

Thames Tideway Tunnel
Thames Water Utilities Limited



Application for Development Consent

Application Reference Number: WWO10001

Planning Statement

Doc Ref: **7.01**

Appendix M

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

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Creating a cleaner, healthier River Thames

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Thames Tideway Tunnel

Planning Statement

Appendix M: Chelsea Embankment Foreshore

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Appendix M: Chelsea Embankment Foreshore

M.1 Introduction

- M.1.1 In a typical year, the Ranelagh combined sewer overflow (CSO) discharges 283,000m³ of untreated sewage into the River Thames in front of Chelsea Embankment in the Royal Borough of Kensington and Chelsea. On the basis that litter tonnages are proportional to discharge volumes, approximately 71 tonnes of sewage derived litter is discharged from this CSO in the typical year.
- M.1.2 In addition, ten other CSOs along the northern bank from Chelsea (Church Street CSO) to the City of Westminster (Essex Street CSO) would be controlled by the works in this location and at Victoria Embankment Foreshore and Blackfriars Bridge Foreshore. In a typical year, these ten CSOs together discharge 2,138,000m³ of untreated sewage into the tidal Thames. This would avoid the need for additional sites at or near these ten CSOs.
- M.1.3 A worksite is required to intercept the Ranelagh CSO, connect to the northern Low Level Sewer No.1 (LLS (N)) and transfer flows into the main tunnel. The Environment Agency identified the Ranelagh CSO as a CSO that needs to be controlled. The proposed development site is known as Chelsea Embankment Foreshore and is located in the Royal Borough of Kensington and Chelsea, close to the boundary with the City of Westminster. The Location plan is provided in Annex M.
- M.1.4 This assessment is structured as follows:
- a. Section M.2 provides a brief description of the Chelsea Embankment Foreshore site.
 - b. Section M.3 sets out the planning context for works in this location.
 - c. Section M.4 describes the site-specific development for which consent is sought and the way in which the proposals evolved through consultation.
 - d. Section M.5 provides an analysis of the principal site-specific planning considerations and how the proposals comply with relevant planning policy.
 - e. Section M.6 provides an overall conclusion of the site-specific assessment for the proposed works at this site.

M.2 Site description

M.2.1 The Chelsea Embankment Foreshore site comprises an area of the foreshore of the River Thames opposite the Bull Ring Gate of the Royal Hospital Chelsea (the 'RHC') South Grounds, sections of the carriageway and pavement of Chelsea Embankment (A3212), and a small southern section of Ranelagh Gardens to connect to the LLS (N). The worksite area would be approximately 2.5ha.

M.2.2 Figure M.1 provides an aerial view of the proposed development site.

Figure M.1 Aerial photograph of Chelsea Embankment Foreshore



M.2.3 Figure M.2 shows a view of Chelsea Embankment and the Ranelagh CSO from Chelsea Bridge.

Figure M.2 View of Chelsea Embankment and the Ranelagh CSO from Chelsea Bridge



- M.2.4 The present-day Chelsea Embankment was created by Sir Joseph Bazalgette as part of the Victorian sewer system for London and was completed in 1874, which comprised the LLS (N) and the Ranelagh CSO in this location. The Ranelagh Sewer (Main Line) incorporates the Westbourne; one of London's 'lost rivers'. This sewer and the Ranelagh and King Scholars Pond Storm Relief sewers run southwest under Chelsea Bridge Road, through Ranelagh Gardens and the RHC South Grounds, and meet at a chamber just behind the river wall. The Ranelagh CSO discharges through an arched opening in the river wall near the Bull Ring Gate.
- M.2.5 Chelsea Embankment is a two-way single carriageway suitable for heavy goods vehicles and other long vehicles. It is a Transport for London Red Route.
- M.2.6 The foreshore site falls within the Thames Conservation Area and is considered to be functional flood plain (Flood Risk Zone 3b). It also falls within the designated Crossrail 2 Safeguarded Zone. The River Thames is designated as the River Thames (including Chelsea Creek) Site of Nature Conservation Importance (Metropolitan).

- M.2.7 The Ranelagh Gardens site to connect to the LLS (N) is within the Royal Hospital Conservation Area and the gardens are a Site of Nature Conservation Importance (Borough II).
- M.2.8 The site is bounded to the north by the RHC, the RHC South Grounds and Ranelagh Gardens which together are a designated Grade II registered park and garden. To the east lies Chelsea Bridge Gardens which is adjacent to Chelsea Bridge Road and Chelsea Bridge which crosses the River Thames to the London Borough of Wandsworth. Lister Hospital is to the east of Chelsea Bridge Road, in the City of Westminster. The River Thames surrounds the site to the east, south and west.
- M.2.9 The RHC South Grounds and Ranelagh Gardens are used for major events for several months each year, such as the Royal Horticultural Society's Chelsea Flower Show and the Masterpiece London art fair. The grounds are publicly accessible via the Bull Ring Gate or Royal Hospital Road when not occupied by these events. The South Grounds are leased by the Royal Borough of Kensington and Chelsea and offer managed football pitches, tennis and netball courts, sports changing facilities and the Chelsea Adventure Playground.
- M.2.10 The Thames Path National Trail follows the south side of Chelsea Embankment and runs from the river's source in the Cotswolds to the Thames Barrier in Greenwich. National Cycle Route 4 also travels along Chelsea Embankment, on its route between London and Fishguard.
- M.2.11 The principle RHC building is located approximately 300m north of the site. The RHC is Grade I listed, was designed by Sir Christopher Wren and built between 1682 and 1702. The RHC is occupied by retired soldiers, known as the 'Chelsea Pensioners'. Approximately 200m to the west of the site are the closest residential properties at the mansion blocks of Embankment Gardens.
- M.2.12 Other listed structures to the north of the site are the Grade II listed Bull Ring Gate on Chelsea Embankment and the Chillianwala War Memorial obelisk on Monument Walk in the grounds of RHC.
- M.2.13 Chelsea Embankment esplanade is a Grade II listed structure to the west of the development site, from Battersea Bridge to Grosvenor College Stairs, opposite the south western corner of the RHC grounds. The listing includes the embankment wall and 64 cast iron lamp posts.
- M.2.14 There are a number of Grade II listed structures to the east, including Chelsea Bridge (120m from the site) and a sewer vent in the pavement (35m from the site). Further east is the Grade II* coal-fired former Battersea Power Station across the river in the London Borough of Wandsworth.
- M.2.15 Battersea Park is located across the river to the south and is a designated Site of Importance for Nature Conservation. The Nature Area within the park is separately designated as a Local Nature Reserve.
- M.2.16 There is no existing vehicle access to the foreshore. A set of stairs (Grosvenor College Stairs) just to the west of the site provides access to the foreshore from Chelsea Embankment; however, they are currently

closed off. Chelsea Embankment also provides a continuous east-west link for pedestrians along the north bank of the river, forming part of the Thames Path National Trail.

M.2.17 The closest National Rail stations to the site are Battersea Park and Queenstown Road on the south side of the River Thames, approximately 1.1km and 1.4km from the site respectively. Sloane Square Underground Station served by the Circle and District lines is located approximately 1.1km to the north. One bus route passes (in one direction only) through the site, the 360 towards South Kensington, with a stop located in the 'Bull Ring' turning circle.

M.2.18 The Site features plan is contained within Annex M.

M.3 Planning context

M.3.1 In developing the proposals and mitigation measures for the development at Chelsea Embankment Foreshore, Thames Water¹ had regard to the policies set out in the National Policy Statement for Waste Water (NPS) and to Development Plan designations where these are relevant to the application.

M.3.2 In this case, the development plan comprises of the *London Plan* (2011), the Royal Borough of Kensington and Chelsea's *Core Strategy* (2010) and the saved policies of the *Unitary Development Plan* (UDP) (2002).

M.3.3 The foreshore site lies within the River Thames, which is designated as part of the strategic Thames Policy Area and Blue Ribbon Network in the *London Plan*.

M.3.4 Within the *Core Strategy*, the foreshore is within the Thames Conservation Area and the River Thames (including Chelsea Creek) Site of Nature Conservation Importance (Metropolitan). The site is also functional flood plain (Flood Risk Zone 3b) and lies within the designated Crossrail 2 Safeguarded Zone (*Core Strategy* Policy CT2).

M.3.5 The site in Ranelagh Gardens to connect to the LLS (N) is within the Royal Hospital Conservation Area and is a Site of Nature Conservation Importance (Borough II) and is a Grade II Registered Park and Garden as part of the RHC.

M.3.6 There are Grade I and Grade II listed buildings and structures in the surrounding area, but none within the site itself.

M.3.7 There are no tree preservation orders on the site, but it contains a number of mature trees which are protected due to the conservation area designations.

M.3.8 Given the site's partial location in the foreshore, there is no relevant planning history for that section of the site. In the immediate vicinity there are current and pending planning applications for the temporary use of the RHC South Grounds as event space for the summer Chelsea Flower

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.

Show (which also uses Ranelagh Gardens) and Masterpiece London and for the winter sale of Christmas Trees. These applications tend to be submitted on an annual basis.

- M.3.9 Approximately 170m to the northeast of the site a major mixed-use development for approximately 400 residential units has been approved (10/10496/OUT approved 1 December 2011) at the former Chelsea Barracks site on Chelsea Bridge Road, in the City of Westminster.
- M.3.10 Across the river in the London Borough of Wandsworth, the Grade II* listed Battersea Power Station is due to be re-developed with a mixed-use scheme under outline planning permission 2009/3575 approved 23rd August 2011 subject to a Mayoral Direction. Applications for reserved matters 2012/4584 and an application for details 2012/4586 were approved on 20th December 2012.
- M.3.11 Beyond the power station, there are other major developments in the pipeline within the Vauxhall Nine Elms Battersea Opportunity Area.

M.4 Description of development

Overview

- M.4.1 The proposed development at Chelsea Embankment Foreshore would intercept the Ranelagh CSO, as well as connect to the LLS (N). The works would convey the flows from the existing CSO, which discharges through the existing river wall, and from the LLS (N), which runs beneath the Chelsea Embankment highway, to the main tunnel.
- M.4.2 By employing this approach at this site and at Victoria Embankment Foreshore and Blackfriars Bridge Foreshore, the flows from ten other CSOs along the north bank of the river would be controlled. This avoids the need for additional sites at or near the ten CSOs from Church Street in Chelsea to Essex Street in the City of Westminster.
- M.4.3 The work would require the construction of a CSO interception chamber, an overflow weir chamber, hydraulic structures (including chambers, culverts and pipes) and ventilation structures. Electrical and control equipment would be located within two kiosks (1.5m in height) constructed alongside the Thames Path. Flows would be transferred from the relatively shallow depth of the existing sewers to the deeper level of the main tunnel via a CSO drop shaft and associated connection tunnel. The CSO drop shaft would be approximately 45m deep.
- M.4.4 Two signature ventilation columns (4m to 8m maximum) would allow air into and out of the shaft. Two smaller ventilation columns (up to 6m in height), one adjacent to the highway on the Thames Path and the other adjacent to the north side of the highway on the footpath, would be used to provide ventilation to the interception and overflow weir chambers.
- M.4.5 Apart from the ventilation columns and kiosks, the structures would be finished flush with existing ground level, and the site would be finished with hardstanding and a river wall parapet to provide flood defence to a new area of public realm.

- M.4.6 All works would be contained within the relevant zones as indicated on the Site works parameter plan contained in the *Book of Plans* which accompanies the application.
- M.4.7 The layout of the proposed above-ground features is illustrative as agreed with the Royal Borough of Kensington and Chelsea in order to maintain flexibility with regard to the final landscape design. This means that the submitted design is one way in which the development may be laid out, but there may be a number of other acceptable ways within the parameters. This retains flexibility and seeks to ensure the full potential of the site is achieved, while retaining Thames Water maintenance access. See Figure M.3 below for an image of the completed illustrative design.

Figure M.3 Visualisation of Chelsea Embankment Foreshore



Application for development consent

- M.4.8 The geographic extent of the proposals for which development consent is sought is defined by the limits of land to be acquired or used which is illustrated in the *Book of Plans*. Table M.1 sets out where the site-specific information for Chelsea Embankment Foreshore is provided.

Table M.1 Chelsea Embankment Foreshore: Drawings that define the proposed development

Drawing title	Status	Location
Location plan	For information	<i>Book of Plans</i> , Section 14
As existing site features plan	For information	<i>Book of Plans</i> , Section 14

Drawing title	Status	Location
Access plan	For approval	<i>Book of Plans, Section 14</i>
Demolition and site clearance plans (various)	For approval	<i>Book of Plans, Section 14</i>
Site works parameter plan	For approval	<i>Book of Plans, Section 14</i>
Site works parameter key plan	For information	<i>Book of Plans, Section 14</i>
Permanent works layout (various)	Illustrative	<i>Book of Plans, Section 14</i>
Proposed landscape plan (various)	Illustrative (save for the scale of the above ground structures which is indicative)	<i>Book of Plans, Section 14</i>
Section AA	Illustrative	<i>Book of Plans, Section 14</i>
As existing and proposed elevation (various)	Illustrative	<i>Book of Plans, Section 14</i>
Proposed elevation (various)	Illustrative	<i>Book of Plans, Section 14</i>
Kiosk design intent	Illustrative (save for the scale of the kiosk which is indicative)	<i>Book of Plans, Section 14</i>
Typical river wall design intent	Illustrative	<i>Book of Plans, Section 14</i>
Construction phases (various)	Illustrative	<i>Book of Plans, Section 14</i>
Existing utilities plan (various)	For information	<i>Utilities Statement</i>
River foreshore zones of working	For information	<i>Navigational Issues and Preliminary Risk Assessment Chelsea Embankment Foreshore</i>
Existing highway layout	For information	<i>Transport Assessment</i>
Highway layout during construction (various)	Illustrative	<i>Transport Assessment</i>
Permanent highway layout (various)	Illustrative	<i>Transport Assessment</i>

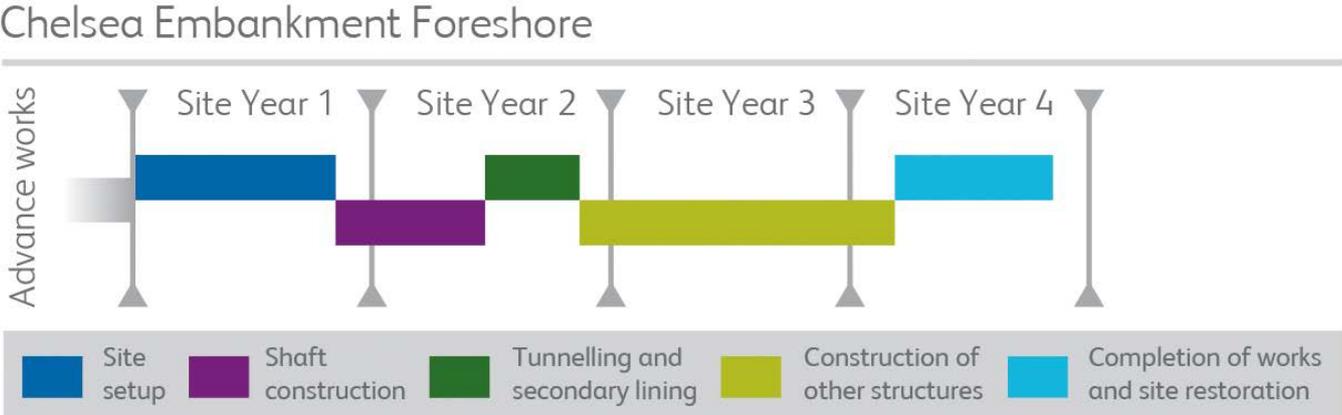
M.4.9 The Nationally Significant Infrastructure Project (NSIP) works (Work Nos. 12a and b) comprise the construction of a CSO drop shaft with an internal diameter of approximately 12m and depth of 46m and a short connection tunnel to the main tunnel. Associated development (Work no. 21c) comprises the works to intercept and divert flow from the Ranelagh CSO and connect the LLS (N) to the CSO drop shaft including construction of an interception chamber, CSO overflow structures, hydraulic structures, chambers with access covers, structures for air management plant and equipment and other structures to manage and intercept flow. The full description of the proposed development can be found in Schedule 1 of the DCO. Further details of the temporary construction works and permanent operational structures are contained below and an extended description can also be found in the *Environmental Statement* (Vol 13, Section 3)

M.4.10 At this site, approval is sought for the works shown on the Works plan showing the main tunnel (west central) (Work no. 1b), Chelsea Embankment Foreshore CSO drop shaft (Work No. 12a), Ranelagh connection tunnel (Work no. 12b) and the Site works parameter plan, which shows the relevant zones and LLAU in which the associated development works would be undertaken (Work No. 12c) Access plans, and Demolition and site clearance plans. The plans for approval are contained in the *Book of Plans* along and other plans 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 5 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

- M.4.11 The construction is programmed to take approximately four years and would involve the following main works:
- a. site set-up (approximately ten months)
 - b. shaft construction (approximately eight months)
 - c. tunnelling and secondary lining (approximately four months)
 - d. construction of other structures (approximately 16 months)
 - e. completion of works and site restoration (approximately eight months).
- M.4.12 Connection of utilities and diversion of major utilities may be conducted in advance of the main activities listed above. Refer to Figure M.4 below for the project timeline at Chelsea Embankment Foreshore.

Figure M.4 Construction timeline



M.4.13 The majority of construction would occur during standard working hours from 8am to 6.30pm Monday to Friday and 8am to 1.30pm Saturdays. Construction activities may occasionally be required outside of these hours during key construction activities subject to agreement with the local authority.

- M.4.14 Heavy goods vehicle (HGV) movements would be limited to standard working hours. In exceptional circumstances HGV and abnormal load movements could occur up to 10pm on weekdays for large concrete pours and later at night on agreement with the local authority.
- M.4.15 A short period of 24-hour working would be required for the connection tunnel and secondary lining. During this period of continuous working, activities would be predominantly below ground, with support activities occurring at ground level. However, HGV movements would be limited to weekday daytime hours.
- M.4.16 Barge loading and transport away from the site would take place on a continuous 24-hour, seven days a week basis as barge movements are linked to high tides.
- M.4.17 Further information about working hours and site-specific restrictions are contained within the *Code of Construction Practice (CoCP)* Parts A and B.
- M.4.18 Construction vehicles would access the site via the Chelsea Embankment turning left into the site. Construction vehicles would leave the site onto Chelsea Embankment, turning left out of the site.
- M.4.19 It is anticipated that an average of seven HGVs would access the site per day for the majority of the construction period. This would rise to approximately 42 HGVs per day over an estimated one-month period during the construction of the overflow weir chamber and the placement of fill around the foreshore structure. Further details regarding the number and breakdown of anticipated heavy goods vehicles accessing the site per day is contained within the *Transport Assessment*, which accompanies the application.
- M.4.20 Potential layouts of the construction site are shown on the Construction phases plans, which are provided in Annex M. It should be noted that these layouts are illustrative 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 the cofferdam does not exceed the maximum extent of temporary works platform shown on the Site works parameter plan.

Site set-up

- M.4.21 In advance of the main works, traffic management would be set up on the northern carriageway and the utilities diverted to facilitate later construction of the overflow weir chamber on the LLS (N).
- M.4.22 Following completion of the utility diversions, traffic management would be established on the southern carriageway to facilitate the set-up of the main foreshore construction site. The Thames Path would also need to be diverted.
- M.4.23 The site boundary would be established and secured. The hoarding would incorporate suitable art work and viewing windows. The site would be set up to provide office and welfare facilities. Tree removal and pruning works would be undertaken.

- M.4.24 As the site is within the River Thames foreshore a cofferdam would be constructed. The piles used to form the cofferdam would be driven into the impermeable clays from a jack-up barge. The top level of the outer wall of the cofferdam would be set to existing flood defence level to maintain the level of defence during construction.
- M.4.25 A concrete campshed would be constructed along the southern face of the temporary cofferdam for barges to sit safely on the river bed. It is assumed that no dredging would be required at this site, although it is likely that there would be some disturbance to the riverbed during construction of the cofferdam and campshed.
- M.4.26 The piles would be driven using vibration piling techniques, although the use of pressed piling techniques would be used where reasonably practicable.
- M.4.27 Following removal and replacement of any soft material within the cofferdam, fill material would be placed onto the foreshore on top of a geotextile layer.
- M.4.28 Monitoring of potential scour would be undertaken during the construction works. The need for scour protection to the cofferdam, the adjacent river walls or other third party structures (such as bridge piers) would be identified using the approach set out in the scour and accretion monitoring and mitigation strategy for temporary works in the foreshore (*Environmental Statement*, Vol 3, Section 14, Appendix L.4).
- M.4.29 Internal site roads, plant and material storage areas, offices, welfare and workshops would be established on the cofferdam.

Shaft construction

- M.4.30 The shaft would be constructed with a primary lining of precast concrete segmental shaft linings. The upper portion would be constructed as a jacked caisson through the water bearing gravels and the lower portion of the shaft would likely be mined using underpinning techniques in tandem with dewatering.
- M.4.31 Approximately five dewatering wells would be drilled outside the periphery of the shaft. Pumps would be placed in the drill casings and groundwater extracted. Approval would be sought from the Environment Agency so that extracted groundwater can be discharged directly into the River Thames. Extracted water would be sampled on a regular basis to check water quality.
- M.4.32 Excavated material would be stored adjacent to the shaft in an excavated materials handling area prior to disposal offsite. A crawler crane would service the shaft.

Tunnel construction

- M.4.33 The connection tunnel would be constructed using sprayed concrete lining techniques. The tunnel is progressively excavated and the sprayed concrete lining tunnel lining is built up in even layers until the required profile is achieved. The concrete would be batched on the surface and pumped to the tunnel.

M.4.34 Due to the anticipated ground conditions to be encountered the tunnelling would be undertaken with advance dewatering, probing and ground treatment as required.

Secondary lining of tunnel and shaft

M.4.35 Secondary lining is an additional layer of concrete placed against the inside of a tunnel's primary concrete segmental lining for watertightness and to improve the overall structural durability. For the purposes of assessment, it was assumed that both the short connection tunnel and the shaft would have a reinforced concrete secondary lining.

M.4.36 The secondary lining of the connection tunnel would be constructed by installing steel reinforcement, erecting a cylindrical shutter within a short length of tunnel and pumping concrete into the gap between the shutter and the primary lining. Once the concrete hardens sufficiently, the shutters would be removed and erected in the next section of tunnel.

M.4.37 It is assumed that the lining of the CSO shaft would be made of reinforced concrete placed inside the shaft's primary support. The steel reinforcement would be assembled in sections and a shutter would be used to cast the concrete against. The shutter would be assembled at the bottom of the shaft and sections of reinforcement installed and lining cast progressively up the shaft.

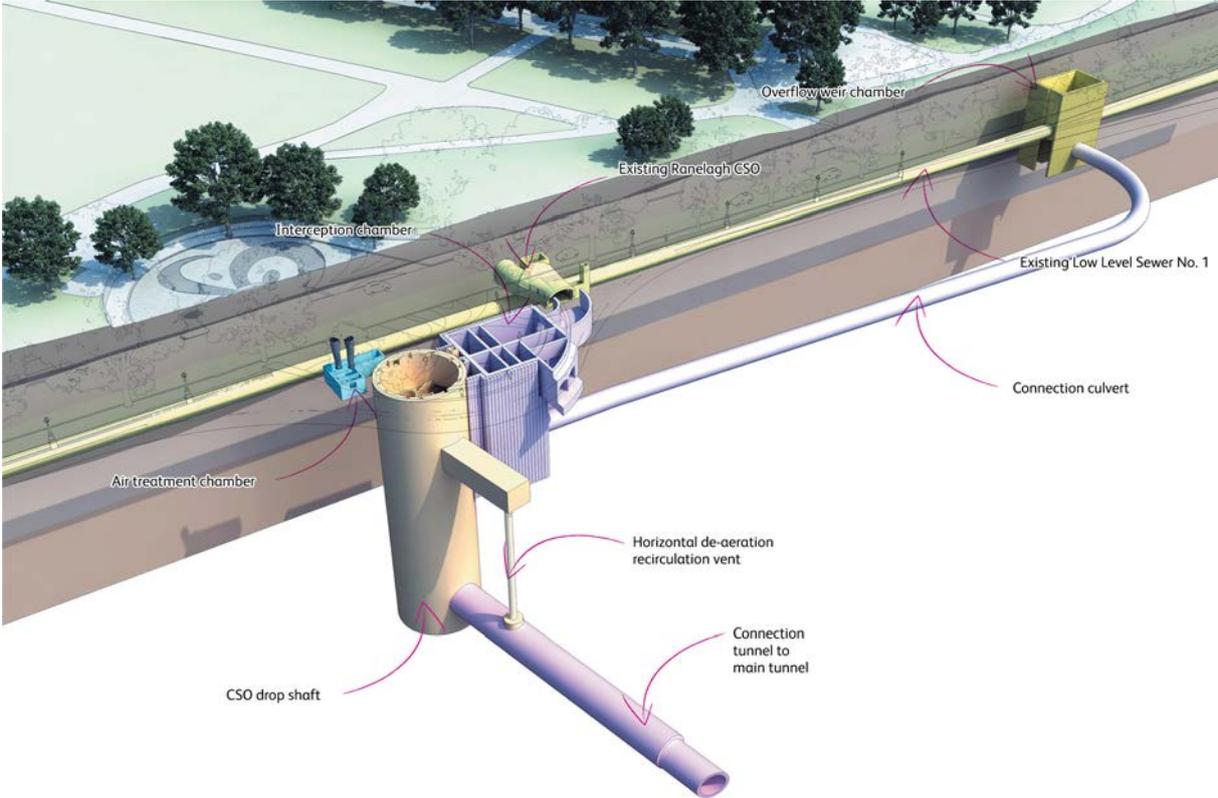
M.4.38 Any reinforced concrete structures internal to the main tunnel shaft and the roof slab would be constructed in a similar manner progressively from the shaft bottom. In some cases precast concrete members may be used.

Construction of other structures

M.4.39 An overflow weir chamber, connection culvert and valve chamber would connect to the existing LLS (N) on the northern side of Chelsea Embankment to the CSO drop shaft. An interception chamber, connection culvert and valve chamber would intercept the Ranelagh CSO and connect it to the CSO drop shaft.

M.4.40 The LLS (N) would be lined before the overflow weir chamber is constructed. The overflow weir chamber would be constructed using secant or sheet piles and excavated exposing the LLS (N). The base slab and internal walls would then be constructed. Flow would be temporarily diverted from the LLS (N) to allow the existing sewer to be broken out on completion of the weir chamber. Refer to Figure M.5 overleaf for the Functional components diagram.

Figure M.5 Functional components diagram



- M.4.41 Sheet pile walls would be used to provide support within which the underground chambers would be constructed. The walls would be constructed to a depth to minimise ground water ingress into the excavation, and small pumps would be utilised to manage any ground water that does seep through.
- M.4.42 The walls, bases and roofs of the chambers and shallow foundations for above-ground structures would be formed by *in situ* concrete techniques. Concrete would be pumped or skipped to the chamber. The piled walls would be extended to the CSO drop shaft to allow the connection culvert to be constructed in a similar manner to the chambers.
- M.4.43 It is assumed that piles would be used to support the underground chambers, and would be bored reinforced concrete piles. The diameter, depth and spacing would depend on the structure design and ground conditions.
- M.4.44 The connection culvert from the overflow weir chamber to the shaft would be constructed using sprayed concrete lining techniques similar to those described for the connection tunnel, driven from the main shaft site to the overflow weir chamber. The tunnel would be fully within the London Clay formation therefore neither ground treatment nor dewatering would be required.
- M.4.45 The existing Ranelagh outfall to the tidal Thames would be intercepted within the new foreshore structure and flow through a flap valve chamber before entering the drop shaft. These chambers would be constructed

using secant or sheet piles for temporary support. A new outfall would be constructed on the front of the new river wall to cater for the event that the main tunnel cannot accept any more flow. Flap valves would be fitted to prevent tidal flow entering the system. Air management structures comprising an underground air treatment chamber and associated ducts and ventilation columns and the electrical and control kiosks would also be built and commissioned.

Completion of works and site restoration

- M.4.46 On completion of the main construction (outlined above) the new river wall would be finished prior to removal of the temporary cofferdam to ensure flood protection.
- M.4.47 Once the cofferdam fill is removed, the geotextile layer would be removed and permanent scour protection would be placed around the structure.
- M.4.48 Once the main elements of construction are completed, the final landscaping works would be undertaken including final treatments and surfaces, planting and installation of street furniture.

Operation and maintenance

CSO drop shaft

- M.4.49 The Chelsea Embankment Foreshore CSO drop shaft would be located opposite the Bull Ring Gate within the river and the Crossrail 2 Safeguarded Zone.
- M.4.50 The CSO drop shaft would be located approximately in the centre of the new curved foreshore structure and would be approximately 12m in internal diameter and 45m deep from the top of the cover slab to the invert of the connection tunnel. The drop shaft would be enclosed at ground level and would be covered in hard standing. Ground level access covers would be installed on the top of the shaft for inspection and maintenance purposes.

Overflow weir chambers and culverts

- M.4.51 The overflow weir chamber and interception/valve chambers would be constructed below ground. Their location is dictated by the location of the LLS (N). Covers would be installed on top of the chambers for inspection and maintenance purposes.
- M.4.52 To connect the overflow weir chamber and interception chamber to the CSO drop shaft, two connection culverts would be installed, one for each chamber. These would be below the carriageway of Chelsea Embankment and accessible from each end.

Connection tunnel

- M.4.53 A connection tunnel would be constructed to connect the CSO drop shaft to the main tunnel under the river. It would be approximately 57m in length and have an approximate internal diameter of 4.8m for the first 46m and an approximate internal diameter of 4m for the remaining 11m.

River wall

- M.4.54 A new river wall to current flood defence levels would be provided around the public space on top of the foreshore structure. The inter-tidal terraces between the embankment and the foreshore structure would sit below the defence level and the lowest terrace would occasionally be flooded.

Ventilation structures

- M.4.55 There would be two ventilation columns with an approximate internal diameter of 0.9m and between 4m and 8m in height. These columns would be of the project's 'signature' design and would sit on the new foreshore structure. There would also be two ventilation columns of approximately 0.225m internal diameter and approximately 6m high: one on the southern footway of Chelsea Embankment adjacent to the foreshore structure serving the Ranelagh CSO interception chamber, and the other on the northern footway of Chelsea Embankment adjacent to Ranelagh Gardens, serving the LLS (N) overflow weir chamber.
- M.4.56 In addition to these structures, an underground air treatment chamber would contain an air management filter and would be connected to the ventilation columns. The air treatment chamber would have ground level access covers for inspection and maintenance purposes.

Electrical and control kiosk

- M.4.57 Electrical and control equipment would be housed within two new kiosks incorporated at either end of the stone parapet wall around the foreshore structure.

Permanent restoration and landscaping

- M.4.58 Following close engagement with stakeholders including the Royal Borough of Kensington and Chelsea, English Heritage and the Design Council CABE an illustrative design was achieved for the site, in order to allow for flexibility in the landscape design. The illustrative design shows one way in which the development may be laid out, but there may be a number of other acceptable ways which would be agreed with the stakeholders through the proposed requirements and in compliance with the Site works parameter plan and design principles agreed for this site.
- M.4.59 The area around the CSO drop shaft would be finished with hardstanding (details to be submitted for approval to the Royal Borough of Kensington and Chelsea) to provide operational access for cranes and maintenance vehicles. This hardstanding would usually be publicly accessible but Thames Water would retain a right of access over it and would install temporary security fencing when the area is used for access to the below-ground structures required for maintenance purposes.
- M.4.60 The existing pedestrian crossing (refuge) to the east of the Bull Ring Gate would be reinstated further east as part of the overall landscaping.

Access and movement

- M.4.61 The construction works would be serviced via a new temporary access off the Chelsea Embankment. The access gates would be manned by a security contractor. The proposed construction access would maintain the

two way traffic along Chelsea Embankment by reducing road lane widths. Further detailed information on traffic and access can be found in the *Transport Assessment*.

- M.4.62 Implementation of a traffic management scheme would be required for the diversion of existing services in the vicinity of the LLS (N) interception chamber on Chelsea Embankment. Traffic management would also need to be established to facilitate the set-up of the main foreshore construction site. The Thames Path and National Cycle Route 4 would also need to be diverted. Once operational vehicle access to the site would be directly from Chelsea Embankment, near the junction with Chelsea Bridge Road. The site would be accessed infrequently as explained under the typical maintenance regime below.
- M.4.63 It is understood that a scheduled Transport for London bus service may be introduced along Chelsea Embankment. This service, in conjunction with other development proposals in the wider area, such as the proposed Lots Road Power Station development on the river adjacent to the boundary with the London Borough of Hammersmith and Fulham, would increase accessibility to the site.
- M.4.64 The proposed new area of public realm would provide an opportunity for pedestrians to enjoy the historic setting of the RHC and the River Thames, in line with *Core Strategy* Policy CT1. The Thames Path would be fully reinstated along the southern pavement of Chelsea Embankment.
- M.4.65 The illustrative designs of the new area of public realm would comply with the Disability Discrimination Act, with the exception of the intertidal terraces surrounding the foreshore structure. The terraces would not be publicly accessible and it is not possible to provide disabled access without changing the nature of the design.
- M.4.66 The intertidal terraces would need to be accessible from the embankment for maintenance purposes. Fixed ladders would be installed on the river-facing side of the river wall. A small, portable step ladder would be required to surmount the stone parapet to reach the fixed ladders. Fixing bolts for a fall restraint system may also be necessary if a portable ground anchor is considered insufficient.
- M.4.67 No access equipment would be visible above the line of the stone parapet so as not to encourage public access to the terraces.

Typical maintenance regime

- M.4.68 Access to the foreshore structure would be via Chelsea Embankment between the mature trees. A crane would be positioned on the foreshore structure and maintenance vans and cranes would park on the kerb. No drop kerb would be provided in order to deter general parking or use as a coach drop-off point.
- M.4.69 The LLS (N) overflow weir chamber would be located beneath the eastbound carriageway and footpath of Chelsea Embankment. Equipment for maintenance and inspection purposes would be positioned on the footpath, which would be temporarily closed and diverted. Several chamber covers that would be accessed infrequently would be positioned

in the carriageway for functional reasons. Traffic management would be required to enable access.

M.4.70 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.

M.4.71 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. A larger crane could also be positioned on the Chelsea Embankment footpath and the foreshore structure. The footpath would need to be temporarily closed and diverted. Other maintenance vehicles could park at the Bull Ring. The inspection would be carried out during normal working hours and would likely take several weeks.

M.4.72 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 personnel to use mobile cranes and vans.

M.4.73 An access gate would be provided in the Ranelagh Gardens boundary fence to allow utility companies to access and maintain utilities diverted through a short stretch of the gardens directly from the highway. No drop kerb would be provided.

Scheme development

M.4.74 The proposed development of the Chelsea Embankment Foreshore site was subject to over two years of extensive consultation and engagement. The site featured as a preferred site in the second full round of public consultation, a phase of interim engagement, and a period of pre-application publicity. Throughout this period the scheme evolved in response to consultation, through engagement with key stakeholders, and through on-going design development. The *Final Report on Site Selection Process* contains detailed information on the site selection process and how it responded to the consultation process.

M.4.75 At phase one consultation (September 2010 to January 2011) the preferred site was at Chelsea Embankment Foreshore (west of Chelsea Bridge), which is east of the site now proposed. The site comprised three separate components. There were two areas in the foreshore linked by a connection culvert and a third beneath Chelsea Embankment/Ranelagh Gardens. Due to the constrained nature of the area in terms of heritage features, the importance of the nearby RHC and the Crossrail safeguarded route running north-east to south-west through Ranelagh Gardens, the RHC South Grounds and the Bull Ring no other suitable sites were shortlisted. Figure M.6 illustrates the proposed design at phase one consultation.

Figure M.6 Visualisation of the phase one consultation design



- M.4.76 English Heritage expressed concerns regarding the use of the foreshore and considered a site within the existing maintenance yard in Ranelagh Gardens to be more suitable, so as to reduce impact on the clean sweep of embankment wall. The Environment Agency also encouraged the investigation of alternative land based sites.
- M.4.77 Sketch options of the Chelsea Embankment Foreshore (west of Chelsea Bridge) site were presented to the Design Council CABE in April 2011. A single foreshore structure was also presented in line with the Monument Walk axis between the RHC and the Bull Ring Gate, marking the historic visual and functional links, such as the former water gates, between the RHC, the River Thames, and the lost River Westbourne. However, at this point it was not certain that this was a feasible option due to the Crossrail safeguarding.
- M.4.78 The Design Council CABE considered that a low key, potentially elongated foreshore structure would be most suitable should the Chelsea Embankment Foreshore (west of Chelsea Bridge) be taken forward and the design should consider views of the RHC from across the River Thames, views of the embankment from the RHC grounds, and views from the elevated approach from Chelsea Bridge. The panel said that Thames Water and the design team need to be fully satisfied that all possible locations were explored before arriving at the preferred site, including a site within Ranelagh Gardens, which would remove the need to break the long, uninterrupted river wall.
- M.4.79 During an interim design period (April 2011) the project received new information from Crossrail stating that it would be acceptable for the project to locate a shaft within the Crossrail 2 safeguarded zone. This

information allowed Thames Water to consider a Chelsea Embankment Foreshore site (opposite Bull Ring Gate) and to explore a consolidated design on the axis formed by Monument Walk. Thames Water carried out a back check of sites and assessed potential new alternatives sites at Ranelagh Gardens and the Chelsea Embankment Foreshore site (opposite Bull Ring Gate). The consideration of Ranelagh Gardens involved engagement with the Royal Horticultural Society and RHC in relation to Chelsea Flower Show and it was found that English Heritage's suggestion of situating a worksite within the existing maintenance yard would not be feasible due to its size and its distance from the existing sewers. Instead most of the open areas and paths, and some trees, in the south east of Ranelagh Gardens along Chelsea Bridge Road would be required for the worksite.

M.4.80 The foreshore site was preferred for the following reasons.

- a. Use of the foreshore would allow a shorter connection tunnel than a site in Ranelagh Gardens, which would result in reduced health and safety risks associated with constructing a connection tunnel in the Lambeth Group (geology). In addition a shorter tunnel would result in less excavated material being generated and less raw materials being required for construction.
- b. Use of the foreshore would have significantly less direct impact on the Grade II registered Ranelagh Gardens. The gardens also provide an important resource for the local community, for events such as the Chelsea Flower Show and they are a designated Site of Nature Conservation Importance (Borough II).
- c. A foreshore site is further away from local residents which would help to reduce the potential impact of construction works.
- d. A foreshore site would facilitate the use of the river to transport materials, which would reduce the potential effects of road traffic. The site would also have good access from the local road network via Chelsea Embankment, which forms part of the Transport for London Road Network.
- e. While the potential negative impacts of having foreshore sites were recognised, including potential effects on aquatic ecology and subsurface archaeology, which would require mitigation; it avoids the need to affect the terrestrial ecology of the gardens.

M.4.81 In June 2011 a more detailed scheme was presented to the Design Council CABE which further developed the design of a single foreshore structure located on the Monument Walk axis. The panel noted the sensitivity of the site's historic setting and the challenges faced through the defined character of the Embankment and the lack of connection to the RHC and Ranelagh Gardens because of Chelsea Embankment. It considered the scheme had the potential to resolve the challenges but close dialogue with Transport for London would be required. The panel considered that the location of the structure on the axis with the RHC lends strength to the idea of a foreshore structure and the termination of this important link with a new space should provide a new appreciation of

the view to the RHC. It considered that the proposed electrical and control kiosks on the foreshore structure could signal the new space and frame the view back to the RHC.

- M.4.82 Intercepting the CSO at Chelsea Embankment Foreshore (opposite Bull Ring Gate) and having only one foreshore structure would result in a more efficient construction site than Chelsea Embankment Foreshore (west of Chelsea Bridge). The river wall is not listed and the permanent structure would be designed to blend in to minimise the effect on the long sweeping view and the materials used would complement those of the embankment.
- M.4.83 Use of Chelsea Embankment Foreshore (opposite Bull Ring Gate) also provides the potential for the permanent structure to positively interact with the RHC by re-establishing its visual link with the river by opening up views from the river towards the RHC and vice versa along Monument Walk axis.
- M.4.84 Additionally, this site would be further from the Grade II listed Chelsea Bridge and therefore would have less impact on its setting.
- M.4.85 The new preferred site and design were presented at phase two consultation (November 2011 to February 2012), comprising a single foreshore site on the RHC axis and utilities diversions and some permanent operational structures on the LLS (N) in a small southern section of Ranelagh Gardens. The design proposed to construct the new section of river wall around the foreshore structure in a sweeping curve to minimise the effect on river views and the setting of the Thames Conservation Area. Two shortlisted sites were also presented, comprising the open areas, paths and some trees in the south east part of Ranelagh Gardens, and the original Chelsea Embankment Foreshore (west of Chelsea Bridge) site. Figure M.7 illustrates the proposed design at phase two consultation.

Figure M.7 Visualisation of the phase two consultation design



- M.4.86 During phase two consultation the project undertook a series of meetings with English Heritage, the Royal Borough of Kensington and Chelsea, RHC and the Royal Horticultural Society to discuss Ranelagh Gardens. As a result of these meetings and acknowledgement of the required size and location of a worksite within Ranelagh Gardens and new evidence provided on the health and safety risks of tunnelling the connection tunnel from Ranelagh Gardens to the main tunnel within the Lambeth Group (geology) all parties agreed Chelsea Embankment Foreshore (opposite Bull Ring Gate) was considered the appropriate site, subject to a high quality design.
- M.4.87 As a result of phase two consultation, a number of minor amendments were made to the design and the resulting single foreshore site with a small section of Ranelagh Gardens was taken through to Section 48 publicity (July 2012 to October 2012). No further significant design changes were made as a result of Section 48 publicity.
- M.4.88 The principal issues that arose from consultation and Section 48 publicity are set out below and where the issue is discussed in this assessment is signposted:
- a. Loss of foreshore habitat and effects on aquatic ecology, flood risk management and recreation within the River Thames: This issue was partially addressed in this *Scheme development* section above and it is also discussed in the *Good design, Water resources and flood risk, Biodiversity and geological conservation and Land use including open space, green infrastructure and green belt sections*.
 - b. Effect on the setting of Ranelagh Gardens: This issue is addressed above in the *Scheme development* section and also addressed in *Landscape and visual impact (including townscape) and Historic environment* sections.
 - c. Effects on the setting of the Grade I listed RHC, Grade II listed Chelsea Bridge and Thames Conservation Area and historic views along the River Thames: This issue is addressed in the *Good design, Landscape and visual impact (including townscape) and Historic environment* sections.
 - d. Disruption to the Thames Path during construction and need to provide a suitable and safe footpath diversion: This issue is addressed in *Land use, including open space, green infrastructure and green belt* and in the *Traffic and transportation* section.
 - e. Opposition to loss of trees arising from construction activities: This issue is addressed in the *Biodiversity and geological conservation and Landscape and visual impact* sections.
 - f. Construction traffic would exacerbate traffic congestion and more use of the river should be made for transporting construction materials: This issue is addressed in the *Traffic and Transport* section.
 - g. Possible odour effects during the operation of the tunnel: This issue is addressed the *Air quality, emissions, dust and odour* section.

M.5 Site-specific planning considerations

M.5.1 This section provides an analysis of the key planning considerations associated with the proposed works at Chelsea Embankment Foreshore, considering the issues and factors identified in the NPS and other issues relevant to the site including, particularly, those arising from consultation as identified in para. M.4.88. The design response to each of these issues was informed by extensive consultation with stakeholders as set out in the *Consultation Report* and the principle issue are dealt with below.

Meeting the need

M.5.2 The proposed works at Chelsea Embankment Foreshore would be successful in meeting the specific need to intercept the Ranelagh CSO and the LLS (N) and would make an important contribution to the wider need for the project identified in the NPS.

M.5.3 Currently in an average year, the Ranelagh CSO discharges approximately 283,000m³ of untreated sewage into the tidal Thames in front of Chelsea Embankment in the Royal Borough of Kensington and Chelsea. The CSO discharges approximately 26 times a year and releases approximately 71 tonnes of sewage derived litter.

M.5.4 The Environment Agency identified the Ranelagh CSO as a CSO that needs to be controlled. The CSO discharges have multiple impacts on 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.

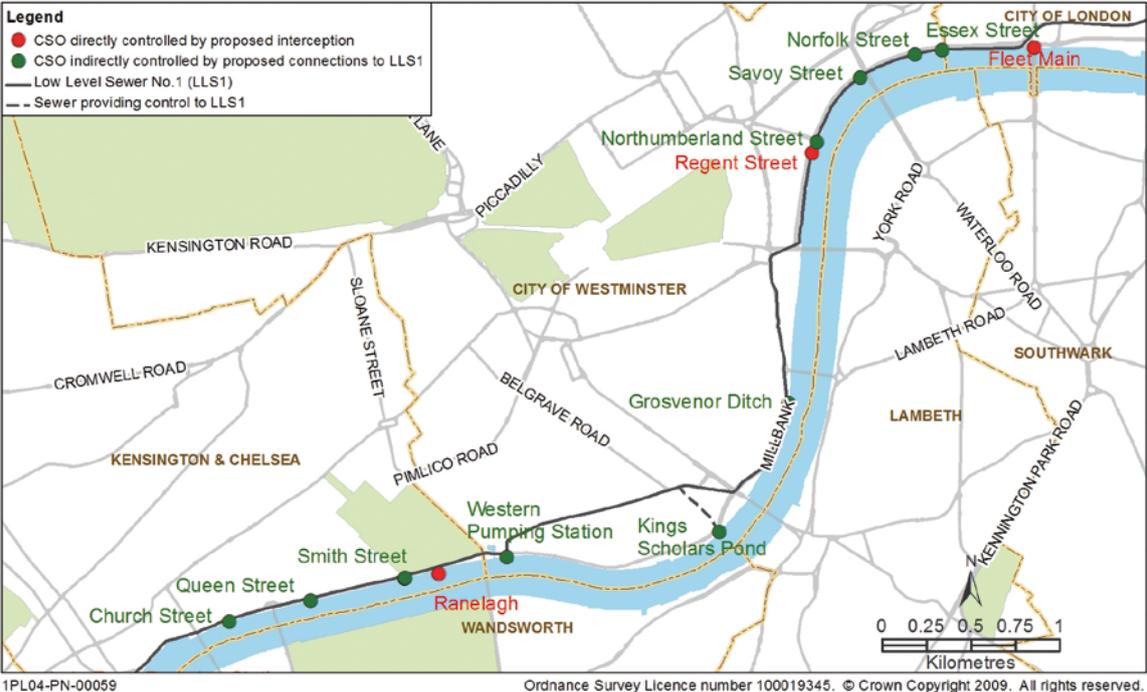
M.5.5 It is predicted that the CSO discharges will continue to worsen both in terms of volume frequency and content. By the time the proposed works at Chelsea Embankment Foreshore become operational (subject to approval) the CSO in an average year is predicted to discharge approximately 306,000m³ of untreated sewage, over 29 discharge events releasing 77 tonnes of sewage derived litter (*Environmental Statement*, Vol 13, Section 14).

M.5.6 Modelling suggests that the current annual average discharge of 26 spills (283,000 m³) could be reduced to approximately two spills in a typical year (18,500m³) with the project in operation. This represents a reduction of 94 per cent. This reduction would have a beneficial effect on water quality. The tonnage of sewage derived litter discharged by the CSO is expected to be reduced by approximately 66 tonnes to 4.6 tonnes per year.

M.5.7 In addition, ten other CSOs along the northern embankment from Chelsea (Church Street CSO) to the City of Westminster (Essex Street CSO) would be controlled by the development of overflow weirs along the LLS (N) at this location and at Victoria Embankment Foreshore and Blackfriars Embankment Foreshore. In a typical year, these ten CSOs together discharge 2,138,000m³ of untreated sewage into the River Thames in the Royal Borough of Kensington and Chelsea, the City of Westminster and the City of London. Modelling suggests that with the three connections to the LLS (N) annual discharges would reduce by 88 per cent from current levels to 249,700m³.

M.5.8 As shown in Figure M.8 below, some of these ten existing CSOs are located near to residential neighbourhoods, major institutions and business locations, and areas of significant built heritage interest. The avoidance of additional construction and permanent development sites at some or all of these locations was welcomed by English Heritage and the three local planning authorities.

Figure M.8 The ten CSOs that the three northern Low Level Sewer No.1 connections would control



M.5.9 Following consultation and stakeholder engagement, the Royal Borough of Kensington and Chelsea and English Heritage are supportive of the use of the site and the illustrative design proposed, subject to their involvement in the development of the detailed design in this visually and historically sensitive location.

Good design

M.5.10 The proposed development at Chelsea Embankment Foreshore was designed primarily to respond to a functional need. The amount, layout and scale of the proposed below-ground structures are dictated by the function they need to perform in transferring flows from the Ranelagh CSO, intercepting the northern Lower Level Sewer No. 1 and directing flows into the main tunnel.

M.5.11 The sensitive location and its historical context were key design considerations, in particular the proximity of sensitive receptors including a number of listed structures.

M.5.12 Following engagement with stakeholders including the Royal Borough of Kensington and Chelsea, English Heritage and the Design Council CABE as described below, a design was achieved and is supported.

M.5.13 The size and curved shape of the foreshore structure are indicative, meaning that the overall massing, scale and layout are fixed, with some items such as materials to be determined. The landscape design is illustrative, which means that the submitted landscape design is one way in which the development may be laid out, but there may be a number of other acceptable ways within the parameters. This would be subject to the subsequent approval of the Royal Borough of Kensington and Chelsea and would be achieved through the proposed site-specific requirements and in compliance with the design principles for this site.

Managing construction impacts

M.5.14 The use of the foreshore site rather than a solely land based option provides a number of opportunities and benefits. It would help to reduce the potential impact of construction on residents, as the works are further away from residential receptors, there would be significantly less direct impact on Ranelagh Gardens, which are an important resource for the local community, for events such as the Chelsea Flower Show and are a designated Site of Nature Conservation Importance (Borough II) and a Grade II registered park and garden.

M.5.15 The use of the foreshore site would also enable the use of the river to transport materials, which would reduce the potential effects of road traffic. The site would also have good access from the local road network via the Chelsea Embankment, which forms part of the Transport for London Road Network.

M.5.16 The location of the works to the LLS (N), where the overflow weir chamber would be constructed, was selected to minimise disruption to third-party utilities services and traffic. Elsewhere, the sewer is routed close to the centre of the carriageway or in proximity to more utilities, requiring more utility diversions, or closer to the listed Bull Ring Gate.

M.5.17 The *CoCP* seeks to reduce the construction impacts at this site, including the following site-specific design mitigation measures from the *CoCP* Part B:

- a. The hoarding would incorporate suitable art work and viewing windows
- b. Construction works would be designed to maintain two-way traffic flow on Chelsea Embankment.
- c. Access to Ranelagh Gardens through the Bull Ring Gate would be fully maintained from mid-April to early August each year to accommodate the annual events such as the Chelsea Flower Show
- d. The Thames Path on the riverside of the embankment shall be reinstated for public use at weekends (except when there is weekend working on-site) ensuring pedestrians are safeguarded.

M.5.18 Changes post phase two consultation in response to consultation feedback included the increased use of barges during construction. Up to 90 per cent of the shaft excavated and 'other' excavated material would be transported by barge thereby reducing HGV traffic on local roads.

Operational design

- M.5.19 The proposed foreshore structure is required to enclose the CSO drop shaft, CSO interception chamber, valve chambers and the new CSO outfall. The structure would form an area of public realm with a lower terraced area flowing around its river-facing sides. The shape of the foreshore structure is indicative and for approval. The details of the public realm and terraces are illustrative and would be developed to a detailed design in line with the site-specific design principles. This would be subject to the subsequent approval of the Royal Borough of Kensington and Chelsea.
- M.5.20 Much of the proposed works at Chelsea Embankment Foreshore are below ground and out of sight but the foreshore intervention and the associated above-ground structures could have adverse visual effects. The sensitive location and historical value of the site was a key consideration, in particular the location on an open and uninterrupted expanse of the embankment river wall and the proximity of sensitive receptors, including listed structures such as the Grade I listed RHC.
- M.5.21 Early site analysis and subsequent engagement identified that it was important for the design to respond to the following opportunities and constraints. The site-specific opportunities included:
- a. Open up views between the River Thames and the RHC.
 - b. Exploit the south-facing aspect of the site to create a new high-quality area of public realm that provides opportunities to sit and enjoy the views over the River Thames away from the road and cycleway. Currently, no seating is provided along the length of Chelsea Embankment.
 - c. Help to indirectly control flows from ten other CSOs along the northern bank of the River Thames.
 - d. Reinststate the link between the RHC and the River Thames, which was lost when the river frontage was in-filled and realigned during construction of the Victorian Chelsea Embankment.
- M.5.22 The site-specific design constraints included:
- a. It is a very sensitive site surrounded by designated heritage assets.
 - b. Townscape views of the uninterrupted stretch of the embankment and views from Chelsea Bridge and Battersea Park must be protected where possible.
 - c. The Bull Ring Gate vehicular and pedestrian entrance to the RHC South Grounds is used during temporary events.
 - d. Tree loss must be kept to a minimum.
 - e. The site falls within the Crossrail 2 safeguarded zone.
 - f. Environment Agency policy seeks to minimise encroachment into the river. The project structures must minimise any impact on river flows and reduce the potential for scour. The structures must also be protected from vessel impacts.

- g. The site is in close proximity to sensitive receptors, including the Lister Hospital, the RHC, Chelsea Adventure Playground, and residential properties.
- M.5.23 The design of the proposals for the site evolved through phase two consultation and formal consultation with key stakeholders including Design Council CABE, the Royal Borough of Kensington and Chelsea, English Heritage and the local community. Details of the consultation process for this site are reported in the *Consultation Report* and the *Design and Access Statement* (Section 15).
- M.5.24 Based on the analysis of opportunities and constraints, and in response to feedback from stakeholder consultations, the main design objectives which influenced the design were:
- a. Position the foreshore structure where it could contribute positively to the setting of the wider area, particularly the Thames and Royal Hospital Conservation Areas, Chelsea Bridge, the RHC and Ranelagh Gardens.
 - b. Create a visual link and open up views between the RHC and the riverfront and reinforce this through the careful selection of materials and a striking paving pattern, which would visually unify the Bull Ring and the foreshore structure.
 - c. Create a clutter-free, simple and elegant space with a fitting stature for the context of the site.
 - d. Blend the foreshore structure into its existing context through sensitive detailing and selection of materials, particularly the new section of river wall.
- M.5.25 Design principles were produced in consultation with the Royal Borough of Kensington and Chelsea. The purpose of the design principles is to establish some fixed guidelines on the final design of the site. However, they also allow a degree of flexibility for the project to make changes as the design process progresses as discussed below.
- Position the foreshore structure where it could contribute positively to the setting of the wider area**
- M.5.26 Throughout design development Thames Water sought to refine and optimise the functional design, footprint, and layout of the new infrastructure proposed, with the aim of minimising encroachment in the foreshore. The proposed foreshore structure would create new land that could be used as an area of public realm.
- M.5.27 By building on the axial alignment of Monument Walk, the design enhances the setting of the RHC and its grounds by visually connecting it with the River Thames along the line of Monument Walk. It would mark the historic confluence of the River Thames and the River Westbourne (now the Ranelagh Sewer (Main Line)), and provide a strong townscape and visual link between the two and the RHC which was lost when the embankment was constructed as part of Bazalgette's works in the 19th century.

- M.5.28 The design of the foreshore sought to complement the shape of the listed Bull Ring Gate and the sweeping curve of the proposed river wall would help to blend the projecting structure into the existing river wall and reduce the apparent bulk of the projection.
- M.5.29 Fixed ladders would be installed on the river-facing side of the river wall and a small, portable step ladder would be required to surmount the stone parapet to reach the fixed ladders. The details of the access ladders, handrails and any other equipment would be submitted to the local authority for approval subject to a Requirement.
- M.5.30 The design of the operational structure in the foreshore would preserve the enjoyment of the public open space at Ranelagh Gardens and the South Grounds and would not impact on the major temporary events held throughout the year, which support the upkeep of the grounds and buildings. It would also have fewer impacts upon amenity of residents along Chelsea Bridge Road during construction works. The *Final Report on Site Selection Process* describes the variety of factors affecting the suitability of the shortlisted sites.

Create a visual link and open up views between the RHC and the riverfront

- M.5.31 An aim of the design was to open up views between the RHC and the river along the axis formed by Monument Walk. See Figure M.9 below showing the proposed view along the axis towards RHC.

Figure M.9 Aerial Visualisation along the Monument Walk axis



- M.5.32 The busy road along Chelsea Embankment currently interrupts the historic connection of the RHC with the river frontage. A single surface/table top approach was explored in order to reunite the RHC with the River Thames; however, it was considered this approach was not feasible in view of the traffic speeds that must be accommodated safely on a Transport for London Road Network road. Therefore it is proposed to use shapes and paving materials to make a purely visual connection.
- M.5.33 The shape of the area of public realm on the foreshore structure was designed to reflect the 'oval' shape of the Bull Ring. It is proposed to strengthen the link between the Bull Ring and the foreshore structure by realigning the kerb lines within the Bull Ring. The curved shape is also reminiscent of various carriage-turning areas that project into the River Thames along the Hammersmith stretch of the river.
- M.5.34 It is proposed to further emphasise the link between the Bull Ring and the foreshore structure with a lozenge-shaped area of paving on either side that would be broken across the Chelsea Embankment carriageway. The paved area would be flush with the surface on the foreshore side and raised on the Bull Ring side to replicate the traffic function of the circular grass and flower bed in the Bull Ring.
- M.5.35 The strong graphic paving layout proposed on the illustrative Landscape plan immediately links the Bull Ring and the foreshore structure together visually. The floral curves of the illustrative pattern seek to reference the annual Royal Horticultural Society Chelsea Flower Show. The final paving pattern would be agreed at a later stage and details submitted to the Royal Borough of Kensington and Chelsea for approval subject to a Requirement.
- M.5.36 Additional tree planting on the foreshore structure and the Bull Ring would give a vertical dimension to the space and reinforce the idea that this is a unified space along the embankment. It is proposed to break the existing line of London Plane trees along the embankment by not replacing one tree which is on the Monument Walk axis. This would open up views from the RHC along Monument Walk to the River Thames and help to re-establish the link between them (design principle CHEEF.3). At the time of writing, the tree had already been removed by others, although it is possible that it may be replaced before the project works commence.
- Create a clutter-free, simple and elegant space**
- M.5.37 An objective is to situate the above-ground components so they are not a physical or visual obstruction and the illustrative design and the Site parameter plan allow flexibility for the design to develop through further engagement with stakeholders.
- M.5.38 The ventilation columns on the foreshore structure would be the project's elegant 'signature' design and smaller ventilation columns on the embankment pavement would be of a more simple nature in order to minimise their appearance and presence.
- M.5.39 In response to consultation, the electrical and control kiosks were incorporated into the parapet of the river wall to reduce visual clutter (design principle CHEEF.18). Seating could be provided in the form of a

simple stone bench parallel to but set back from the new parapet wall. The bench would break around the Monument Walk axis.

- M.5.40 The detailed design of the materials and the final layout of above-ground structures would be discussed with the Royal Borough of Kensington and Chelsea and English Heritage and final details submitted for approval subject to a Requirement. The proposed hard landscape and furniture palette is outlined in the *Design and Access Statement* (Appendix 15, para. 15.4.60).
- M.5.41 The design palette would respect the historic surroundings and the new foreshore structure's open and uncluttered design would foster natural surveillance and be self-policing. In response to public consultation, the proposed paved area in the Bull Ring was reduced and pedestrian refuges omitted in order to reduce visual clutter and for highway safety reasons. No drop kerbs would be provided to ensure the design does not encourage the use of the site as a coach/bus drop-off point (design principle CHEEF.04)

Blend the foreshore structure into its existing context

- M.5.42 The new section of river wall was designed to mimic the cross-section and materials of the existing wall. The existing wall comprises a lower brick section of wall topped by a stone parapet. The brick wall features a curved batter to help reduce wash from passing river traffic. The parapet is a continuation of the parapet on the listed section of the river wall to the west. The new river wall and parapet materials would match the existing (design principle CHEEF.01) and details would be submitted for approval subject to a Requirement.
- M.5.43 The proposed intertidal terraces on the new section of river wall would perform several important functions, such as hiding the infrastructure and helping to blend the foreshore structure into the long sweep of the river wall in this location. Terraces are proposed that provide either inter-tidal habitat or floodable public realm which incorporates planting (design principles CHEEF.02 and CHEEF16). The location of the terraces was determined by the location of the existing Ranelagh CSO and the design objective to reinstate the link between the RHC and the River Thames, reflect the shape of the Bull Ring, and create a smooth transition between the existing river wall and the foreshore structure.
- M.5.44 The new section of wall around the foreshore structure would form part of the flood defences along this stretch of the River Thames. It is assumed that in the future the flood walls along Chelsea Embankment would be raised to meet the Environment Agency's requirements to meet Thames Estuary 2100 (TE2100) flood defence levels and this was factored into the design to ensure the development is durable and resilient to change. Also see the Water resources and flood risk subsection.
- M.5.45 An existing marker for the parish boundary is inscribed into the stone of the river wall, which marks the location of the former River Westbourne. The marker would be obscured by the foreshore structure and it is therefore proposed to reinstate the parish boundary marker on the new

stone parapet to recognise its historical significance (design principle CHEEF.10).

M.5.46 Appropriate maintenance is a key consideration of good design and it impacts greatly on quality and longevity. As the illustrative design evolves into a detailed design, maintenance requirements would be discussed with the Royal Borough of Kensington and Chelsea and English Heritage to ensure they meet the site's specific needs.

M.5.47 The design life of the major civil engineering components of the project is 120 years, including buildings. The details of the external finishes of the ventilation columns and kiosks are not specified in the application, but are to be submitted for the subsequent approval of the local planning authority. The project has been designed to be durable and resilient to change.

Conclusion

M.5.48 The indicative and part illustrative design at Chelsea Embankment Foreshore demonstrates an appropriate functional design, which would be attractive, usable, durable and adaptable, meeting the criteria set in the NPS (para. 3.5.1). The aesthetic components relate to the creation of a new, high quality landscaped public space. The design developed through stakeholder engagement and was presented to the Design Council CABE on two occasions. The proposed scheme is an exemplar of good design in a sensitive context.

M.5.49 The Site works parameter plan, the design principles and the illustrative nature of the detailed design would produce a good design which would be visually attractive and contribute positively to its sensitive setting. The illustrative design of the hard landscaping and materials palette demonstrates that alternative designs could work within the defined parameters, subject to the design meeting relevant technical standards.

Water resources and flood risk

M.5.50 In terms of ground water resources, there is one licenced groundwater abstraction for the River Terrace Deposits or upper aquifer located 140m north east of the site. The capture zone for the source is estimated to be approximately 75m from the permanent foreshore structure. This source is not anticipated to be impacted by construction or operation at the Chelsea Embankment Foreshore site as no dewatering of the upper aquifer is anticipated to be required and the excavations would be sealed by the jacked caisson and secant pile walls.

M.5.51 Measures to protect water quality and resources during construction are detailed in Section 8 of the *CoCP* Part A, and referred to in Section 5 and 7 of the *Planning Statement*. The *CoCP* also covers activities that are subject to pollution control and makes reference to good practice.

M.5.52 After taking into account the measures incorporated into the design and *CoCP*, including adherence to good pollution prevention practice, there would be no adverse impacts on surface water resources, river flows and groundwater resources.

- M.5.53 Once operational, modelling suggest that the current annual discharges of untreated sewage from the Ranelagh CSO would be reduced from significantly from 26 discharge events (or 29 in the 2020s) a year to a predicted level of two events per year with the project in operation. Therefore the project would have a beneficial effect on water quality in the tidal Thames and contribute to the protection and enhancement of biodiversity of the Blue Ribbon Network.
- M.5.54 In addition, the ten other CSOs along the northern bank from Chelsea (Church Street CSO) to the City of Westminster (Essex Street CSO) would be controlled by the construction of overflow weirs along the LLS (N) at this location and at Victoria Embankment Foreshore and Blackfriars Embankment Foreshore. In a typical year, these ten CSOs together discharge 2,138,000m³ of untreated sewage into the River Thames in the Royal Borough of Kensington and Chelsea and the City of Westminster. Modelling suggests that the three connections to the LLS (N) would reduce annual discharges by 88 per cent from current levels to 249,700m³. These reductions would have a substantial beneficial effect on water quality and are described in more detail in Meeting the need above.
- M.5.55 The site therefore meets the decision making principles set out in the NPS as no adverse effects are expected on water quality or resources and the Environment Agency has no outstanding concerns.
- M.5.56 The main source of flood risk to the site during construction and operation is the tidal Thames. The majority of the site is situated within the foreshore which is a functional floodplain and is classified as Flood Zone 3b (land where water has to flow or be stored in times of flood). The inland section falls within the 'high probability' flood zone (Flood Zone 3a). A Flood Risk Assessment including the sequential and exception test that was undertaken in accordance with Section 4.4 of the NPS is included within the *Environmental Statement* (Vol 3, Section 15; Vol 13, Section 15).
- M.5.57 Flood defence levels along the River Thames frontage would be maintained during the temporary works. This would be achieved by constructing a temporary works platform in the river (including cofferdam) to the same height as the existing flood defence level. This temporary structure would tie into the existing flood defences on either side of the site.
- M.5.58 The permanent operational area would be protected from flooding through the provision of flood defences which would provide the same level of protection as existing defences. This would be secured via a project-wide riparian design principle (IRVR.02). In addition, to accommodate climate change the proposed new structure at Chelsea Embankment Foreshore was designed so that the river walls can be raised to TE2100 levels in the future.
- M.5.59 The new flood defences would be located along the periphery of the operational area and tie into existing flood defences, providing a continuous defence line along the embankment at all times. However, as at present, the site would be at residual risk of tidal flooding in the event of a breach in the new flood defence wall or overtopping of the defence wall as a result of a failure of the Thames Barrier. The consequence of a

breach or failure of flood defences would not compromise the long term operational function of the tunnel and therefore no additional measures in addition to those outlined above are proposed.

- M.5.60 Part B of the *CoCP* includes site-specific measures for temporary drainage of the construction access route and permeable surfacing of temporary areas of hardstanding.
- M.5.61 Operational surface water drainage at this site is addressed in the design principles, which require on-site drainage to be designed in accordance with relevant National Standards and in accordance with the Water Management Act 2010. Site-specific design approaches and measures were developed to ensure surface water is positively drained once operational. In the event of a storm coinciding with a high tide event, surface water drainage from the site may be restricted by tide-locking of the surface water outfall, similar to existing riverside areas. Although water would potentially pool on the surface of the public realm, given the rare concurrence of such events, on-site storage at or below the surface would be provided in accordance with design principle SDRN.02.
- M.5.62 A site-specific requirement in the DCO would ensure the permanent drainage details are submitted and approved in writing by the local authority in accordance with the design principles.
- M.5.63 The Flood Risk Assessment shows that the proposed development would be appropriate for the area as flood risk to the development would remain unchanged and the development would not lead to a significant increase in flood risk in the surrounding area. The presence of permanent structures within the foreshore has the potential to reduce the availability of flood storage within the tidal foreshore of the River Thames. The effect of removal of flood storage on flood levels is propagated throughout the hydrological unit of the Thames reach and was considered on a cumulative basis. This is discussed further in the project-wide assessment.
- M.5.64 The project would have a direct beneficial effect on water quality in the River Thames at this location and contribute to the protection and enhancement of biodiversity of the Blue Ribbon Network and the River Thames (including Chelsea Creek) Site of Nature Conservation Importance (Metropolitan).
- M.5.65 Following the construction of the proposed development, the risk of flooding would remain unchanged. Therefore, the proposed development satisfies the decision making principles of the NPS as set out in para. 4.4.10.

Air quality, emissions, dust and odour

- M.5.66 The nearest receptors which may be sensitive to the proposed development are occupiers of nearby residential dwellings and the RHC, patients at the Lister Hospital and users of the adjacent Ranelagh Gardens and RHC South Grounds. Other receptors in the vicinity of the site include recreational users of the river and the Thames Path.

- M.5.67 The Chelsea Embankment Foreshore site is located within the Royal Borough of Kensington and Chelsea's Air Quality Management Area for NO₂ and PM₁₀ which covers the entire borough. Local monitoring data indicates that there are currently exceedences of the air quality standards in the vicinity of the site.
- M.5.68 Through the measures included in the *CoCP* (Section 7), for example low emission vehicles and road sweepers, all reasonable steps would be taken to minimise detrimental impacts on air quality or amenity resulting from emissions and dust, as required by the NPS (para. 4.12.10). The overall effect on local air quality from construction (ie, effects from construction road traffic, tugs for river barges and construction plant), would not be adverse to the assessed sensitive receptors.
- M.5.69 The *Air Management Plan*, which accompanies the application, is designed to ensure that odours do not arise from the operation of the scheme at any of the proposed site locations. Air would be released from the ventilation columns for approximately 20 hours in a typical year, of which all air would be treated having passed through the local air treatment chamber containing carbon filters. The *Environmental Statement* (Vol 13, Section 4), states that the effects of odours released from the ventilation columns at Chelsea Embankment Foreshore would be negligible. Subsequently no further mitigation measures are required at this site during the operational phase.
- M.5.70 The project-wide air management plan is designed to ensure that the air in the tunnel system is kept fresh, that pressure does not build up inside the tunnels and that when air is treated when released. This would be achieved by a combination of forced/active ventilation and treatment and passive air treatment. In addition, most sites would have ventilation structures that would allow air to enter and leave the tunnel system.
- M.5.71 When the tunnel system is empty, clean air would be drawn inside to keep the air fresh. This means that odours would not build up while the system is empty. As the tunnels fill, air displaced from the tunnels would pass through carbon filters, which would clean the air and remove any odours before release.
- M.5.72 At passive ventilation sites, a passive carbon filter would be installed within a below-ground chamber. During a typical year, the filter would treat all the air displaced from the shaft, which would occur only when it fills with rising wastewater in the tunnel. During infrequent, extreme storm events (approximately once in 15 years), the air 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.
- M.5.73 The construction and operational effects with regard to air quality and odour would be consistent with the NPS policy objectives to minimise detrimental impacts on amenity and the likelihood of nuisance (paras. 4.12.3, 4.11.4 and 4.11.5) at Chelsea Embankment Foreshore.

Appropriate measures are proposed to ensure that the proposals would not lead to any or substantial changes in air quality, emissions, dust or odour or a significant loss of amenity during construction or operation.

Biodiversity and geological conservation

- M.5.74 The site is not designated for its geology or geomorphological importance. There are no internationally (Special Protection Areas, Ramsar sites) or nationally designated ecological sites (Sites of Special Scientific Interest, Marine Conservation Zones) in the vicinity of the site.
- M.5.75 With regard to aquatic ecology, the foreshore is designated as the River Thames (including Chelsea Creek) Site of Nature Conservation Importance (Metropolitan). There is an area of gravel foreshore exposed at low tide underlain mostly by pebbles. Surveys were undertaken to understand the aquatic ecology present within the site and it was determined that the site has a relatively high diversity of fish species, including common smelt, but a relatively low diversity of invertebrates.
- M.5.76 The *Environmental Statement* (Vol 13, Section 5) identifies that during construction there is likely to be adverse effects on fish because of the loss of feeding, resting and nursery habitat due to temporary land take. Additionally, during piling there would be suspended sediment blanketing fish feeding areas and reducing the visibility of water.
- M.5.77 The construction effects would be managed in accordance with the *CoCP* and the *CoCP* Part B, which identifies a site-specific requirement to install a membrane between the river bed and temporary back-fill material to prevent contamination of the juvenile fish habitat.
- M.5.78 Once in operation, the permanent loss of designated inter-tidal habitat because of the new foreshore structure would have residual effects on designated sites and habitats and fish.
- M.5.79 The extent of the physical works in the river was reduced as far as practicable for the construction and operational phases and there are no further on-site measures available to reduce adverse effects of the land take. In this stretch of the river land take was significantly reduced through the interception of the LLS (N) which along with sites at Victoria Embankment Foreshore and Blackfriars Bridge Foreshore results in the avoidance of worksites to intercept up to ten other CSOs along the northern embankment in central London.
- M.5.80 Although there would be residual effects on aquatic ecology due to land take, by intercepting the CSO, the project would result in the reduction in the occurrence of dissolved oxygen related fish mortalities and would improve the quality of the foraging habitat for fish, constituting a significant beneficial effect.
- M.5.81 With regards to terrestrial ecology, the site comprises existing paving, scattered trees and the part of the site within Ranelagh Gardens Site of Nature Conservation Importance (Borough II) comprises amenity grassland, scattered trees and semi-improved grassland. There are two other designated Sites of Nature Conservation Importance within 500m of

- the site: Chelsea Hospital South Grounds (Borough I) and Royal Hospital Old Burial Grounds (Borough II).
- M.5.82 Surveys carried out indicate low levels of bat activity, predominantly by common pipistrelle bats and wintering birds were recorded. Existing sources of potential disturbance to wintering birds is high from the traffic and pedestrians along the embankment. The site and surrounding area provides foraging habitat and nesting potential for breeding birds.
- M.5.83 During construction, the *Environmental Statement* (Vol 13, Section 6) does not anticipate adverse effects on the designated sites, habitats or notable species and therefore no mitigation is proposed above that embedded in the *CoCP*.
- M.5.84 Site set-up would result in the temporary loss of several trees, which would be replaced following the completion of the works, and the pruning of adjacent trees. This is specified in the *CoCP* Part B (Section 11), which also states that retained vegetation would be protected during construction works. The works to trees would not have any adverse effects.
- M.5.85 Lighting that may be required during construction would be controlled through measures included in the *CoCP* Part B (Section 4), which specifies a site-specific lighting plan to address the impact on terrestrial and aquatic ecology. This includes the use of low level directional lighting where possible while meeting safe work requirements
- M.5.86 It is anticipated that operational activity would be limited to the occasional maintenance works and any permanent lighting which may be required would be designed to avoid adverse effects on ecology as set out in the *Design Principles*. Therefore there would be no adverse effects on terrestrial ecology during the operation of the tunnel.
- M.5.87 In accordance with NPS policy (para. 4.5.3), Thames Water assessed the impact and sought to take advantage of opportunities to conserve and enhance biodiversity as part of the proposals in this location. Such measures would be addressed through final landscape designs to be discussed with and approved by the Royal Borough of Kensington and Chelsea. The mitigation measures proposed satisfy the criteria in the NPS (para. 4.5.17).

Landscape and visual impacts

- M.5.88 Chelsea Embankment is a visually attractive and relatively tranquil part of the Thames riverside and the development site is located within an unbroken expanse of river wall. This historical stretch of the River Thames provides the setting to Battersea Park and the RHC.
- M.5.89 Through robust site selection, extensive consultation, significant design developments and mitigation, the proposed scheme was refined to minimise its impact on the surrounding townscape and views during construction, and provide benefits once operational in terms of visual appearance and high quality design.
- M.5.90 In accordance with paras. 4.7.1 and 4.7.2 of the NPS, townscape character assessments were also considered and their sensitivity to change determined, for example, different views from and along the river

and residential townscapes. The assessment also takes into account saved 2002 *UDP* Policy CD1 (Protect and enhance views and vistas along the riverside) and CD8 (Protect important views and vistas around the Royal Hospital).

- M.5.91 The NPS (para. 1.4.4) recognises that NSIPs are likely to take place in mature urban environments, with adverse construction effects on townscape and visual receptors likely to arise. During construction the scale and intensity of the construction activity within the linear stretch of the river would have an effect on townscape and local views. The visibility of construction is an unavoidable consequence of the scale of works required to construct the drop shaft and associated works at this site. However, the type and scale of the temporary construction activities proposed is not uncharacteristic of other major construction projects undertaken throughout central London, such as Crossrail, or the scale of regeneration development which is forecast over the next 20 years within the wider area at Chelsea Barracks, or the Vauxhall, Nine Elms and Battersea Opportunity Area Planning Framework.
- M.5.92 Measures to mitigate possible townscape and visual effects during construction are embedded in the proposed scheme and in the *CoCP* Part A. These measures include:
- a. protection of retained trees with tree protective fencing to BS5837 Guide for trees in relation to construction, if working conditions allow
 - b. protection of listed structures, including the listed lamp standards along Chelsea Embankment
 - c. use of well-designed visually attractive hoardings
 - d. use of appropriate capped and directional lighting when required.
- M.5.93 The construction site was reduced as much as possible to mitigate visual effects in line with the NPS (para. 4.7.16) but no further mitigation during construction is possible due to the highly visible nature of the construction activities.
- M.5.94 In terms of the operational effects on landscape, visual and townscape components, the NPS (para. 4.7.6) states that projects need to be designed carefully, having regard to siting, operational and other relevant constraints.
- M.5.95 Once operational, it is anticipated that permanent adverse effects on townscape and views would be limited to the site, the RHC and Battersea Reach and the effects would be minimised through appropriate siting and design of the site.
- M.5.96 The operational scheme would have no substantial lighting requirements apart from low level lighting associated with the area of public realm and therefore, in line with the NPS (para. 4.7.3) there would be no light pollution effects on local amenity and nature conservation. Design principle CHEEF 17 states that the signature ventilation column would not be flood lit in order to ensure the lighting does not detract from the existing lit features along this stretch of the river.

- M.5.97 The design sought to minimise its effect on the views of Chelsea Embankment through blending the new river wall into the existing through a curved protrusion, with materials proposed to match the existing wall and parapet (design principle CHEEF.01)
- M.5.98 The location was chosen to re-establish the link between the RHC and the River Thames, both visually along the axis formed by Monument Walk and physically by tying in the surface finishes of the new development with the Bull Ring.
- M.5.99 With regard to enhancing the view between the RHC and the river, design principle CHEEF.03 states that a gap in the line of the existing London Plane trees would be maintained as part of the landscape scheme to facilitate views between the river and RHC. Design principle CHEEF.05 seeks to ensure that all the proposed above-ground equipment shall not be located on the axis of Monument Walk to enable views along Monument Walk to/from the river to/from the RHC and design principle CHEEF.11 would ensure that no railings shall be provided on top of the new river wall parapet.
- M.5.100 In response to public consultation and a concern about the new foreshore structure being used as a coach lay by, therefore obscuring the view of the RHC, design principle CHEEF.04 is included which seeks to ensure the design would discourage use of the foreshore structure as a bus/coach drop off. No drop kerbs are proposed for maintenance access to avoid encouraging parking of any kind on the Red Route.
- M.5.101 The proposed design and geometry of the foreshore structure and new river wall would be sympathetic to the character of the surrounding area and terraces built into the structure would reduce its bulk. The ventilation columns and control kiosks would introduce new built elements into the view, but their design, facade materials and locations would suit the character of the sensitive townscape, meeting the criteria outlined in the NPS (para. 4.7.17).
- M.5.102 Once construction is complete Thames Water's proposals for new high quality public space would benefit townscape and visual amenity and the wider benefits of the proposed development at this site outweigh the temporary adverse visual effects experienced during construction.
- Land use including open space, green infrastructure and green belt**
- M.5.103 The impact of the proposals on land uses and designations (as identified in the *Core Strategy*) was a key consideration in the project's site selection process and on-going design development. The land uses of the site and its surroundings are identified in the Land use plan within Annex M.
- M.5.104 As identified in Section M.3, the Chelsea Embankment Foreshore site is subject to a number of development plan designations which are described below. Additionally, undesignated land uses are also discussed, as required by the NPS (para. 4.8.5).
- M.5.105 An *Open Space Assessment* was undertaken, which looked at Chelsea Embankment Foreshore and Ranelagh Gardens where there would be a

temporary loss of open space. 0.04 ha of open space within Ranelagh Gardens would be required temporarily by Thames Water and 1.82 ha of inaccessible foreshore. This was minimised as far as practicable. The area of publically accessible open space to be created by the project (in the form of the permanent hard standing area) would be 0.12 ha.

- M.5.106 The assessment determined that temporary construction effects are unlikely to affect the function of the site as whole for its main purpose as a place for informal recreational activity. The assessment also determined that the area is not deficient in open space.
- M.5.107 The majority of the operational development would be within the foreshore, as no solely land-based options or previously-developed land was available, as explained in the Scheme development subsection. A very small area of land within Ranelagh Gardens would be required permanently for the connection to the LLS (N).
- M.5.108 Once the scheme is operational, a new area of public realm would be created at Chelsea Embankment Foreshore for sitting out and relaxation. The new space would form part of the Thames Path, forming part of a wider regional network of open space, which would be a beneficial, direct and permanent impact of the scheme.
- M.5.109 The Thames Path passes through the site and would be temporarily diverted due to construction works at Chelsea Embankment. The *CoCP* Part B commits to clearly signing the diversion, providing a temporary pedestrian crossing to divert pedestrians from the riverside footway. Additionally, the Thames Path on the riverside of the embankment would be opened for public use at weekends, except when there is weekend working on-site, which complies with the guidance in the NPS (para. 4.8.24).
- M.5.110 Once the infrastructure is operational, the Thames Path would be fully reinstated along the southern pavement of Chelsea Embankment. The RHC South Grounds and Ranelagh Gardens are used for major events for several months each year such as the Royal Horticultural Society's Chelsea Flower Show, which has used the site since 1913, the Masterpiece London art fair and the annual sale of Christmas Trees. There is no land use designation to recognise these temporary events but it was taken into consideration in the design of the construction works and the operational site at Chelsea Embankment Foreshore site. The *CoCP* Part B (Section 5) makes reference to event restrictions and states that arrangements for site traffic management would be confirmed with the Royal Borough of Kensington and Chelsea and Transport for London.
- M.5.111 Once the development is operational the new public realm would be a convenient pedestrian assembly point during major events at the RHC and Ranelagh Gardens, although as noted in the Landscape and visual impacts (including townscape) section above, its use as a coach drop-off would not be encouraged or acceptable.
- M.5.112 The site falls within the designated Crossrail 2 Safeguarded Zone and *Core Strategy* Policy CT2 seeks new and enhanced rail infrastructure, which includes the Crossrail/Chelsea-Hackney Line safeguarding.

- M.5.113 Crossrail 2 confirmed to Thames Water that there is sufficient flexibility in its alignment to allow the CSO drop shaft to be located within the safeguarded zone for the Chelsea to Hackney line. This confirmation removes concerns regarding conflict with proposals in a development plan (NPS para. 4.8.12).
- M.5.114 The proposed works would not prevent the beneficial continuation of surrounding land uses, either during construction or operation. No extant planning permissions, committed developments, or policy allocations for future development within the surrounding area would be adversely affected as a result of the works in this location.

Noise and vibration

- M.5.115 The current noise environment in the vicinity of the site is dominated by the road traffic noise from Chelsea Embankment and Chelsea Bridge Road (A3216). The receptors which could be sensitive to noise and vibration as a result of construction or operation of the site were assessed in the *Environmental Statement* (Vol 13, Section 9), in accordance with the NPS (para. 4.9.4).
- M.5.116 No adverse noise or vibration effects as a result of construction activities are anticipated. During construction, the contractor would be required to follow best practice (*CoCP* Part A, Section 6) at all times to mitigate construction noise and vibration effects, for example through suitable siting of equipment on site, in line with the NPS (4.9.8). No further mitigation measures are required.
- M.5.117 Due to the nature of the development and the minimal activity associated with its operation, no adverse noise and vibration effects are anticipated once the site is operational and no permanent noise and vibration mitigation is required. The proposed development would avoid impacts on health and quality of life through mitigation (NPS para. 4.9.9) and the mitigation measures are secured in the *CoCP* (NPS para. 4.9.10).

Historic environment

- M.5.118 Heritage assets can comprise below and above-ground buildings, monuments, sites, places, areas and landscapes which hold value to this and future generations because of their historic, archaeological, architectural or artistic interest. The NPS recognises that NSIPs are likely to take place in mature urban environments and to have adverse effects on archaeology and cultural heritage (para. 1.4.4).
- M.5.119 The effects of the proposed development on heritage assets at Chelsea Embankment Foreshore during construction and operation were assessed in the *Environmental Statement* (Vol 13, Section 7), and examined in more detail in the *Heritage Statement* (Appendix F), in line with the NPS (para. 4.10.7).
- M.5.120 All below-ground construction works are relevant to the assessment because they could potentially truncate or entirely remove any archaeological assets within the footprint of the works. It was assessed that during construction, there could be impacts on buried heritage assets due to the works, such as the construction of the temporary cofferdam and

subsequent scour around temporary foreshore structures and from the construction of the interception and overflow weir chambers within Chelsea Embankment. Further evaluation and mitigation would be carried out in accordance with a scope of works (*Site-specific Archaeological Written Scheme of Investigation*), based on the principles in the *Overarching Archaeological Written Scheme of Investigation*, which accompanies the application, to ensure that the scope and method of fieldwork are appropriate. The site-specific scheme would be submitted in accordance with a Requirement and would meet NPS criteria (para. 4.10.8).

- M.5.121 The temporary removal of above-ground heritage assets during construction could also have adverse effects. For example, the localised temporary removal of the brick boundary wall and railings would impact on the Grade II registered Ranelagh Gardens and the removal of three lamp standards would impact on the setting of the conservation area. This would be mitigated through recording and photographic surveys carried out to English Heritage standards in order to form preservation by record, which is set out in the overarching scheme.
- M.5.122 The construction works are likely to impact on other heritage assets, such as the conservation areas and the adjacent listed structures including the Bull Ring Gate and the listed Chelsea Embankment river wall to the west of the site.
- M.5.123 Chelsea Bridge would experience a maximum settlement of 16mm. The damage assessment report (*Heritage Statement Vol 3, Appendix E.1*) states the potential damage risk to be negligible, with the possibility of hairline cracks of a typical maximum width of 0.1mm. However, there may be small impact upon decorative elements. No mitigation is proposed beyond repairs using appropriate conservation techniques following the conclusion of the proposed works.
- M.5.124 Best practice is identified in the *CoCP Part A* (Section 12) with regards to the historic environment and site-specific measures are incorporated in the *CoCP Part B* to mitigate construction effects as identified below:
- a. Protective measures would be implemented to mitigate potential strike damage to the Bull Ring Gate, the boundary of Ranelagh Gardens and the Chelsea Embankment river wall.
 - b. A proportion of the brickwork of the river wall as well as all of the granite parapet stones would be retained for reinstatement and re-use in accordance with the procedures set out within the *Heritage Statement*.
 - c. Retain materials and reuse or reinstate where possible. The railings that form the boundary of the Grade II Registered Ranelagh Gardens would be carefully removed, stored and reinstated.
- M.5.125 Once the site is operational, beneficial effects are anticipated.
- M.5.126 The replacement boundary treatment for Ranelagh Gardens needs to include a gate for utility company maintenance access. Design principle CHEEF.14 states that the boundary treatment of Ranelagh Gardens,

including the new gate, shall be designed to match the existing walls and railings, to minimise visual impacts.

- M.5.127 The effect on the setting of Chelsea Bridge is assessed in the *Environmental Statement* (Vol 13, Section 11) as adverse due to the projection of the new permanent foreshore structure and the loss of three lampstands. However, this is unavoidable due to the other site selection constraints and no mitigation is possible further to that embodied within the proposed design and the design principles. The design parameters and principles for the above-ground structures (foreshore structure, ventilation columns, kiosks and river wall) and landscaping were carefully chosen so as to ensure they are sensitive to the setting of local heritage assets.
- M.5.128 Once operational, there would be a beneficial effect on the Grade II registered RHC South Grounds and Ranelagh Gardens, the setting of the Royal Hospital Conservation Area, the Chillianwala Memorial Obelisk and the Grade I listed RHC. This is primarily due to the increased emphasis on the main axis in the grounds of the RHC and improved public space from which to view the heritage asset. This is in compliance with the NPS (4.10.17) which states that the decision maker should treat favourably applications which preserve those elements of the setting that make a positive contribution to or better reveal the significance of an asset.
- M.5.129 In summary, the key heritage impacts of these proposals concern the fabric of the boundary feature of Ranelagh Gardens, and the effect of the proposed drop shaft structure on the foreshore on the settings of the heritage assets in the vicinity. Every effort was made to minimise any adverse impacts by careful siting, massing, scale, and detailed design of the proposals, including the improvement and additional provision of public open space, maintenance of views, and enhancement of the central axis of the RHC. The position of the existing outfall in front of the RHC site presents challenges for the design of the proposed infrastructure; however, by taking the opportunity to reconnect the historic main axis to the river the proposals would make a significant beneficial change to the setting of the most important historic building near the site. In terms of the archaeology, the unavoidable impacts would be fully mitigated by a programme of investigation and recording, which would provide a permanent record for posterity of all elements of interest.
- M.5.130 The assessment of impact on heritage assets demonstrates that the development meets the criteria set in the NPS and seeks to minimise any impacts on their significance (paras. 4.10.11 and 4.10.14), minimise impacts on their settings (4.10.17), avoid unnecessary damage and ensure unavoidable losses are recorded (4.10.18).

Light

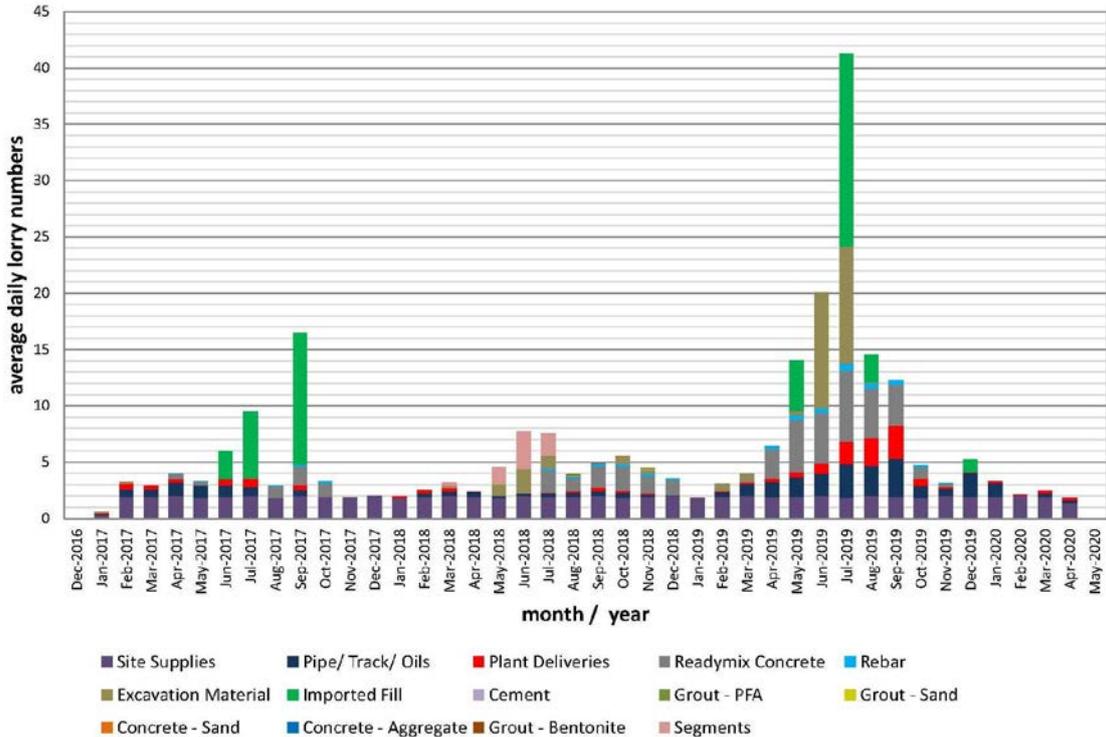
- M.5.131 A *Daylight/Sunlight Assessment* was conducted to assess the potential impact that structures associated with the project would have on the sunlight and daylight amenity of the properties surrounding the proposed construction sites. No impact during construction at Chelsea Embankment Foreshore is anticipated, nor once the site is operational.

- M.5.132 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. A short period (approximately four months) of below ground 24-hour working would be required at this site. 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 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.
- M.5.133 During construction, the *CoCP* Part B (Section 4) identifies that a site-specific lighting plan is required. The lighting would address the impact on terrestrial and aquatic ecology and include the use of low level directional lighting where possible, while meeting safe work requirements.
- M.5.134 Effects arising from lighting during the construction and operational phases were not assessed on the basis that there would not be any adverse effects as a result of construction works or operation of the site.
- M.5.135 No assessment of effects on night time character is made for this site during construction on the basis that:
- a. The site would generally only be lit in the early evening during winter.
 - b. There would be minimal spill from site lighting into the wider area due to the measures set out in the *CoCP*.
 - c. The surrounding area is lit through the night by street lighting and by vehicles along Chelsea Embankment.
 - d. Visual receptors have limited sensitivity to additional lighting in the early evening.
- M.5.136 An illustrative lighting design was developed showing how the permanent works may appear at night. This is explained in more detail in the *Design and Access Statement*, which accompanies the application (Appendix 15, Section 15.4). At present there are generally low levels of light beyond the river walls with strong bands of lighting from the Lion's Foot lamp standards and the road lighting dominating the views of the site. Chelsea Bridge and Albert Bridge are also lit. The illustrative lighting design was developed in line with the high level lighting design objectives for the site and lighting details would be submitted for approval subject to a Requirement.
- M.5.137 To ensure no operational lighting effects, a site-specific design principle was agreed with the Royal Borough of Kensington and Chelsea (CHEEF.17), which states that the signature vent columns would not be flood lit.
- M.5.138 Therefore, in line with the NPS (para. 4.12.7) there would be no light pollution effects on local amenity and nature conservation arising from construction or operation of the site.

Traffic and transport

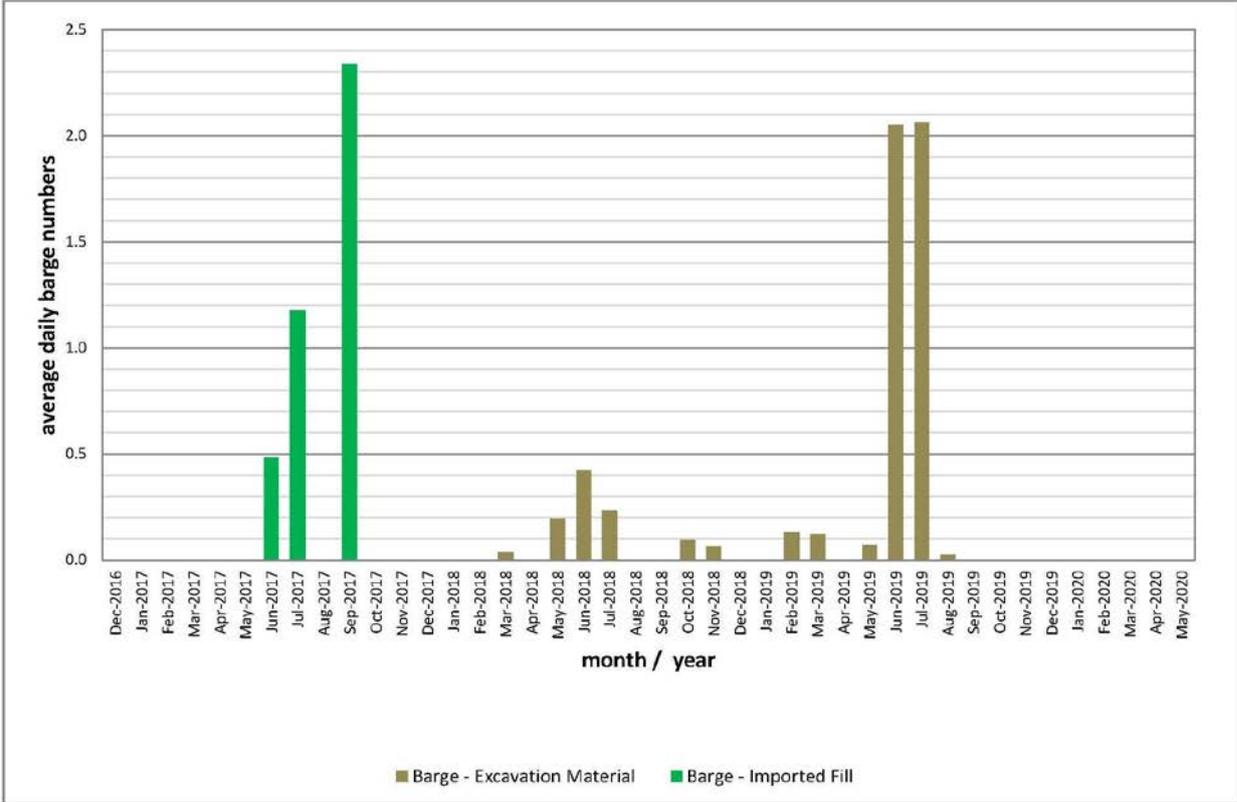
- M.5.139 The site has moderate public transport accessibility with numerous bus routes within the local area. The closest London Underground station is Sloane Square, approximately 1km away.
- M.5.140 The worksite would be directly off Chelsea Embankment, which is a Red Route and part of the Transport for London Road Network, close to the junction of Chelsea Bridge Road (A3216)/Chelsea Bridge (A3216)/ Grosvenor Road (A3212).
- M.5.141 The *Environmental Statement* (Vol 13, Section 12) and *Transport Assessment* (Vol 11) assess the likely transport effects at this site in respect of the development during both construction and operational phases and identify appropriate mitigation measures.
- M.5.142 During construction, it is anticipated that pedestrians using the Thames Path and Chelsea Embankment and nearby residents would be affected by the loss of footway, pedestrian diversion routes, the increased journey time on foot and the movement of large vehicles. Private vehicles (including taxis) and emergency service vehicles using the local highway or on-street parking may also experience some inconvenience and delay due to the movement of large vehicles and highway layout changes.
- M.5.143 During construction, the peak number of HGV movements would be 84 per day (42 two-way vehicle trips). Due to the foreshore location of the site it is intended that two-way traffic would be maintained throughout the construction period and there would be no adverse effect on road network operation and delay. Figure M.10 overleaf illustrates the predicted lorry movements at Chelsea Embankment Foreshore during construction.

Figure M.10 Chelsea Embankment Foreshore: Lorry movements



- M.5.144 Up to 90 per cent of the shaft and other excavated (cofferdam fill material import and export) would be transported by barge and all other material by road. This is in line with NPS (para. 4.13.10) which seeks water-borne transport over road transport where possible and cost effective.
- M.5.145 The peak number of barge movements would occur within Site Year 1 of construction and would be an average of six barge movements a day (three two-way trips of a tug pulling one or more barges). A separate *Navigational Issues and Preliminary Risk Assessment* was undertaken for the temporary construction works and barges movements were discussed with the Port of London Authority. No impacts on river navigation are anticipated as a result of the additional barge movements. Figure M.11 overleaf illustrates the predicted barge movements at Chelsea Embankment Foreshore during construction.

Figure M.11 Chelsea Embankment Foreshore: Barge movements



- M.5.146 Measures are incorporated into the *CoCP Part A* to reduce transport effects include HGV management and control measures such as designated vehicle routes to sites for construction vehicles. In addition, the following transport measures are incorporated into the *CoCP Part B* (Section 5) relating to the Chelsea Embankment Foreshore site:
 - a. All vehicles would access/egress site from the westbound lane, using a left turn in and left turn out arrangement.
 - b. Site areas would be designed to maintain two-way traffic flow on Chelsea Embankment. If required a suitable central safety barrier would be installed between alternate direction lanes.

- c. Traffic lanes of a minimum width of 3.25m would be retained.
 - d. The existing traffic island directly to the northeast of the Bull Ring Gate would be removed.
 - e. Management arrangements during events in the adjacent area would be confirmed in consultation with the Royal Horticultural Society and Transport for London.
 - f. Access through the Bull Ring Gate for set-up and take-down of the Chelsea Flower Show and Masterpiece events, and for VIP and emergency access would be maintained during these events.
 - g. The diversion of the Thames Path would be adequately signed and a temporary signalised pedestrian crossing provided between the foreshore site and the worksite on the eastbound carriageway of Chelsea Embankment.
 - h. The riverside footway on Chelsea Embankment would be reinstated for public use outside of working hours at weekends.
 - i. Arrangements to allow buses to turn right from the A3212 into the bus stop in the Bull Ring would be maintained, except during landscaping works in this area, unless agreed otherwise.
- M.5.147 Additionally, a site-specific work-force travel plan would be submitted to the local authority for approval, in accordance with a site-specific requirement. There would be no parking provided in the site boundary for workers and it is highly unlikely that any workers would travel to the site by car (*Transport Assessment*, Section 11).
- M.5.148 The transport demands created by the development in the operational phase would be limited to occasional maintenance visits only (as discussed under the Operation and maintenance subsection above) The project was designed to limit the effects on the transport networks as far as possible and no further mitigation is proposed at this site.
- M.5.149 No further mitigation is required for the operational phase than the embedded design measures and the site-specific design principles (Section 4.10) developed with the Royal Borough of Kensington and Chelsea.
- M.5.150 The proposed works at Chelsea Embankment Foreshore were designed to ensure that the construction works do not give rise to substantial impacts on the surrounding transport infrastructure. The potential disruption to pedestrians caused by footway diversions would be minimised as far as practical within the constraints of the construction requirements on site.

Waste management

- M.5.151 The Waste Strategy was developed to provide a framework for the management of materials and waste produced throughout the construction and operational phases of the project. This would satisfy the criteria set out in NPS para. 4.14.6. The Waste Strategy would be secured via a requirement in accordance with NPS para. 4.14.7.
- M.5.152 No particular site-specific waste issues would arise at this site.

Socio-economic

- M.5.153 The project-wide socio-economic benefits of the project, to which the works at this site would contribute, are detailed Section 7 of the *Planning Statement*.
- M.5.154 During construction, adverse amenity effects are not anticipated on the residents of nearby dwellings, the institutions and open space users.
- M.5.155 Disruption to sections of the Thames Path and national cycle route and amenity impacts on users of these routes is anticipated; however, measures to mitigate impacts are included in the *CoCP* Part B (Section 5). For example, the Thames Path diversions would be clearly signposted and the Thames Path would be opened at weekends except where there is weekend working on-site. The measures identified meet the criteria in the NPS (para. 4.8.24) and the impacts are no greater than they would be during the construction of other infrastructure projects in Central London.
- M.5.156 An *Equalities Impact Assessment* was undertaken for the project in accordance with the NPS (para. 4.15.6). The assessment (Table 7.11) identified that older people may be particularly affected by the diversion of the Thames Path by approximately 60m, as there is a high proportion of older people in the assessment area (29 per cent over 65). The diversions would be Disability Discrimination Act compliant and would provide accessible routes for those with a disability. The proposed route would involve road crossings, but would make use of existing crossings. No further mitigation is possible.
- M.5.157 This site is expected to require a maximum workforce of 65 workers. These jobs and training opportunities would provide a stimulus to the local economy.
- M.5.158 Once operational, there would be a beneficial effect resulting from the gain in publicly accessible space associated with the extension of the Thames Path into the foreshore and there are not expected to be any socioeconomic effects at Chelsea Embankment Foreshore which require mitigation.
- M.5.159 While the proposed works would cause inconvenience for some local residents during construction, these would be limited in time and mitigated as far as possible.

M.6 Overall conclusions

- M.6.1 The need for the project is established at the national level in the NPS. The Environment Agency identified the Ranelagh CSO as one of the 34 CSOs that require control through the project. In a typical year, the Ranelagh CSO discharges approximately 283,000m³ of untreated sewage into the River Thames at Chelsea Embankment Foreshore. The capture of the Ranelagh CSO discharges within the main tunnel would substantially reduce the flows of untreated sewage into the River Thames in this location making a contribution to meeting the wider need for the project identified in the NPS.

- M.6.2 An additional, and not insignificant benefit of having works at this site, is that by diverting the flow from the LLS (N) at Chelsea Embankment Foreshore, as well as at Victoria Embankment Foreshore and Blackfriars Bridge Foreshore, works would be avoided at or near ten currently unsatisfactory CSOs along the northern embankment of the river.
- M.6.3 This assessment presented an analysis of the key planning considerations associated with the proposed works at Chelsea Embankment Foreshore, in accordance with the factors identified in the NPS. The potential impacts of the construction and operation of the project in this location were carefully considered throughout design development and consultation as reported in the *Consultation Report, Design and Access Statement* and *Environmental Statement*.
- M.6.4 Given the site location on an uninterrupted stretch of river wall in a historically significant part of London, it is inevitable that there would be some disturbance to sensitive receptors during the four year construction period.
- M.6.5 While Thames Water sought to minimise any disturbance that would be experienced through sensitive design and mitigation, some adverse effects are likely to remain. These principally comprise:
- a. Aquatic ecology: permanent loss of part of the designated intertidal habitat due to the new foreshore structure.
 - b. Landscape and visual effects (including townscape): permanent effects on the River Thames, Royal Hospital and Battersea Reach Townscape Character Area and views from the northern end of Chelsea Bridge.
 - c. Historic environment: effects on the listed Chelsea Bridge due to the projection of the foreshore structure and the loss of lampstands on Chelsea Embankment.
- M.6.6 These remaining significant effects are considered further in Section 7 of the *Planning Statement*. For each of these significant effects, the project design was refined and all practicable mitigation applied and it is considered that the remaining adverse impacts are an unavoidable consequence of intercepting the CSO in a dense urban environment.
- M.6.7 The proposals at Chelsea Embankment Foreshore would also give rise to a number of significant beneficial effects, including:
- a. Landscape and visual, (including townscape): the provision of a new area of public realm which would open up new views of the RHC.
 - b. Historic environment: beneficial effect on the RHC South Grounds and Ranelagh Gardens, the setting of the Royal Hospital Conservation Area, the RHC and the Chillianwala Obelisk because of the increased emphasis on the RHC axis and new public realm from which to view the heritage assets.
 - c. Socio-economic: the gain in publicly accessible open space.
- M.6.8 The proposed works at the Chelsea Embankment Foreshore site, and the mitigation measures 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.

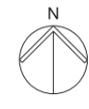
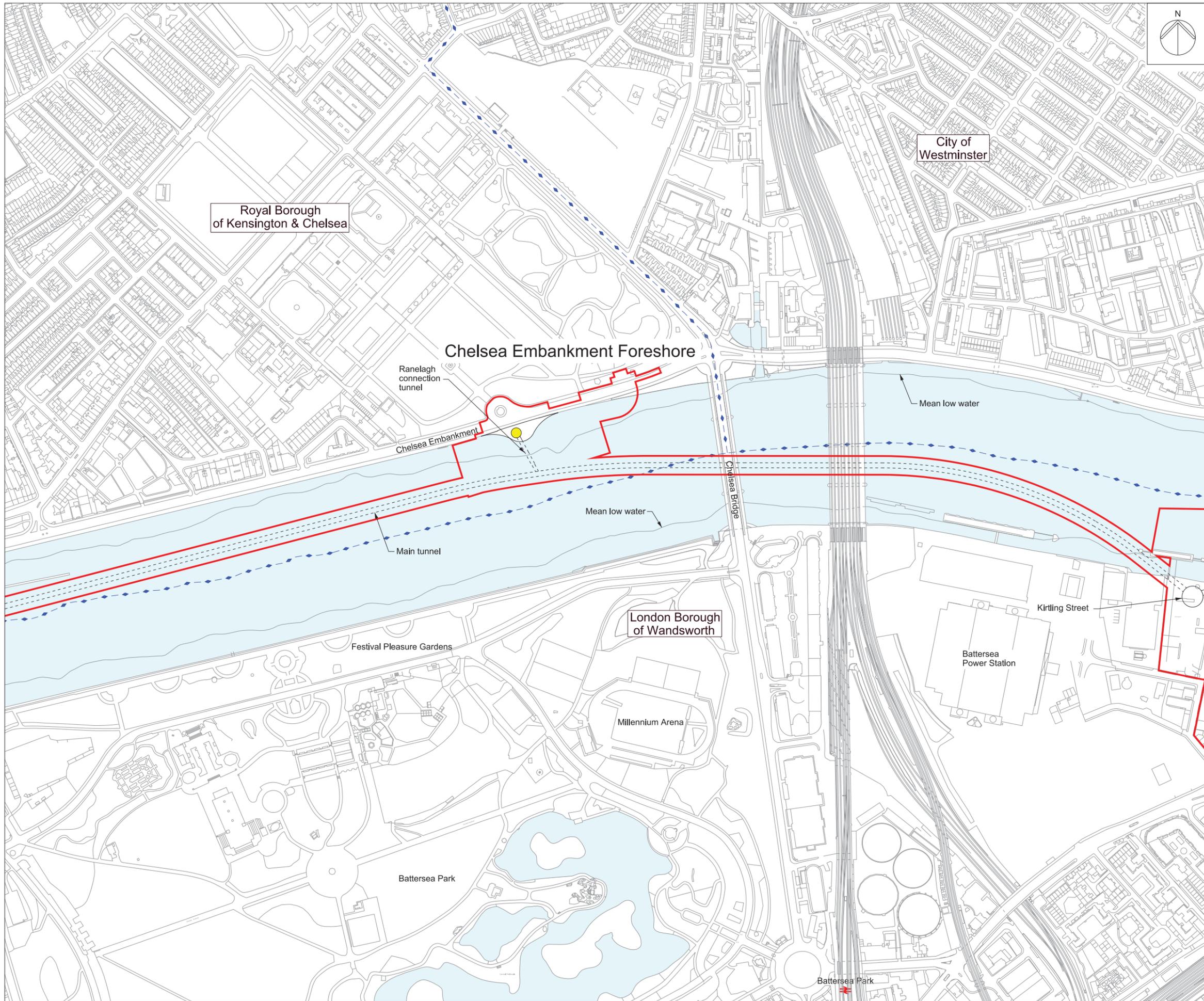
- M.6.9 Sections 8 and 9 of the *Planning Statement* consider the implications of the local effects of the work at Chelsea Embankment Foreshore and the other sites, and describe the overall balance between impacts and benefits associated with the project as a whole, against the guidance in the NPS. It concludes that the works at Chelsea Embankment Foreshore and the project as a whole, are compliant with the NPS and that development consent should be granted.

Annex M: Drawings for Chelsea Embankment Foreshore

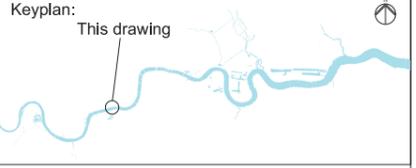
List of drawings

- Chelsea Embankment Foreshore: Location plan
- Chelsea Embankment Foreshore: As existing site features plan
- Chelsea Embankment Foreshore: Construction phases plans
- Chelsea Embankment Foreshore: Land use plan

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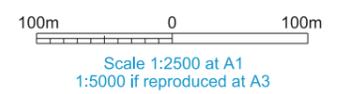


Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

- Key:
- Local authority boundary
 - Order limits
 - Tunnel
 - Shaft

Notes:

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



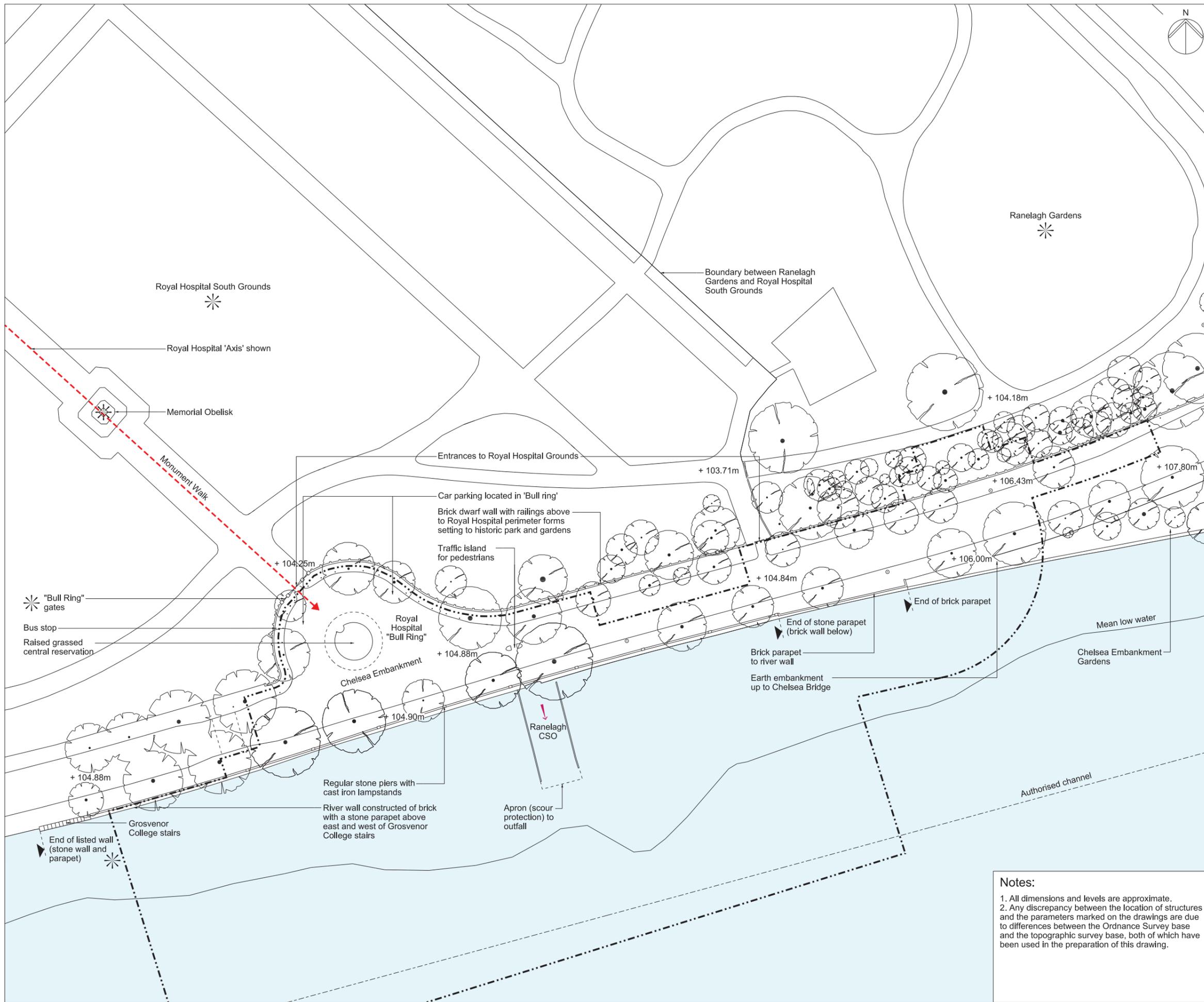
FOR INFORMATION

Location
Chelsea Embankment Foreshore
Royal Borough of Kensington & Chelsea

Document Information
Application for Development Consent
Location plan

Book of plans - section 14
DCO-PP-12X-CHEEF-140001
January 2013



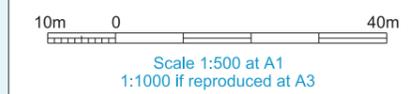


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- Key:**
- Limits of land to be acquired or used (LLAU)
 - - - - - Authorised channel
 - + 105.40m Existing levels (shown in metres above tunnel datum)
 - * Listed buildings/structures
 - Approximate position of CSO outlet
 - ⊙ Existing trees within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



FOR INFORMATION

Location
Chelsea Embankment Foreshore
Royal Borough of Kensington & Chelsea

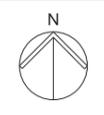
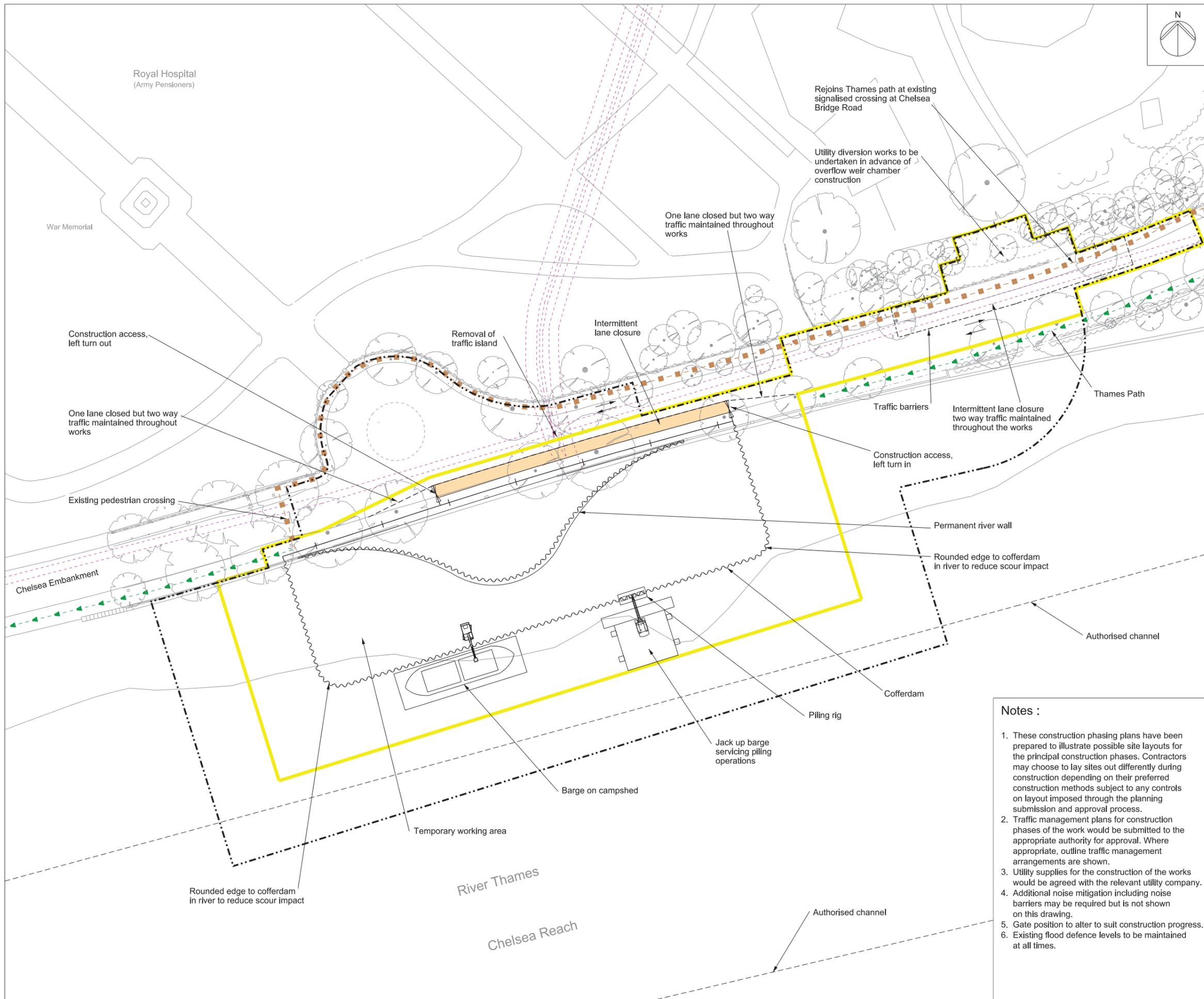
Document Information
Application for Development Consent

As existing
Site features plan
Book of plans - section 14
DCO-PP-12X-CHEEF-140002
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.



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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



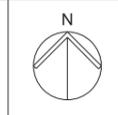
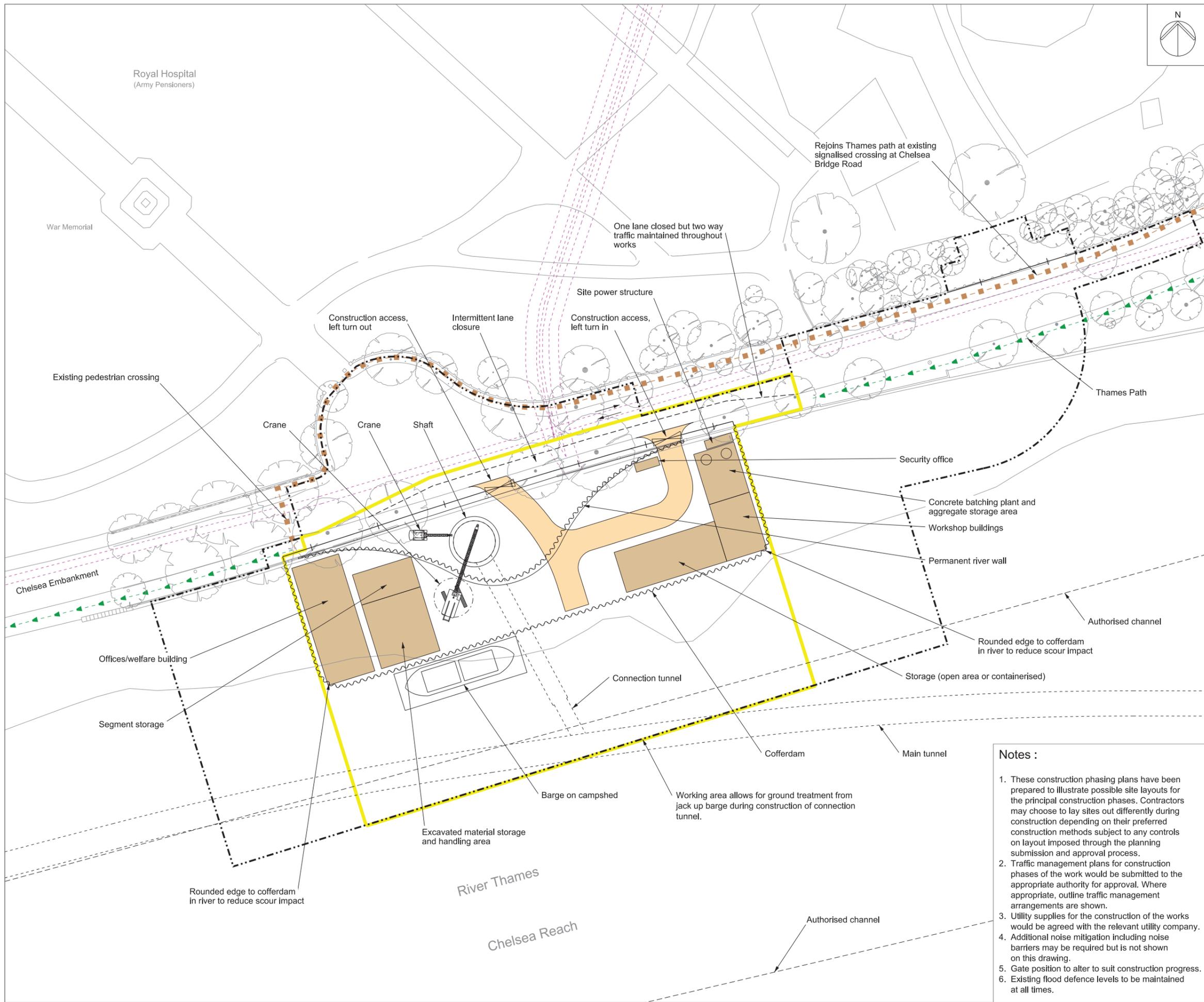
- Notes :**
1. These construction phasing plans have been prepared to illustrate possible site layouts for the principal construction phases. Contractors may choose to lay sites out differently during construction depending on their preferred construction methods subject to any controls on layout imposed 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. Gate position to alter to suit construction progress.
 6. Existing flood defence levels to be maintained at all times.

ILLUSTRATIVE

Location
Chelsea Embankment Foreshore
Royal Borough of Kensington & Chelsea

Document Information
Application for Development Consent
Construction phases - phase 1
Site setup
Book of plans - section 14
DCO-PP-12X-CHEEF-140019
January 2013





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- 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



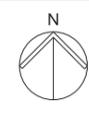
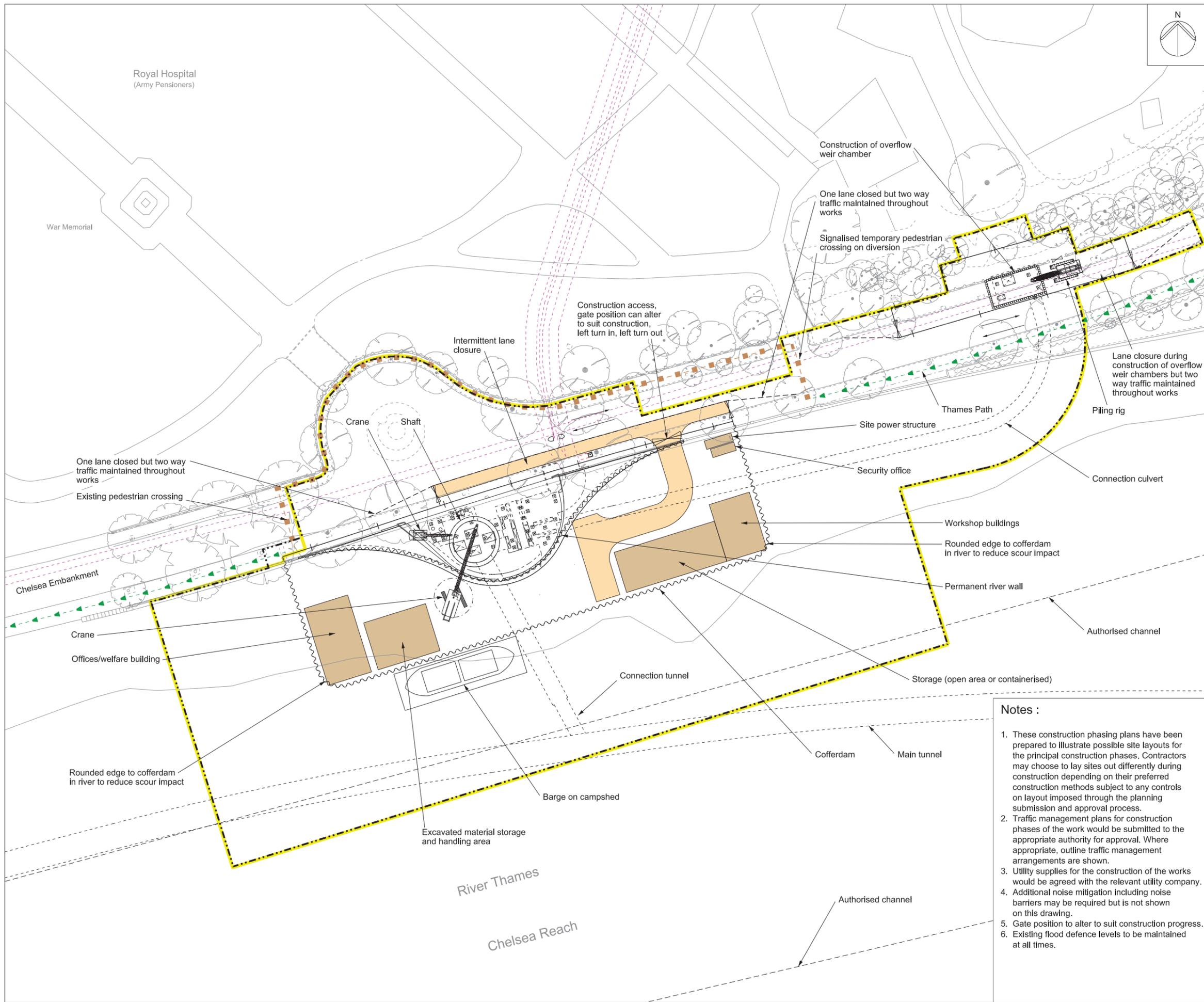
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1. These construction phasing plans have been prepared to illustrate possible site layouts for the principal construction phases. Contractors may choose to lay sites out differently during construction depending on their preferred construction methods subject to any controls on layout imposed through the planning submission and approval process.
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 4. Additional noise mitigation including noise barriers may be required but is not shown on this drawing.
 5. Gate position to alter to suit construction progress.
 6. Existing flood defence levels to be maintained at all times.

ILLUSTRATIVE

Location
Chelsea Embankment Foreshore
Royal Borough of Kensington & Chelsea

Document Information
Application for Development Consent
Construction phases - phase 2
Shaft construction & tunnelling
Book of plans - section 14
DCO-PP-12X-CHEEF-140020
January 2013





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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 :

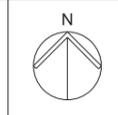
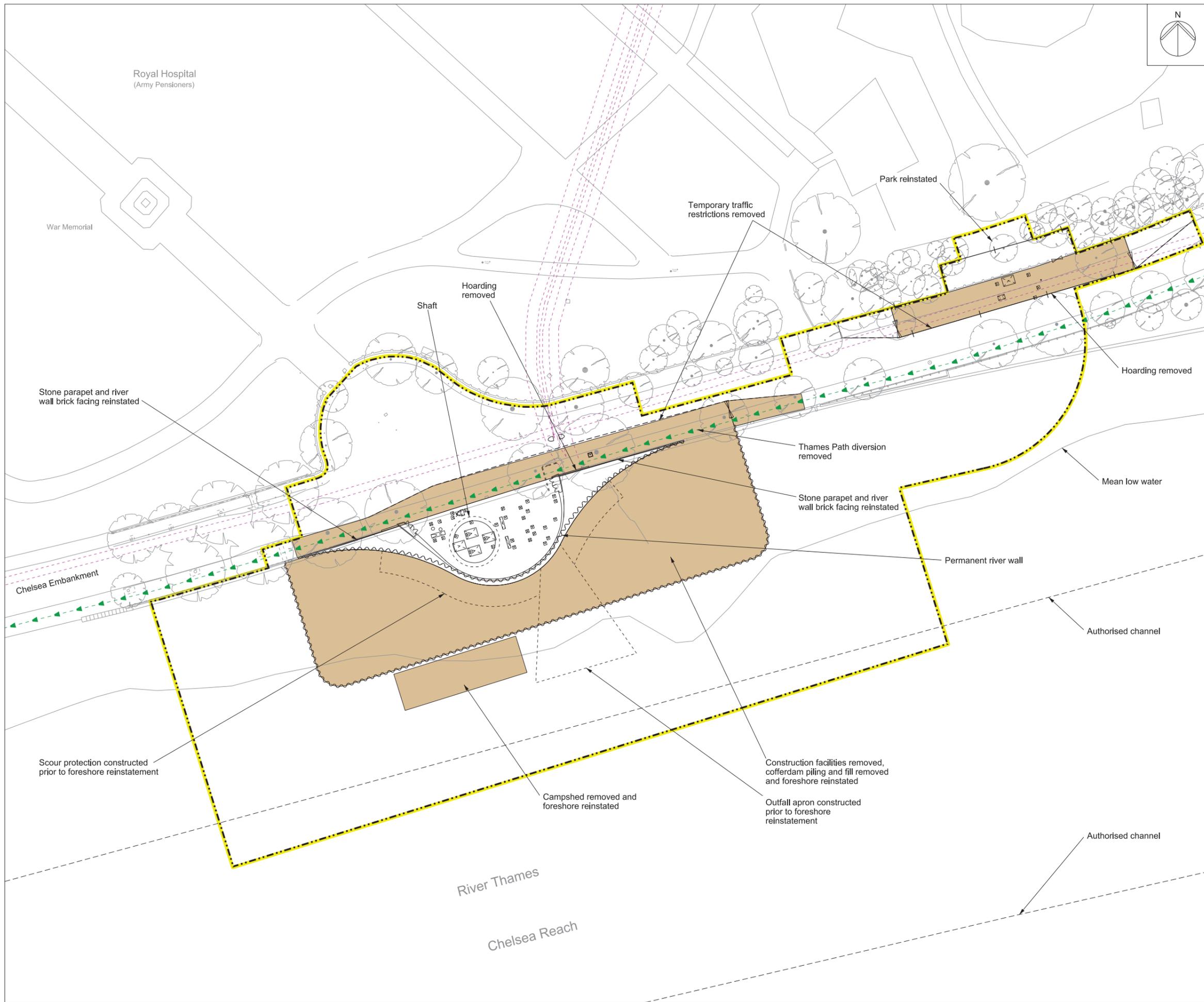
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5. Gate position to alter to suit construction progress.
6. Existing flood defence levels to be maintained at all times.

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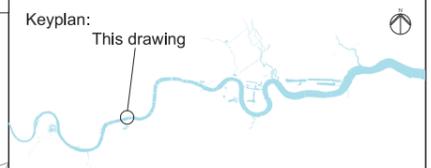
Location
Chelsea Embankment Foreshore
Royal Borough of Kensington & Chelsea

Document Information
Application for Development Consent
Construction phases - phase 3
Construction of other structures
Book of plans - section 14
DCO-PP-12X-CHEEF-140021
January 2013



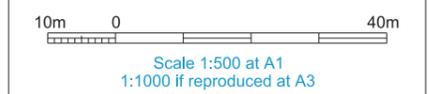


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- Key:
- Limits of land to be acquired or used (LLAU)
 - Hoarding
 - Maximum extent of working area
 - Existing public right of way
 - Site access
 - Existing sewers
 - Sheet piles

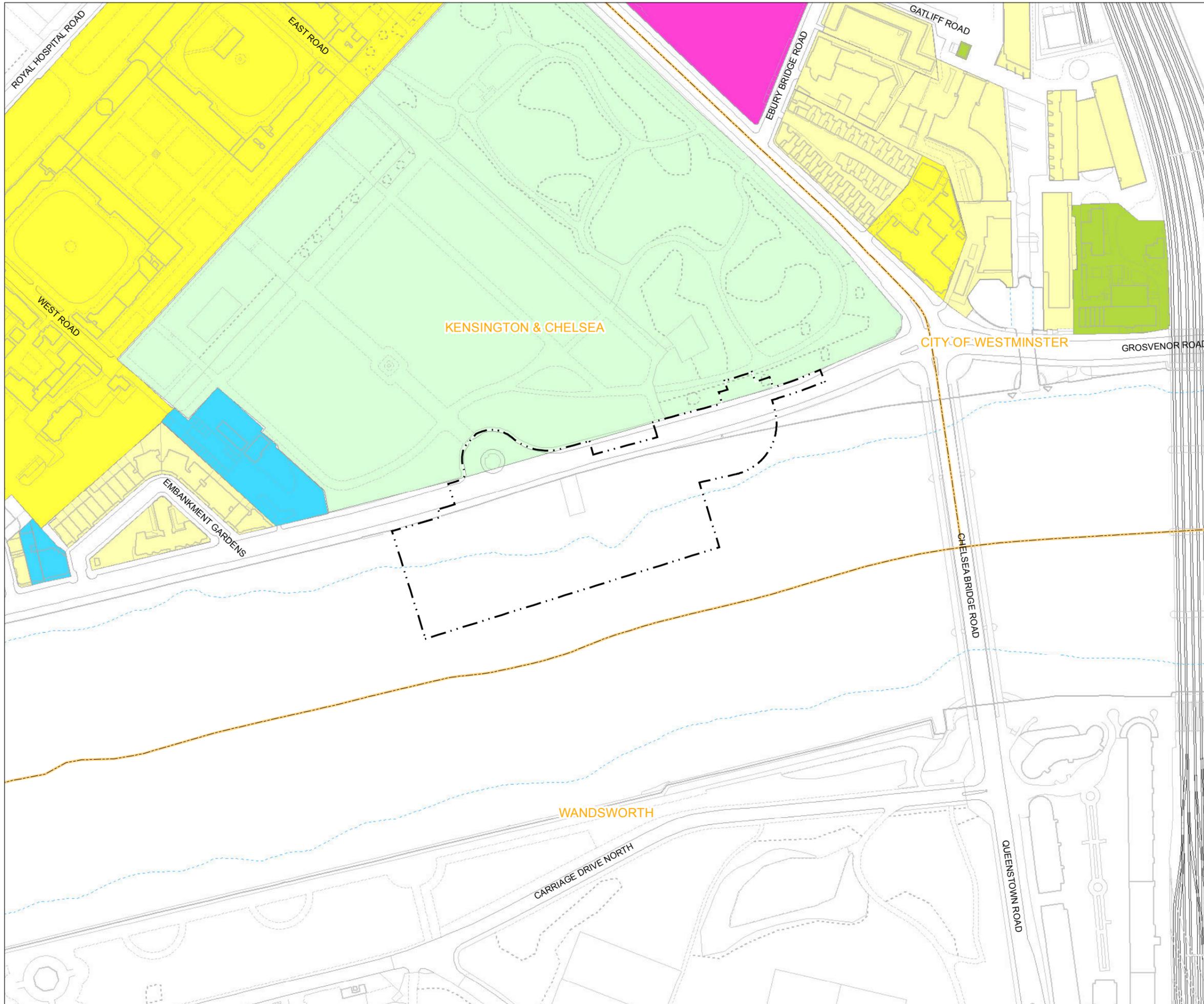


ILLUSTRATIVE

Location
Chelsea Embankment Foreshore
 Royal Borough of Kensington & Chelsea

Document Information
Application for Development Consent
 Construction phases - phase 4
 Site demobilisation
 Book of plans - section 14
 DCO-PP-12X-CHEEF-140022
 January 2013





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



FOR INFORMATION

Location
Chelsea Embankment Foreshore
 Royal Borough of Kensington & Chelsea

Document Information
Planning Statement
 Land use

1PL03-MG-00811
 January 2013



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