for safe orientation and direction after dark.

D.6.98 All reasonable steps would be taken to minimise any detrimental effects arising from the use of artificial lighting at this site in accordance with the NPS (para. 4.12.7).

Traffic and transport

D.6.99 The *Environmental Statement* and *Transport Assessment* consider the likely transport effects at this site in respect of the proposals for both the construction and operational phases. The project-wide approach to managing transport is set out in the *Transport Strategy*.

D.6.100 The Putney Embankment Foreshore site has an excellent public transport accessibility level of 6a. A total of 13 daytime bus routes and two night-time bus routes operate within 640m of the site. Putney Bridge underground station, which lies on the District Line, is located within approximately 650m walking distance to the northeast of the site. The closest National Rail station is Putney station situated approximately 700m walking distance to the southeast, and a passenger river bus service operates from Putney Pier, Monday to Friday during peak hours.

D.6.101 On-street parking is provided on both sides of Embankment and is subject to Controlled Parking Zones which require permits to park. Parking is also permitted on the eastern end of Embankment on a shared use basis, which includes provision for permit holders and on a pay and display basis, with a maximum stay of four hours within restricted time periods.

D.6.102 Information regarding the travel arrangements of staff working on the site is included in the construction environmental management plan and the *Draft Project Framework Travel Plan,* which accompanies the application. At this site there would be no parking provided within the site boundary for workers. Parking on surrounding streets is restricted as stated above, and measures to reduce car use would be incorporated into a site-specific travel plan. A site-specific construction workforce travel plan would be required to be submitted and approved by the local planning authority in advance of the commencement of the main CSO works.

D.6.103 The location of vehicular access and egress to and from the main site during both construction and operation is via Lower Richmond Road (B306) and Embankment. This access arrangement on an existing one-way route, would avoid large construction vehicles egressing from the site via the residential roads located to the southwest.

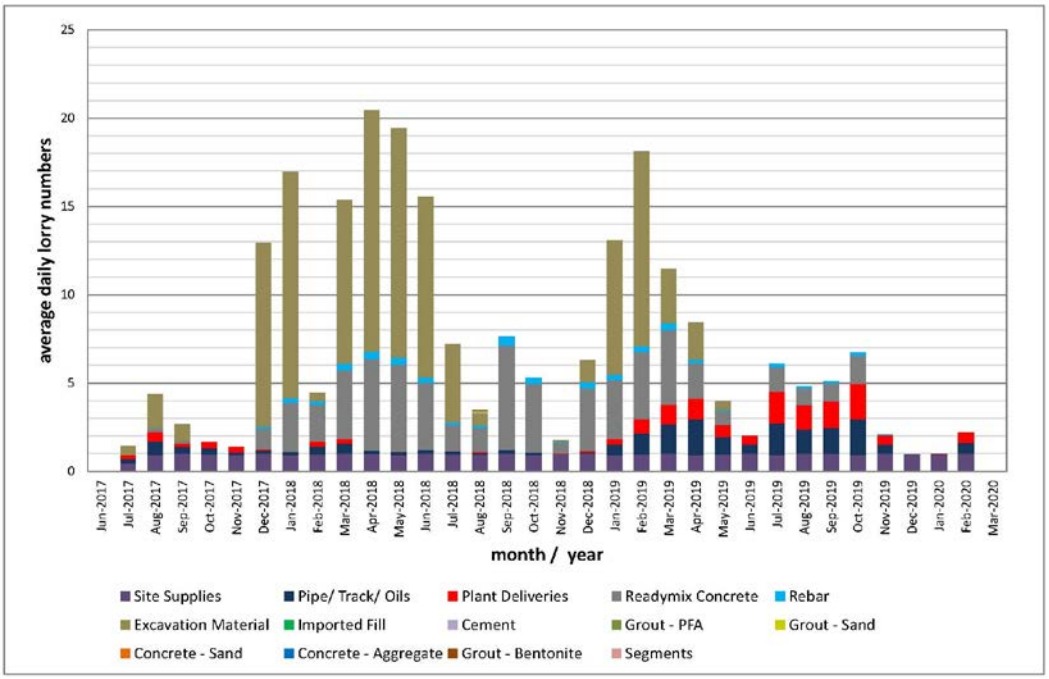
D.6.104 Lower Richmond Road and Glendarvon Street would be used to access the temporary slipway site by construction vehicles. Vehicles would exit the slipway site from the Embankment via Thames Place and back onto Lower Richmond Road. Barges would also be used to access both sites during the construction works.

D.6.105 It is anticipated that an average of three HGVs would access the temporary slipway site per day during its construction and subsequent dismantling. HGVs would only access the temporary slipway site between 10am to 3pm Monday to Friday to minimise the impact on the local community. This is covered by the *CoCP* Part B.

D.6.106 During the main CSO construction typical vehicle movements would take place on weekdays between 8am to 6pm and on Saturdays from 8am to 1pm with up to one hour before and after these hours for mobilisation and demobilisation of staff. Mobilisation may include: loading; unloading; and arrival and departure of workforce and staff at site and movement to and from the place of work. In exceptional circumstances HGV and abnormal load movements could occur up to 10pm for large concrete pours and later at night on agreement with the local authority.

D.6.107 The assumed average peak daily construction lorry vehicle movements and duration is 42 movements per day (21 two-way vehicle trips) for one month. A histogram of the average daily lorry numbers at Putney Embankment Foreshore is illustrated below.

Figure D.9 Estimated construction lorry profile



D.6.108 The estimated construction lorry profile is based on the average day in the peak month and is a reasonable 'worst case' scenario. During many months vehicle numbers would be lower. Further detailed information on construction vehicle numbers and access can be found in the *Transport Assessment*.

D.6.109 The additional highway demand due to construction traffic flow would not have any significant impact on the local road network. Minor delays to journey times may be experienced due to junction modifications; however no significant impact is likely to arise.

D.6.110 A number of car parking spaces would need to be temporarily removed during the construction works in order to allow unimpeded access of HGVs and to avoid conflicts with existing road users in the surrounding area. Car parking surveys were completed along the route of the temporary accesses.

D.6.111 Approximately 25 to 35 parking spaces along Embankment would be suspended and a small number of spaces suspended at the southern end of Glendarvon Street during the construction of the temporary slipway. This lost car parking provision would not be replaced elsewhere in the vicinity since there is no available kerbside space. Parking surveys show that while there is spare capacity in some parking bays, the remaining capacity in the area would not be sufficient to accommodate displaced parking demand. As a result, there would be an adverse impact on parking on Embankment during construction of the temporary slipway. All

of the displaced parking associated with the temporary slipway would be used for two periods of three months during the construction and removal of the temporary slipway. This displaced parking would be reinstated prior to the commencement and after completion of the main CSO works.

D.6.112 During construction at the main site, it would be necessary to relocate an informal pedestrian crossing located on Embankment, to the west of the Putney public slipway, which includes dropped kerbs and tactile paving. The crossing would need to be relocated in order to prevent conflict between construction vehicles utilising that part of Embankment as a two-way access and crossing pedestrians. To facilitate these works a small number of car parking spaces would be temporarily suspended. This lost provision would not be re-provided elsewhere, however, parking surveys show that there is spare capacity in some parking bays and therefore spare capacity would be available within the vicinity of the site.

D.6.113 During construction it is anticipated that 90 per cent of cofferdam fill (import and export) and 90 per cent of shaft, tunnel and other excavated material would be transported by barge. A daily average of four barge movements per day would be the peak number of barge movements and would occur within Site Year 2 of the construction programme. Public access to the river would be maintained throughout the construction phase through the provision of the temporary slipway. The *Transport Assessment* concludes that due to the low number of barges servicing the site, the impact on river navigation at Putney Embankment Foreshore would be negligible. A separate *Navigational Issues and Preliminary Risk Assessment* was undertaken for the construction works and barges to be used at the Putney Embankment Foreshore site and accompanies the application.

D.6.114 The Thames Path runs along the riverside footway of Embankment past both the main and secondary sites. During work at the main site, the Thames Path would be diverted to the southern footway of Embankment immediately opposite the site access. During the construction of the temporary slipway pedestrians would be diverted from the northern footway of Embankment onto a protected diversion route within the carriageway. These diversions would result in two additional crossings of Embankment. These would affect pedestrians and cyclists (including pedestrians) using the Thames Path and other routes in the vicinity of the main CSO construction site.

D.6.115 Measures incorporated into the *CoCP* Part A to reduce transport impacts include HGV management and control measures such as designated vehicle routes to sites for construction vehicles. In addition to these general measures, site-specific measures were incorporated into the *CoCP* Part B including:

a. Two-way flow on Embankment is to be maintained during construction of the temporary slipway for general traffic using a priority traffic management system as required.

b. A traffic marshal would be in place if large vehicles are required to reverse out of the site onto Embankment.

c. Traffic management plan to address potential conflict between construction vehicles and other large vehicles such as vehicles transporting boats at Glendarvon Street junction with Embankment by measures such as timed deliveries, traffic marshals or priority signage.

d. Construction vehicle drivers to be advised in advance of the restricted road width along Glendarvon Street and to look out for potential conflicts with oncoming vehicles

e. The cycle stands on Embankment will be relocated approximately 20m to the west

f. An equivalent safe crossing point for pedestrians to be provided on Embankment while the existing informal crossing is suspended.

g. Construction vehicles associated with either the construction or subsequent dismantling of the temporary slipway will only access via Glendarvon Street between the hours of 10.00 and 15.00 hrs Monday to Friday. Construction vehicles will not be permitted to use Glendarvon Street outside this period.

D.6.116 The project was designed to limit impacts on the transport networks as far as possible and many measures are embedded directly in the design of the project. The *Transport Assessment* indicates that with the embedded measures in place, the changes to be expected in the transport networks are not significant and therefore no additional measures are required.

D.6.117 The NPS recognises that residual transport impacts are inevitable and should be afforded little weight where it has been demonstrated that all practicable mitigation measures have been sought to minimise adverse impacts.

D.6.118 During the operational phase there would be very occasional vehicle trips to and from the site for maintenance activities. Access for a light commercial vehicle would be required, for inspection and maintenance purposes, on a three to six monthly basis. In addition, once every ten years, a major internal inspection of the tunnel and underground structures would be required. This would involve a small team of inspection staff and two mobile cranes, and might require temporary suspension of on-street parking in the vicinity of the site.

D.6.119 There would not be any significant transport effects during the operational phase on the basis of infrequent and short-term maintenance trips to the site. No mitigation is therefore required for the operational phase of the project.

D.6.120 The construction works in this location would not likely result in any significant transport effects on road network operation or delays. No significant effects were identified on pedestrian and cyclist amenity, safety or on local public transport services. Thames Water is willing to enter into obligations and Requirements to secure necessary highway improvements and to mitigate transport impacts as required by the NPS para. 4.13.7, and therefore, development consent should not be withheld, and limited weight should be applied to residual transport effects.

Waste management

D.6.121 The Waste Strategy was developed to provide a framework for the management of materials and waste that would be produced throughout the construction and operational phases of the project. This ensures that the requirements set out in para. 4.14.6 of the NPS would be satisfied.

D.6.122 There are no particular site-specific waste issues associated with the use of this site.

Socio-economic

D.6.123 The project wide socio-economic benefits of the project both during construction and operation are detailed in Section 8 of the *Planning Statement*.

D.6.124 The immediate area (within 250m) surrounding the site to the south of the river contains a mix of terraced and medium rise residential developments. Commercial, retail and restaurant related uses are located to the immediate south and west of the site on Putney Embankment, Lower Richmond Road and Putney High Street. St Mary's Church is located to the east of the site. A number of rowing clubhouses and a boatyard are located to the northwest of the site along Putney Embankment.

D.6.125 In this location the River Thames is widely used primarily for recreational uses, although commercial users are also present. Fourteen rowing clubs operate within the area and other clubs further along the river also operate around Putney. Recreational users include canoeists, rowers and sailors, of both casual users and affiliated to clubs, many of which are based in close proximity to the temporary work sites along Putney Embankment. Commercial users include a commuter service operated by Thames Executive Charters and Livett's Launches, which both operate services from the adjacent Putney Pier.

D.6.126 The community profile suggests that the local community is made up of residents who are predominantly White, who generally experience good health and have high life expectancy and experience effectively no measureable deprivation.

D.6.127 Waterman's Green is a narrow strip of public amenity space located between Putney public slipway and Lower Richmond Road. Minor temporary construction impacts and a permanent loss of a small proportion of the green resulting from the positioning of the electrical and control kiosk, are not anticipated to result in any significant socio-economic or equalities effects.

D.6.128 In accordance with the NPS (para. 4.15.6), an initial *Equalities Impact Assessment* was undertaken to identify potential adverse, differential or positive impacts on equalities groups, direct or indirect, and whether a full assessment should be undertaken. Given the scale of the project and the potential for impacts on certain equalities groups, it was determined that a full assessment should be undertaken.

D.6.129 In accordance with the NPS, the *Equalities Impact Assessment* describes the demographics of the surrounding area and assesses whether a disproportionate number of people from particular equalities groups would be affected by the generic impacts associated with the project, including air emissions, flood risk, noise and vibration. It also outlines the impact on people living, working or owning businesses that may be displaced as a result of the project. It did not identify any differential impacts on equalities groups resulting from the proposed construction or operational works at Putney Embankment Foreshore.

D.6.130 Construction is expected to require a maximum workforce of approximately 50 workers at any one time. This would not significantly alter the demand for services in the surrounding area. These jobs and training opportunities would provide a stimulus to the local economy.

D.6.131 No significant socio-economic impacts were identified in relation to the temporary use of the river for barges, temporary closure of Putney public slipway, temporary diversion of the Thames Path or possible construction effects on St Mary's Church.

D.6.132 Adverse noise effects are predicted during the construction phase at the Star and Garter Mansions, Star and Garter public house staff accommodation, 10 Ruvigny Gardens and the houseboats moored at Putney Pier.

D.6.133 The predicted noise levels at Star and Garter Mansions and public house staff accommodation, and 10 Ruvigny Gardens do not exceed the noise insulation thresholds given in the *Thames Tideway Tunnel noise insulation and temporary re-housing policy* and as such would not be eligible for noise insulation under this policy. However, these properties may be eligible for compensation under the *Thames Tideway Tunnel project compensation programme.*

D.6.134 The construction noise levels predicted at the houseboats moored at Putney Pier exceed the thresholds for noise insulation provided by the *Thames Tideway Tunnel noise insulation and temporary re-housing policy*. However, the standard noise insulation measures available would not be effective or appropriate for houseboats. Residents of the houseboats who would be eligible for temporary re-housing would be re-housed only during those periods when noise levels exceed the thresholds given in the above policy. It is assumed that residents would return to their houseboats in the intervening period, and therefore, the effects of temporary re-housing would be short term.

D.6.135 It has been assumed that houseboat residents who take up the option of temporary re-housing would be re-housed within walking distance (considered to be a search area of approximately 1,600m) of their current location. Houseboat residents may also be eligible to apply for reasonable costs and expenditure incurred in association with relocation to be met by Thames Water, including but not limited to removal expenses and the costs of securing new accommodation, in accordance with the Thames Tideway Tunnel compensation programme.

D.6.136 It is possible that the businesses closest to the site, namely Thai Square, and Café 2 and 4 to 6 Putney High Street (the possible new cafés within the vaults on Waterman's Green) could experience a fall in patronage during the construction phase due to perceived and actual drop in amenity, and in particular due to adverse visual effects. Thames Water has engaged and continues to liaise with all potentially affected nearby businesses. The potential effect of loss of business on a small number of adjacent premises due to the temporary construction works is being carefully considered, and may be eligible for compensation under the Thames Tideway Tunnel project compensation programme.

D.6.137 For the operational phase, there are not expected to be any negative socio-economic effects or equalities impacts at Putney Embankment Foreshore site which require mitigation. Once operational there would be substantial benefits to the recreational users of the River Thames in this location due to the significant reduction in discharges from the Putney Bridge CSO and associated health benefits. Furthermore, the creation of a new, permanent, above-ground foreshore structure would result in the provision of an area of well designed, landscaped and functional public amenity space, ideally suited to passive recreation, along this section of the Thames Path.

D.6.138 This site is located within a nationally significant historical and cultural stretch of the River Thames recognised by events such as the annual Oxford and Cambridge University boat race and experienced by large numbers of people. The legacy of the project in terms of water quality improvements and creation of new public amenity space would positively contribute to the special riparian character of the area. These longer term benefits outweigh the short-term inconvenience of construction impacts for some local residents and businesses, which would be limited in time and mitigated as far as practical.

D.7 Overall conclusions

D.7.1 In an average year, the CSO discharges approximately 68,000m^3 of untreated sewage into the River Thames at Putney Bridge in the London Borough of Wandsworth. The Environment Agency identified the Putney Bridge CSO as a CSO that needs to be controlled, and Thames Water's solution to deal with this CSO is full interception.

D.7.2 Putney Bridge Foreshore was selected after extensive consideration and engagement as the appropriate site on which to meet the need. The site is suitable and the application proposals would meet the identified need.

D.7.3 Given the site location, within the foreshore, close to listed structures, residential dwellings and commercial premises, it is inevitable there would be some disturbance during the construction period. While Thames Water sought to minimise any disturbance that would be experienced through sensitive design and mitigation, some temporary negative effects during construction would likely remain.

D.7.4 These effects principally comprise:

a. noise effects at the closest sensitive receptors

b. townscape and visual effects during construction

c. low potential for removal of unknown buried heritage assets

d. loss of car parking during the construction and removal of the temporary slipway

e. adverse socio-economic effects on business premises, specifically the Thai Square, Café 2 and 4 to 6 Putney High Street during construction.

D.7.5 The assessment above explained that the proposals incorporate measures to limit the effect of each of these residual impacts. For each of these effects, the project design was refined and all practicable mitigation identified and committed to, in accordance with the advice in the NPS. The residual impacts are an unavoidable consequence of intercepting the CSO which discharges under the shore arch of Putney Bridge, in a mature, built-up urban environment.

D.7.6 The proposals at Putney Embankment Foreshore would also give rise to a number of significant beneficial effects, including:

a. reducing discharges from the Putney Bridge CSO would significantly improve the water quality in the tidal Thames with consequent benefits to ecology, recreation and amenity, and reduce sewage derived litter and health risks to river users

b. introducing a new area of high quality and useable public realm on the River Thames.

D.7.7 The proposed works at the Putney Embankment Foreshore site, and the mitigation measures that were developed and advanced as part of the application for development consent, directly accord with the approach required by the NPS. Adverse effects have been minimised as far as possible and opportunities taken to enhance the local environment and to leave a positive legacy.

D.7.8 Section 8 and 9 of the *Planning Statement* considers the implications of the local effects of the works at Putney Embankment Foreshore and the other main tunnel and CSO sites. It describes the overall balance between impacts and benefits associated with the project as a whole, against the guidance in the NPS and concludes that the works at Putney Embankment Foreshore, and the project as a whole, are compliant with the NPS and that development consent should be granted.

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Annex D: Drawings for Putney Embankment Foreshore

List of drawings

Putney Embankment Foreshore: Location plan

Putney Embankment Foreshore: As existing site features plan

Putney Embankment Foreshore: Construction phases plans

Putney Embankment Foreshore: Land use plan

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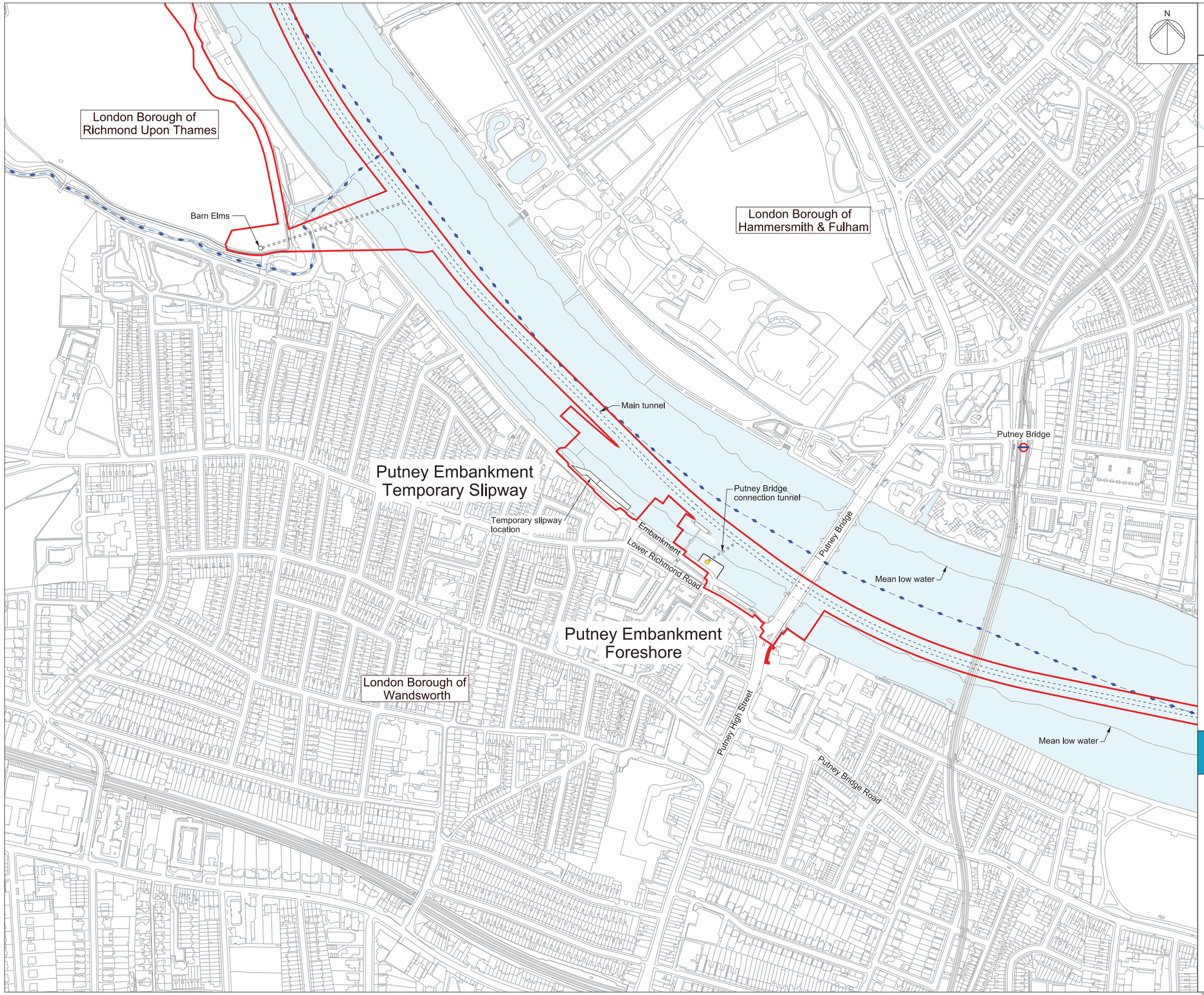


N

Keyplan:

Coordinates are to be Ordance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordance Datum Newlyn.

Key:

- Local authority boundary
- Order limits
- Tunnel
- Shaft

Notes:

1. The alignment of the tunnels are illustrative within limits of deviation.

100m 0 100m

Scale 1:2500 at A1
1:5000 if reproduced at A3

FOR INFORMATION

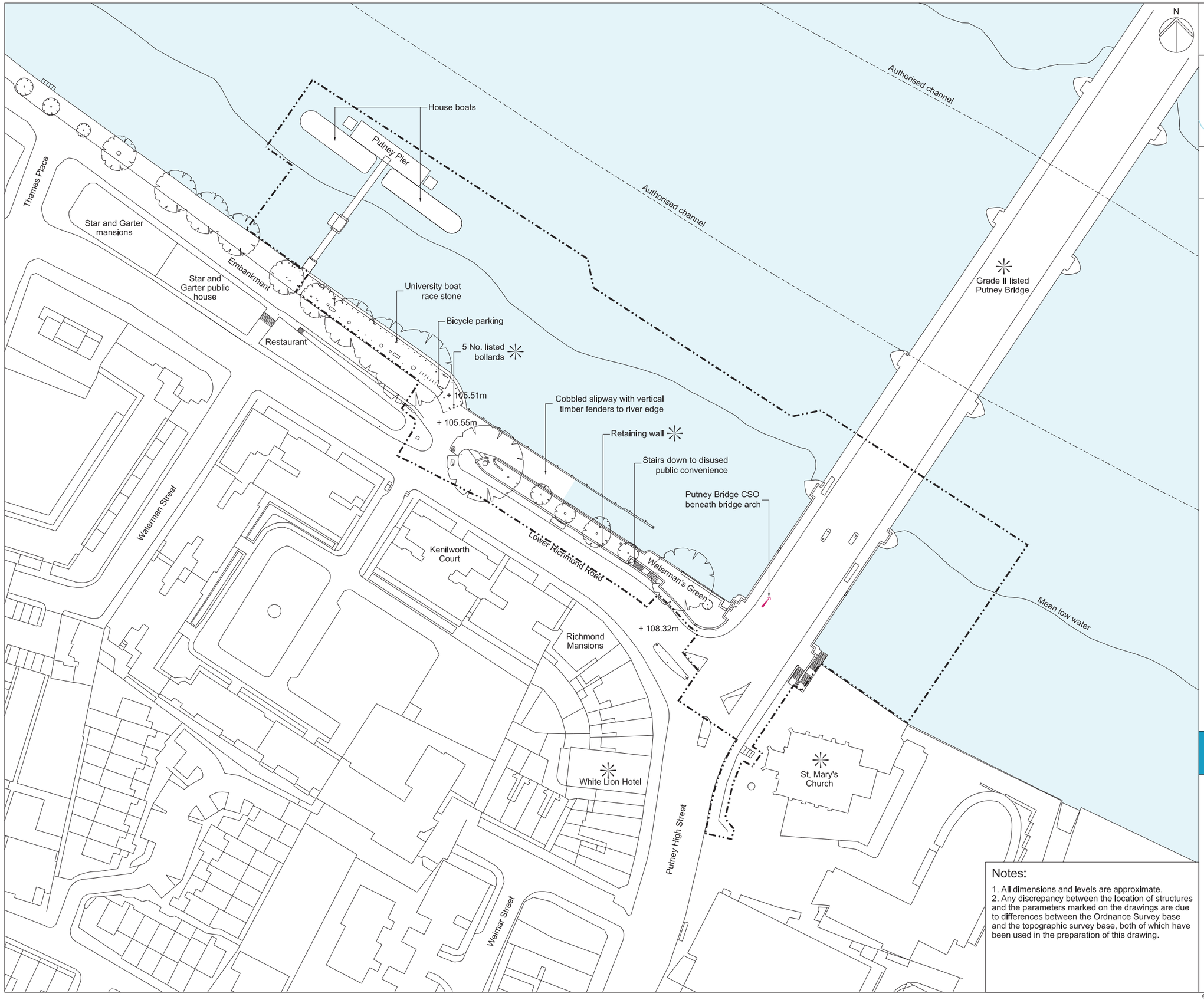
Location
Putney Embankment Foreshore
London Borough of Wandsworth

Document Information
Application for Development Consent
Location plan

Book of plans - section 8
DCO-PP-05X-PUTEF-080001
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



Keyplan:

Coordinates are to be Ordance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordance Datum Newlyn.

Key:

- Limits of land to be acquired or used (LLAU)
- Authorised channel
- + 105.40m — Existing levels (shown in metres above tunnel datum)
- Listed buildings/structures
- Approximate position of CSO outlet
- Existing trees within surveyed area (trunk sizes vary)

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

FOR INFORMATION

Location

Putney Embankment Foreshore
London Borough of Wandsworth

Document Information

Application for Development Consent

As existing
Site features plan
Book of plans - section 8

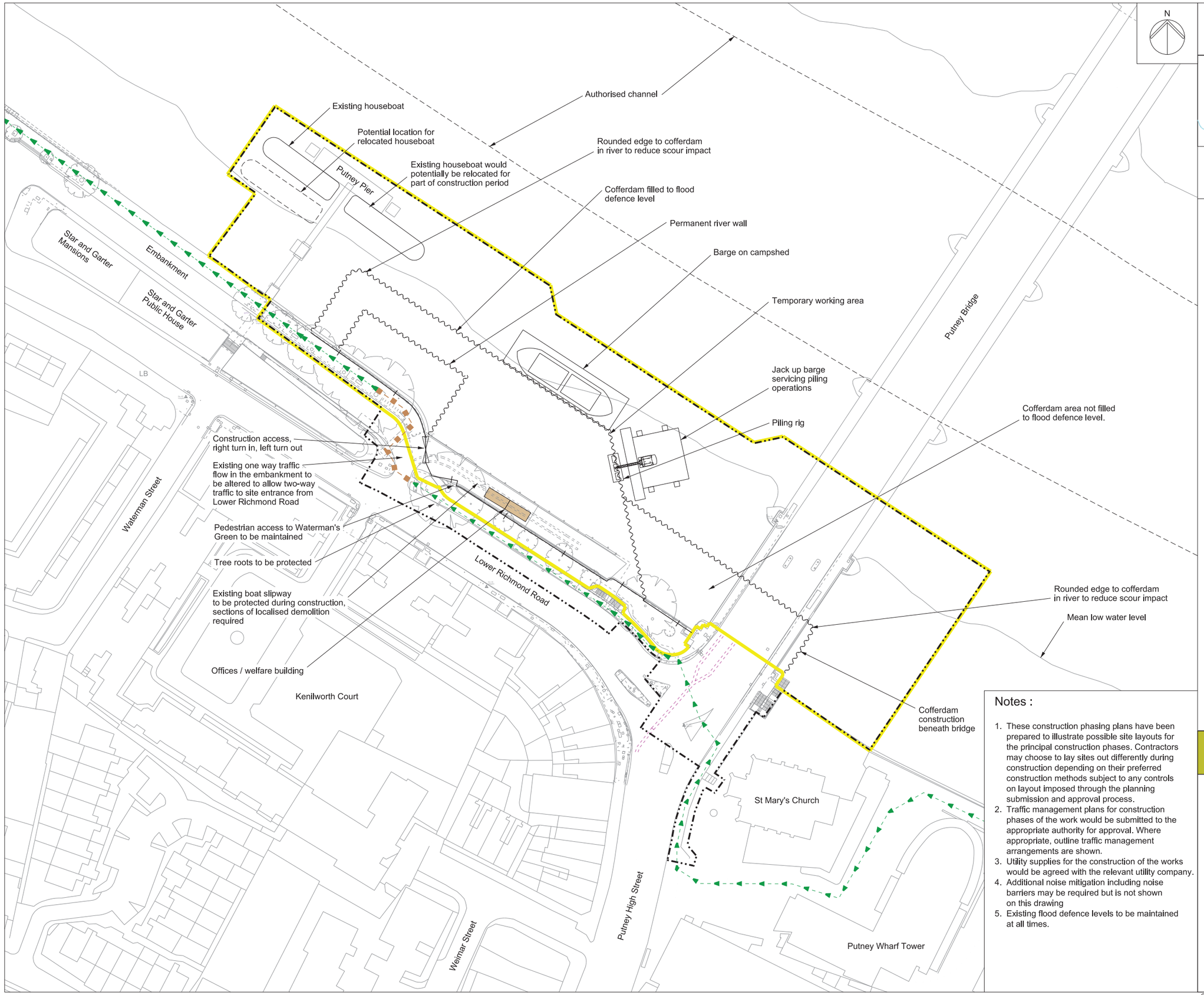
DCO-PP-05X-PUTEF-080002
January 2013

Notes:

1. All dimensions and levels are approximate.
2. Any discrepancy between the location of structures and the parameters marked on the drawings are due to differences between the Ordnance Survey base and the topographic survey base, both of which have been used in the preparation of this drawing.

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



Keyplan:

Coordinates are to be Ordance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key:

- Limits of land to be acquired or used (LLAU)
- Hoarding
- Maximum extent of working area
- Existing public right of way
- Route of temporary diversion of right of way
- Site access
- Access / haul route
- Existing sewers
- Sheet piles

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

Notes :

1. These construction phasing plans have been prepared to illustrate possible site layouts for the principal construction phases. Contractors may choose to lay sites out differently during construction depending on their preferred construction methods subject to any controls on layout imposed through the planning submission and approval process.
2. Traffic management plans for construction phases of the work would be submitted to the appropriate authority for approval. Where appropriate, outline traffic management arrangements are shown.
3. Utility supplies for the construction of the works would be agreed with the relevant utility company.
4. Additional noise mitigation including noise barriers may be required but is not shown on this drawing
5. Existing flood defence levels to be maintained at all times.

ILLUSTRATIVE

Location

Putney Embankment Foreshore
London Borough of Wandsworth

Document Information

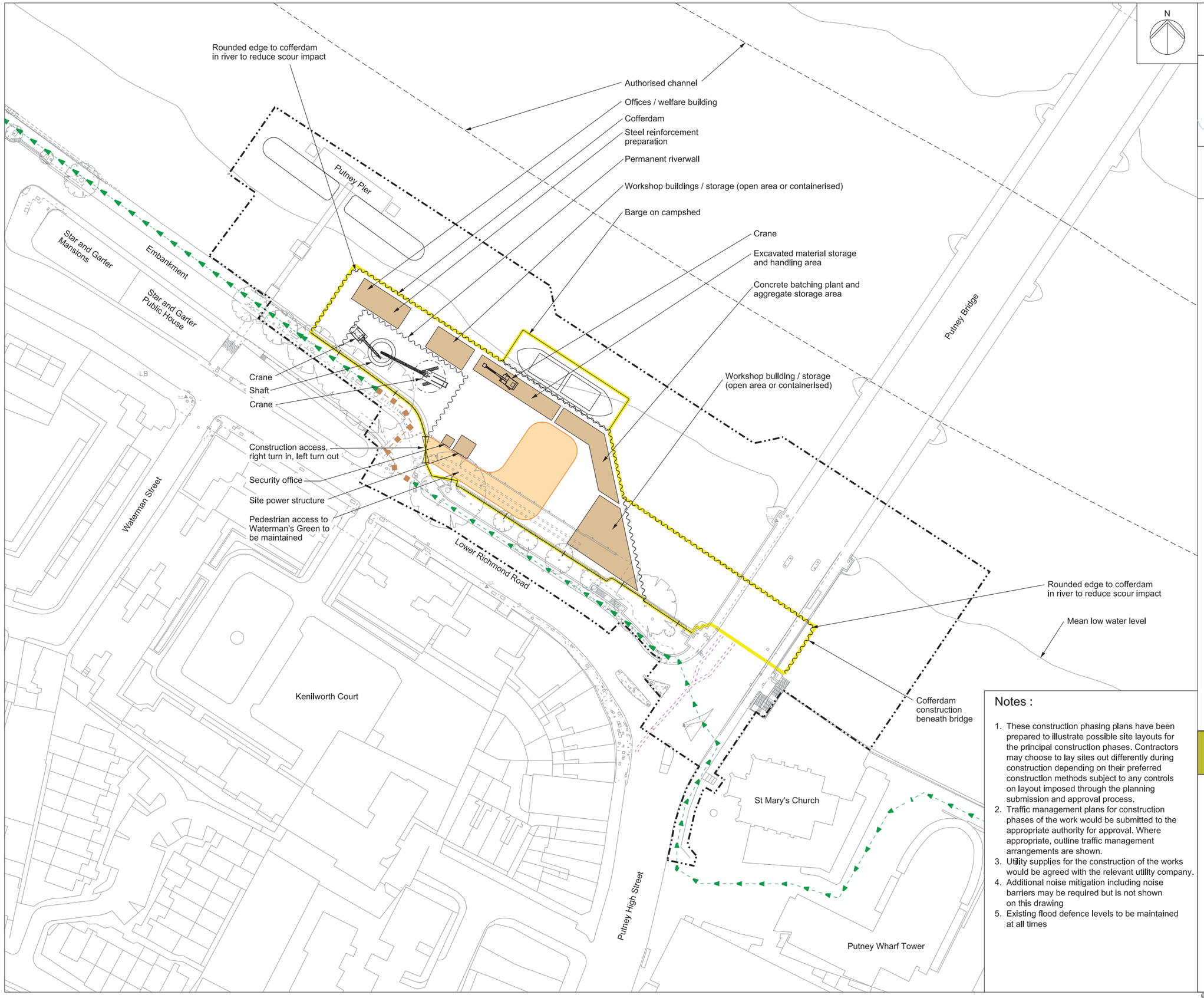
Application for Development Consent

Construction phases - phase 1
Site setup
Book of plans - section 8

DCO-PP-05X-PUTEF-080030
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



N

Keyplan:

Coordinates are to be Ordance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key:

- Limits of land to be acquired or used (LLAU)
- Hoarding
- Maximum extent of working area
- Existing public right of way
- Route of temporary diversion of right of way
- Site access
- Access / haul route
- Existing sewers
- Sheet piles

Notes :

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2. Traffic management plans for construction phases of the work would be submitted to the appropriate authority for approval. Where appropriate, outline traffic management arrangements are shown.
3. Utility supplies for the construction of the works would be agreed with the relevant utility company.
4. Additional noise mitigation including noise barriers may be required but is not shown on this drawing
5. Existing flood defence levels to be maintained at all times

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location

Putney Embankment Foreshore
London Borough of Wandsworth

Document Information

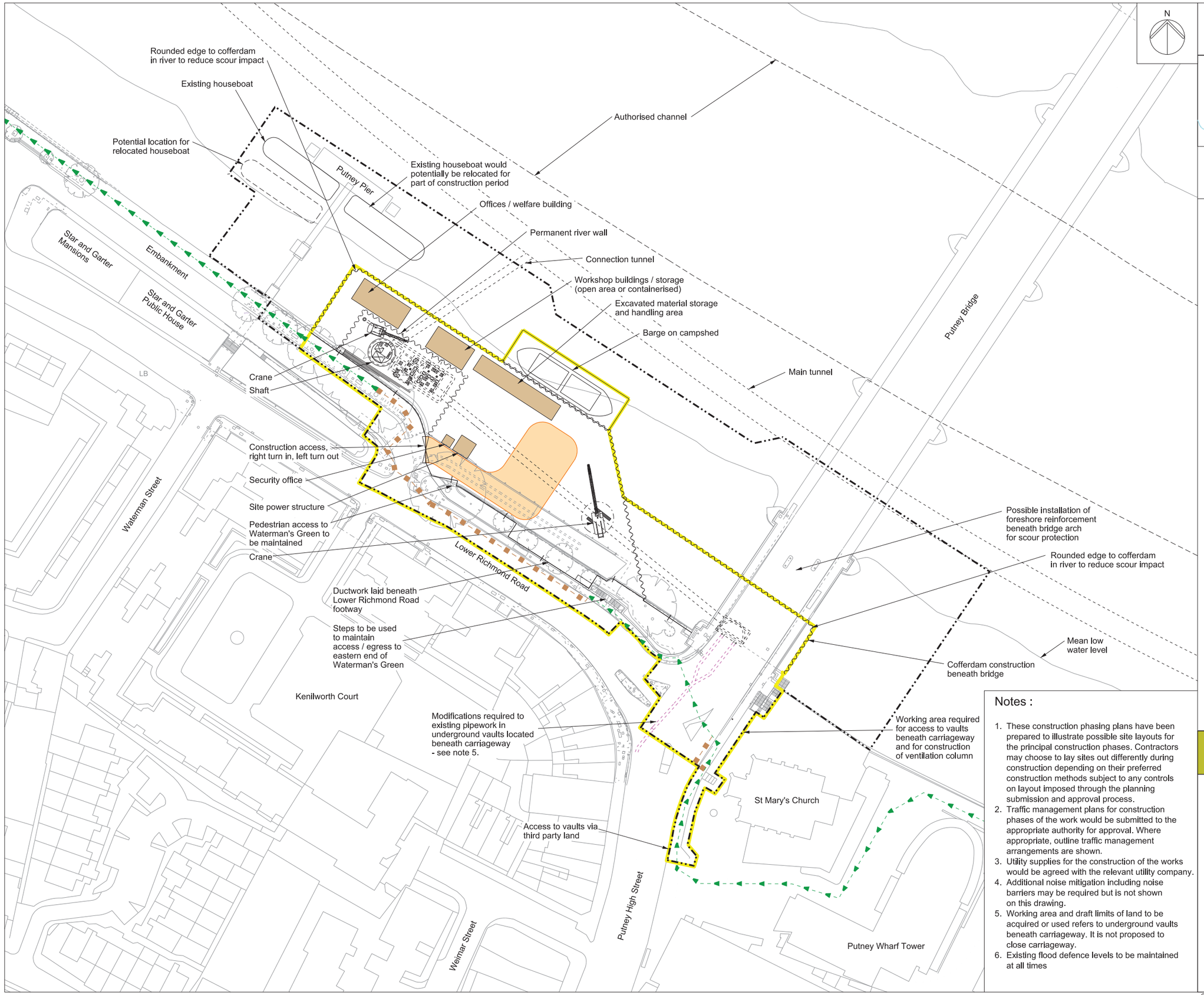
Application for Development Consent

Construction phases - phase 2
Shaft construction & tunnelling
Book of plans - section 8

DCO-PP-05X-PUTEF-080031
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



Keyplan:

Coordinates are to be Ordance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key:

- Limits of land to be acquired or used (LLAU)
- Hoarding
- Maximum extent of working area
- Existing public right of way
- Route of temporary diversion of right of way
- Site access
- Access / haul route
- Existing sewers
- Sheet piles

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

Notes :

1. These construction phasing plans have been prepared to illustrate possible site layouts for the principal construction phases. Contractors may choose to lay sites out differently during construction depending on their preferred construction methods subject to any controls on layout imposed through the planning submission and approval process.
2. Traffic management plans for construction phases of the work would be submitted to the appropriate authority for approval. Where appropriate, outline traffic management arrangements are shown.
3. Utility supplies for the construction of the works would be agreed with the relevant utility company.
4. Additional noise mitigation including noise barriers may be required but is not shown on this drawing.
5. Working area and draft limits of land to be acquired or used refers to underground vaults beneath carriageway. It is not proposed to close carriageway.
6. Existing flood defence levels to be maintained at all times

ILLUSTRATIVE

Location
Putney Embankment Foreshore
London Borough of Wandsworth

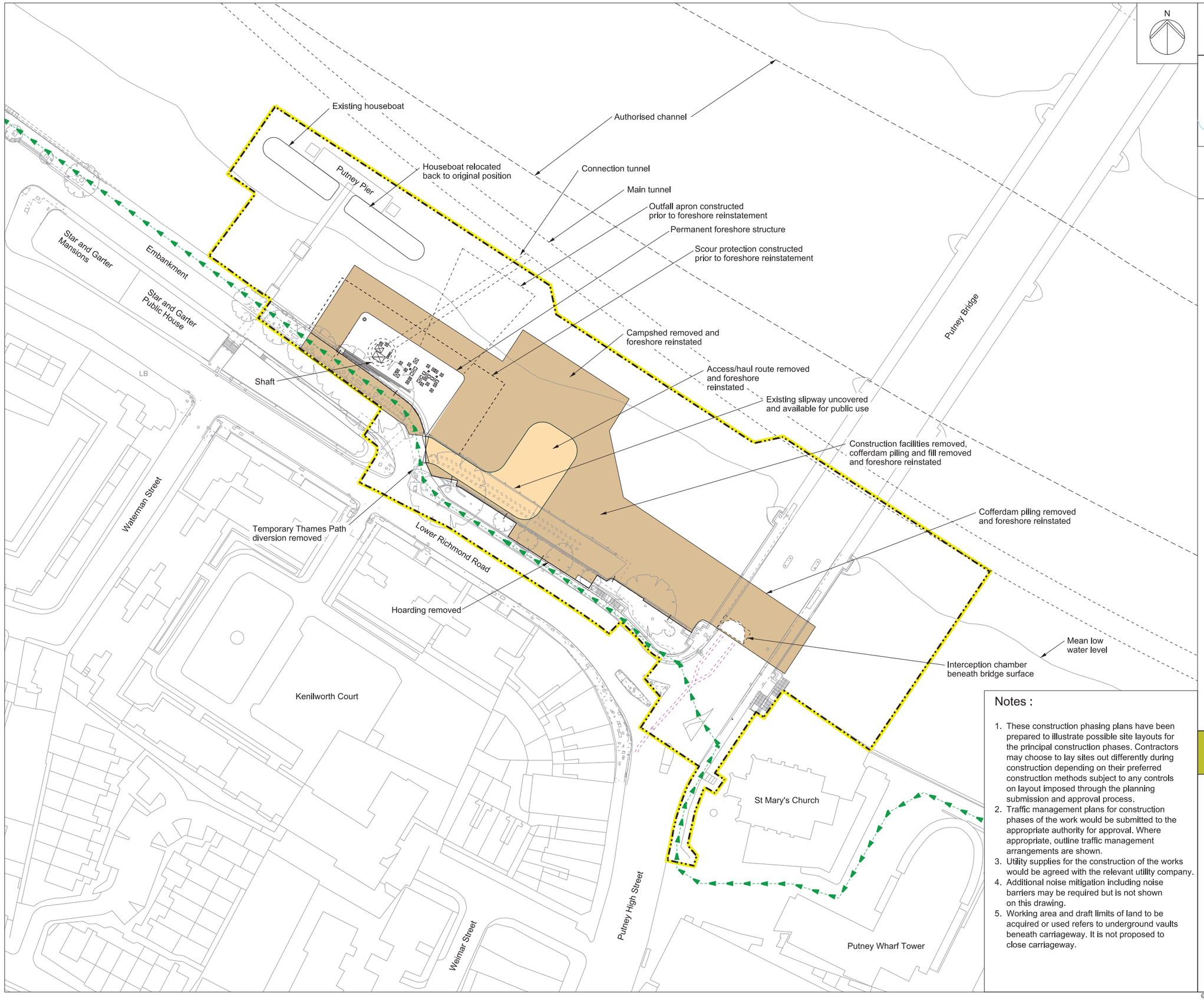
Document Information
Application for Development Consent

Construction phases - phase 3
Construction of other structures
Book of plans - section 8

DCO-PP-05X-PUTEF-080032
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



Keyplan:

Coordinates are to be Ordance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key:

- Limits of land to be acquired or used (LLAU)
- Hoarding
- Maximum extent of working area
- Existing public right of way
- Route of temporary diversion of right of way
- Site access
- Access / haul route
- Existing sewers

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

Notes :

1. These construction phasing plans have been prepared to illustrate possible site layouts for the principal construction phases. Contractors may choose to lay sites out differently during construction depending on their preferred construction methods subject to any controls on layout imposed through the planning submission and approval process.
2. Traffic management plans for construction phases of the work would be submitted to the appropriate authority for approval. Where appropriate, outline traffic management arrangements are shown.
3. Utility supplies for the construction of the works would be agreed with the relevant utility company.
4. Additional noise mitigation including noise barriers may be required but is not shown on this drawing.
5. Working area and draft limits of land to be acquired or used refers to underground vaults beneath carriageway. It is not proposed to close carriageway.

ILLUSTRATIVE

Location
Putney Embankment Foreshore
London Borough of Wandsworth

Document Information
Application for Development Consent

Construction phases - phase 4
Site demobilisation
Book of plans - section 8

DCO-PP-05X-PUTEF-080033
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

Keyplan:

Coordinates are to be Ordance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key:

- Limits of land to be acquired or used (LLAU)
- Hoarding
- Maximum extent of working area
- Existing public right of way
- Route of temporary diversion of right of way
- Site access
- Access / haul route

Notes :

1. These construction phasing plans have been prepared to illustrate possible site layouts for the principal construction phases. Contractors may choose to lay sites out differently during construction depending on their preferred construction methods subject to any controls on layout imposed through the planning submission and approval process.
2. Traffic management plans for construction phases of the work would be submitted to the appropriate authority for approval. Where appropriate, outline traffic management arrangements are shown.
3. Utility supplies for the construction of the works would be agreed with the relevant utility company.
4. Additional noise mitigation including noise barriers may be required but is not shown on this drawing.

10m 0 40m

Scale 1:500 at A1
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ILLUSTRATIVE

Location

Putney Embankment Foreshore
London Borough of Wandsworth

Document Information

Application for Development Consent

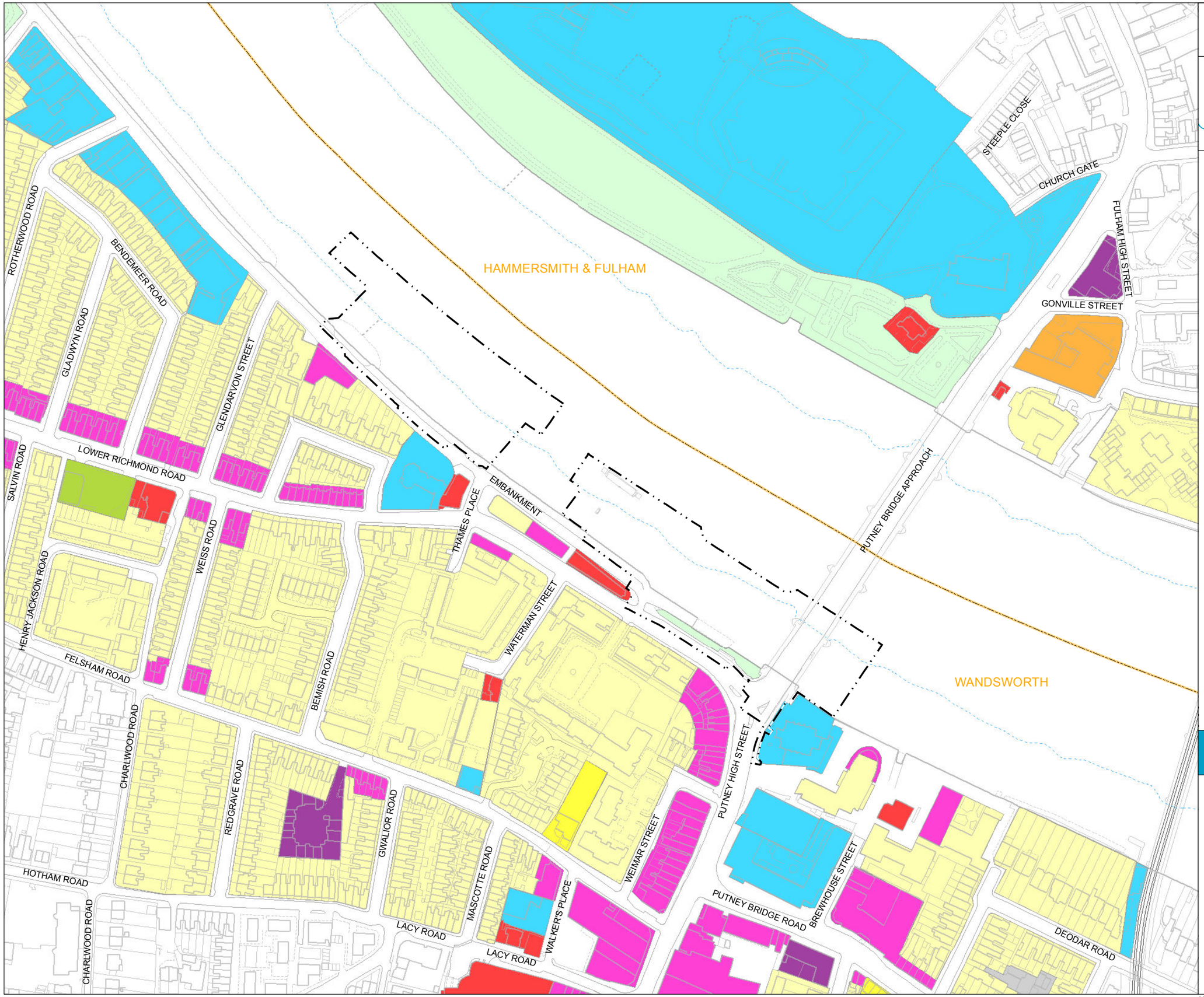
Construction phase - Temporary slipway

Book of plans - section 8

DCO-PP-05X-PUTEF-080034
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



Keyplan:

Key

- Limits of Land to be Acquired or Used
- Local Authority Boundary

Land Use

- Class A1-A5 (Shops, Financial & Professional Services, Restaurants, Drinking Establishments and Hot Food Takeaways)
- Class B1 (Business (Offices except A2) Research and Development, Light Industry)
- Class B2-B8 (General Industrial / Storage or Distribution)
- Class C1 (Hotels)
- Class C2-C2A (Residential Institutions)
- Class C3-C4 (Dwelling Houses)
- Class D1-D2 (Non Residential Institutions (Community Facilities) and Assembly and Leisure)
- Mixed Use
- Other
- Open Space

50 25 0 50 m

Scale 1 : 2,500 at A3

FOR INFORMATION

Location

Putney Embankment Foreshore
London Borough of Wandsworth

Document Information

Planning Statement

Land use

1PL03-MG-00814
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

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Thames Water Utilities Limited
Clearwater Court, Vastern Road, Reading RG1 8DB

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