

Thames Tideway Tunnel
Thames Water Utilities Limited



Application for Development Consent

Application Reference Number: WWO10001

Planning Statement

Doc Ref: **7.01**

Appendix S

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 S: Chambers Wharf

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Appendix S: Chambers Wharf

S.1 Introduction

- S.1.1 Chambers Wharf was selected to accommodate permanent structures required to operate the project. The proposed site is needed to receive the main tunnel drive from Kirtling Street, drive the main tunnel to Abbey Mills and connect three combined sewer overflows (CSOs) to the main tunnel via the Greenwich connection tunnel.
- S.1.2 The proposed development site is known as Chambers Wharf, which is located in the London Borough of Southwark on the south bank of the River Thames. The London Borough of Tower Hamlets lies to the north of the river.
- S.1.3 The location of the site is illustrated in Annex S.
- S.1.4 This assessment is structured as follows:
- a. Section S.2 provides a brief description of the Chambers Wharf site.
 - b. Section S.3 sets out the planning context and setting for works in this location.
 - c. Section S.4 describes the site-specific development for which consent is sought and how the proposals evolved through consultation.
 - d. Section S.5 provides an analysis of the principal site-specific planning considerations and demonstrates compliance of the proposals with relevant planning policy.
 - e. Section R.6 provides an overall conclusion of the site-specific assessment for the proposed works at the site.

S.2 Site description

- S.2.1 The proposed development site comprises previously developed land that has now been predominantly cleared, an area of the tidal Thames foreshore and areas of highway.
- S.2.2 The site is rectangular in shape and includes an existing concrete wharf on concrete piles that extends into the foreshore. An associated timber 'dolphin' structure that is in poor condition is located in the river to the east of the wharf.
- S.2.3 During construction, land would be temporarily required within the foreshore to facilitate the required works.
- S.2.4 Ancillary to the main site, areas of highway land in East Lane, Chambers Street and Bevington Street would be required to carry out access improvements and for the diversion of utilities. Small areas of land would also be required in front of Luna House and to the west of Fountain Green Square adjacent to the river.
- S.2.5 The combined site would cover an area of approximately 28,220m².

Figure S.1 Aerial photograph of Chambers Wharf



- S.2.6 The site is previously developed and has been partially cleared. It is currently hoarded off while awaiting re-development.
- S.2.7 The site is bounded to the north by the River Thames, to the east by Loftie Street, to the south by Chambers Street and to the west by East Lane Bermondsey Wall West. The Thames Path currently runs around the site along Chambers Street and Loftie Street.
- S.2.8 The area surrounding Chambers Wharf comprises a mix of uses. On the riverbank to the north of Loftie Street are two three-storey residential blocks in Fountain Green Square.
- S.2.9 To the east of the site along Loftie Street and Bermondsey Wall East the uses are predominantly residential. The area features brick terrace houses and blocks of flats two to four storeys high.
- S.2.10 The Riverside Primary School and its grounds and a residential development of two-storey buildings lie to the southeast of the site on Bevington Street. Opposite these properties sit five to six-storey blocks of flats set within spacious, informally landscaped green spaces. More residential properties extend to the southeast, including some commercial frontages.
- S.2.11 An area of cleared brownfield land, which is subject to residential development permission lies to the south across Chambers Street.
- S.2.12 To the southwest is St Michael's Catholic College, which recently underwent redevelopment comprising buildings up to three storeys high with associated access, parking and amenity space.
- S.2.13 Luna House and Axis House, residential blocks between six and eight storeys high, adjoin the western boundary of the site on East Lane.

Other buildings between four and eight storeys high to the west of the site are predominantly residential with some commercial uses on the lower levels. The St Saviour's Dock and Tower Bridge Conservation Areas lie further to the west and comprise mixed residential and commercial uses.

S.2.14 The key features of the site are illustrated in Annex S.

S.3 Planning context

S.3.1 In developing the proposals and mitigation measures for the development at Chambers Wharf, Thames Water¹ had regard to the policies set out in the National Policy Statement for Waste Water (the 'NPS'), and to local development plan designations where these are relevant to the application.

S.3.2 In this case, the local development plan comprises the *London Plan* (2011), the London Borough of Southwark's *Core Strategy* (April 2012), and the council's saved *Unitary Development Plan* (as amended September 2007), which is expected to be fully replaced in early 2013.

S.3.3 The policy designations relevant to the site are its inclusion within an archaeological priority zone and its location within the Thames Policy Area.

S.3.4 The tidal Thames is designated as a Site of Importance for Nature Conservation and a small section of land along the riverfront to the east of the site is designated as Borough Open Land (OS.25).

S.3.5 Planning permission has been granted for a mixed-use residential development on land to the north and south of Chambers Street (including land within the proposed development site). Planning permission 07/AP/1262 was granted on 8/10/2010 for a mixed-use residential development comprising six residential buildings (four to the north of Chambers Street and two to the south). This would provide 587 residential units and 275m² of flexible Class A/B1 floor space at ground-floor level along Chambers Street, 203m² of Class D1 floor space along Llewellyn Street, basement parking, service and access roads, hard and soft landscaping works and other associated works.

S.4 Description of development

Overview

S.4.1 Chambers Wharf would function as a main tunnel reception and drive site and as a reception site for the Greenwich connection tunnel which intercepts CSOs at Greenwich Pumping Station, Deptford Church Street and Earl Pumping Station. A drop shaft would be constructed to facilitate removal of the tunnel boring machine (TBM) driving from Kirtling Street and to launch a TBM to drive the main tunnel to Abbey Mills Pumping

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

Station. The TBM from Greenwich Pumping Station would be removed from the same shaft. The Site works parameter plan within the *Book of Plans* details the zones in which the works are proposed.

Figure S.2 Visualisation of Chambers Wharf, the approved residential development and the permanent project structures



Application for development consent

- S.4.2 The geographic extent of the proposals for which development consent is sought, and which is assessed within the Environmental Impact Assessment at this site, is defined by the limits of land to be acquired or used (LLAU) and the Site works parameter plan within the *Book of Plans*.
- S.4.3 Table S.1 sets out the application drawings of relevance to this site and their status.

Table S.1 Chambers Wharf: Drawings that define the proposed development

Drawing title	Status	Location
Proposed schedule of works	For approval	Schedule 1 to the <i>Draft Thames Water Utilities Limited (Thames Tideway Tunnel) Development Consent Order</i>] (the 'Draft DCO')

Drawing title	Status	Location
Access plan	For approval	<i>Book of Plans</i> , Section 21
Demolition and site clearance	For approval	<i>Book of Plans</i> , Section 21
Site works parameter plan	For approval	<i>Book of Plans</i> , Section 21
Permanent works layout	Illustrative	<i>Book of Plans</i> , Section 21
Finished site levels	For approval	<i>Book of Plans</i> , Section 21
Proposed site features various	Illustrative except the above-ground structures, which is indicative	<i>Book of Plans</i> , Section 21
Post residential development section AA	Illustrative	<i>Book of Plans</i> , Section 21
As existing and post residential development north elevation	Illustrative	<i>Book of Plans</i> , Section 21
Kiosk design intent	Illustrative except the kiosk, which is indicative	<i>Book of Plans</i> , Section 21
Construction phases	Illustrative	<i>Book of Plans</i> , Section 21
Highway layout during construction (various)	Illustrative	<i>Transport Assessment Chambers Wharf Figures</i>
Permanent highway layout (various)	Illustrative	<i>Transport Assessment Chambers Wharf Figures</i>
River foreshore zones of working	For information	<i>Navigational Issues and Preliminary Risk Assessment Chambers Wharf</i>

S.4.4 The Nationally Significant Infrastructure Project (NSIP) works (Work No. 19a) comprise the construction of a drop shaft with an internal diameter of approximately 25m and depth of approximately 57m. Associated development (Work no. 19b) establishes a main tunnel drive and reception site for use in constructing, connecting and operating the main tunnel (east central) (Work No. 1c) and main tunnel (east) (Work No. 1d) and the Greenwich connection tunnel (Work No. 20) including: demolition of the existing jetty and river wall; construction of a new river wall; demolition of existing underground structures; ground preparation works including remediation; provision of storage areas from materials and plant; construction of air management plant and equipment; provision of conveyors and acoustic enclosures; construction of an acoustic enclosure; electrical and control kiosk, pits, chambers, ducts, pipes; construction of access; and highway works.

S.4.5 Further works are required at this site that constitute associated development within the meaning of Section 115(2) of the Planning Act 2008.

S.4.6 The full description of the proposed development is provided in the *Draft DCO*. Further details of temporary construction works and permanent

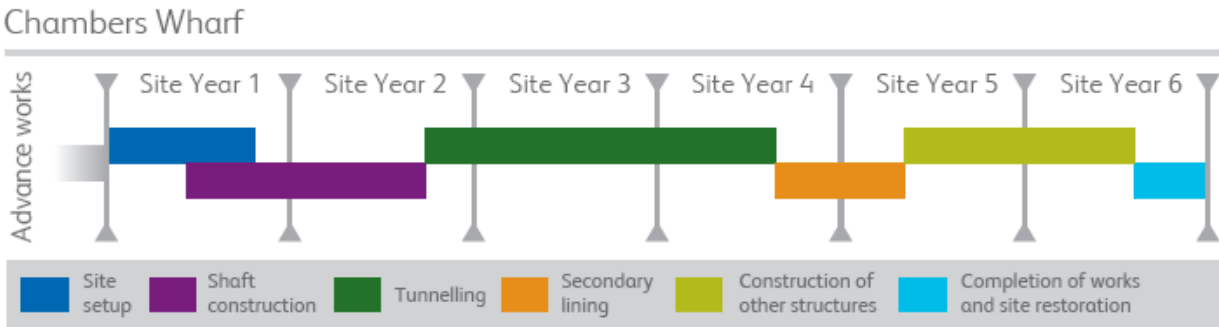
operational structures are contained below and an extended description is provided in the *Environmental Statement*, which accompanies the application (Vol 20).

S.4.7 At this site, approval is sought for the works shown on the Works plan showing the main tunnel (west central) (Work no. 1c); Chambers Wharf drop shaft (Work No. 19a); Greenwich connection tunnel (Work no. 20); the Site works parameter plan, which shows the relevant zones and LLAU in which the associated development works would be undertaken; the Access plans; and the Demolition and site clearance plans. The plans for approval are contained in the *Book of Plans* along with other relevant Construction phasing and Permanent works drawings. These other plans are marked either for approval, for information, indicative or illustrative depending on the level of detail they provide. Section 5 of this statement explains in more detail the overall approach to the level of detail and how the plans for approval were developed.

Construction

- S.4.8 Construction would be undertaken in the following stages:
- a. Site Years 1 to 2: site set-up (approximately eight months)
 - b. Site Years 1 to 2: main tunnel shaft construction (approximately 14 months)
 - c. Site Years 2 to 4: tunnelling (approximately 25 months)
 - d. Site Years 4 to 5: secondary lining (approximately eight months)
 - e. Site Years 4 to 5: construction of other structures (approximately 15 months)
 - f. Site Year 6: completion of works and site reinstatement (approximately five months).

Figure S.3 Construction timeline



S.4.9 A detailed description of these stages is provided in the *Environmental Statement* (Vol 20).

S.4.10 At Chambers Wharf the construction phase would last approximately six years. This site would operate to the standard, extended and continuous working hours for various phases and activities as set out in the *Code of Construction Practice (CoCP)* Part A and B (Section 4). Standard working hours would be applied to all of the above phases of construction work

apart from elements of main tunnel shaft construction, tunnelling and secondary lining as described below.

- S.4.11 Extended working hours are required at this site to enable major concrete pours for main tunnel shaft construction including diaphragm wall panels, base slab, roof slab and other large elements. It is assumed that extended hours would be required approximately twice a week during diaphragm walling for a total duration of approximately three months, and once a month during other major concrete pours. The exact timing of any extended hours of working would be consulted on with, and notified to, the London Borough of Southwark.
- S.4.12 Continuous hours would be required during tunnelling for approximately 25 months, and during secondary lining of the tunnel for approximately eight months; however, these activities are generally underground. During these periods only activities directly connected with the task would be permitted within the varied hours.
- S.4.13 Construction traffic would access the site from Jamaica Road (A200), travelling along Bevington Street and turning right into the site from the existing access on Chambers Street. Traffic would leave the site via the same route. Some parking bays along Chambers Street and Bevington Street would need to be suspended or relocated during construction and a new pedestrian crossing would be constructed on Bevington Street near the corner of Chambers Street.
- S.4.14 It is anticipated that an average of 20 heavy goods vehicles (HGVs) would access the site per day for the majority of the construction period. This would rise to approximately 55 HGVs per day over an estimated three-month period during the construction of the main tunnel shaft. 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.
- S.4.15 Potential layouts of the construction site are shown on the construction phasing plans (Annex S). It should be noted that these layouts are indicative 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

- S.4.16 Prior to any works commencing a new hoarded site boundary would be established and would consist of close boarded hoarding panels to the heights specified in the *CoCP*. Welfare and office facilities would also be set up.
- S.4.17 Other site works set up at this early stage would include the setting up of the required site access from Chambers Street and introduction of the required traffic management activities in the vicinity of the main site, including provision of a temporary pedestrian crossing on Bevington Street. Access gates would provide access off Chambers Street. Full pedestrian access would be retained along the southern side of Chambers

Street and appropriate site access signing would be provided to inform and remind pedestrians and lorry drivers of pedestrian safety.

- S.4.18 The approach to any land remediation that might be required cannot be defined at this stage. However it is assumed that any remediation that is required would occur within this early phase of construction and that any associated lorry movements would be substantially lower than the subsequent peak during the main construction phases.
- S.4.19 Internal site roads, plant and material storage areas, offices, welfare and workshops would be established on the site.
- S.4.20 As the site is within the tidal 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.
- S.4.21 It is assumed that no campshed or 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.
- S.4.22 It is assumed that the piles would be driven using vibration piling techniques although the intention would be to seek to maximise the use of pressed piling techniques where reasonably practicable.
- S.4.23 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.
- S.4.24 Monitoring of potential scour would be undertaken during the temporary construction works. The need for scour protection to the cofferdam would be identified using the approach set out in the scour monitoring and mitigation strategy.
- S.4.25 Internal site roads, plant and material storage areas, offices, welfare and workshops would be established on the cofferdam.

Shaft construction

- S.4.26 The 25m internal diameter main tunnel shaft would then be constructed by diaphragm wall techniques.
- S.4.27 During diaphragm wall excavation the trench would be filled with bentonite for ground support; on completion of the excavation cycle, steel bar reinforcement cages would be lowered in before concrete is pumped into the trench in order to displace the bentonite and form a solid wall panel.
- S.4.28 This process would be repeated for each diaphragm wall panel in order to create the full circle of the shaft. Diaphragm wall excavated material would be processed as required and then loaded onto lorries for transport off site.
- S.4.29 The main tunnel shaft excavation would commence after the diaphragm walls are complete. Excavated material would be put into skips within the shaft working area and hoisted by crawler crane from the shaft and deposited in a suitable storage area. After any required treatment, the material would be loaded onto a barge for transport off site. Once the

excavation is complete, a steel reinforced concrete base plug would be formed at the base of the shaft.

- S.4.30 It is anticipated that dewatering would be required. Dewatering wells would be drilled from the surface from within the shaft (a process known as 'internal dewatering') and groundwater extracted via pumps.
- S.4.31 It is anticipated that ground treatment would be required within the Chalk and fissure grouting to the chalk immediately below the toe of the wall may also be required. In addition, ground treated blocks would be constructed on each side of the main tunnel shaft to facilitate main TBM break in/break out and also for the Greenwich connection tunnel reception.

Tunnelling

- S.4.32 Approximately 5.5km of 7.2m internal diameter tunnel would be driven east from Chambers Wharf by a slurry TBM to be received at Abbey Mills Pumping Station. The Chambers Wharf site would also be used as a reception site for the main tunnel TBM from Kirtling Street and also the long connection tunnel TBM from Greenwich Pumping Station.
- S.4.33 On completion of the main tunnel shaft construction, the worksite layout would be reconfigured to support the tunnelling works.
- S.4.34 The TBM sections would be delivered to site by road and assembled within the shaft serviced by large mobile or crawler cranes.
- S.4.35 Tunnel portals would be formed in the shaft lining. After TBM assembly but prior to the start of tunnelling works, the enclosure would be installed over the shaft area to mitigate for potential noise, dust and light effects.
- S.4.36 Once launched the TBM would cut the ground by rotating the cutter head whilst hydraulic shove rams would propel it forward. A precast concrete segmental tunnel lining would be installed as the TBM progresses. The excavated chalk would be transported back along the newly formed tunnel in slurry form through temporary pipework. The slurry would be pumped to the slurry processing plant on the surface where the solids would be separated and the solid excavated material transported off site. The TBM would move forward and a temporary railway built behind it within the tunnel as the TBM proceeds to bring material to the TBM including precast concrete segments. A proportion of the cleaned slurry would be re-circulated back to the advancing TBM.
- S.4.37 Excavated material would be transported to awaiting barges via conveyors or cranes for onward disposal offsite. The TBM launched from the site would be received into the reception shaft at Abbey Mills Pumping Station where it would be dismantled. At Chambers Wharf the TBMs received from Kirtling Street and from Greenwich Pumping Station would be dismantled. Large mobile cranes would be used to raise the TBM sections from the shaft for removal offsite by road.

Secondary lining of tunnel and shaft

- S.4.38 Secondary lining is an additional layer of concrete placed against the inside of a tunnel's primary concrete segmental lining for water tightness and to improve the overall structural durability. It was assumed that both

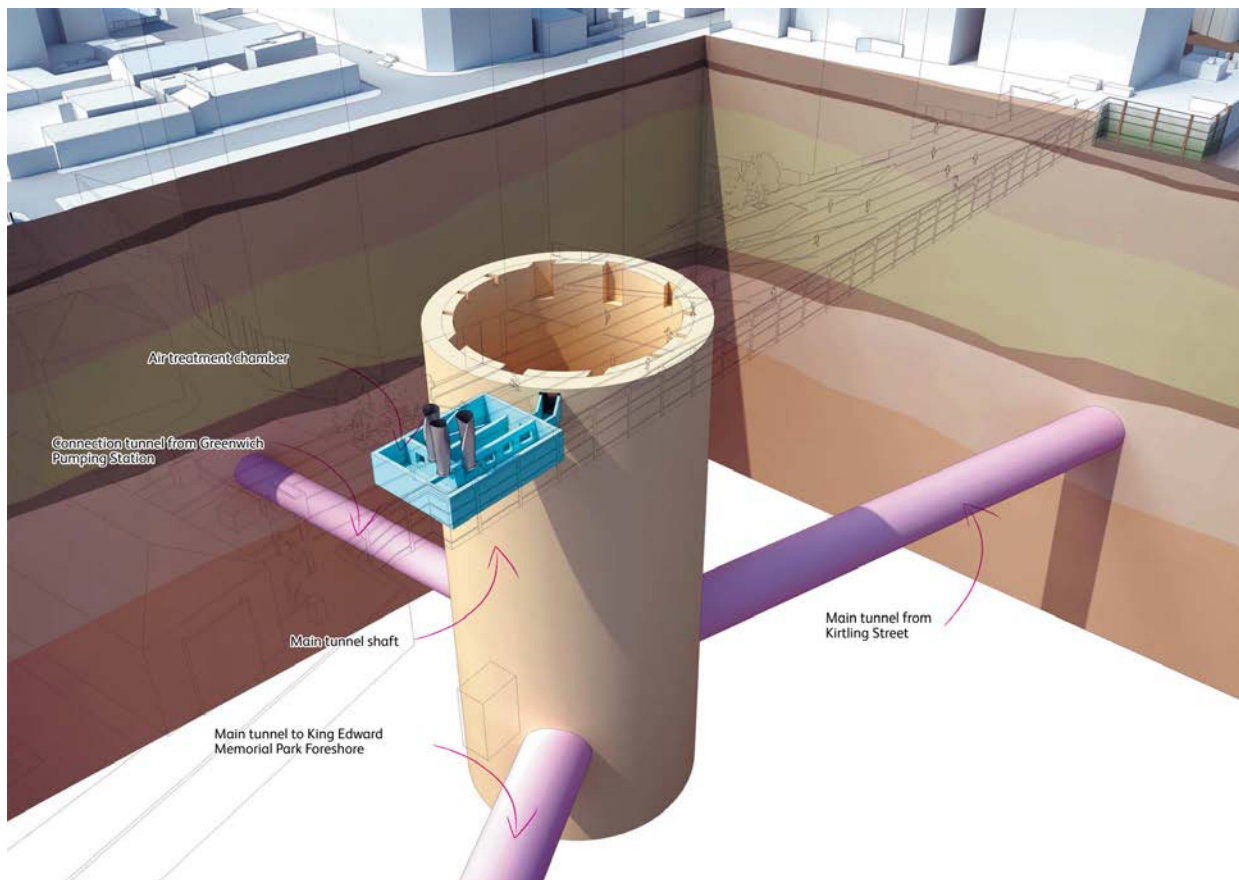
the main and long connection tunnels would have reinforced concrete secondary linings.

- S.4.39 It was assumed that on completion of the tunnelling phase, a concrete batching plant would be mobilised to site. The plant would supply the secondary lining of the main tunnel. Concrete would be batched on the surface and pumped or skipped to the tunnel. The tunnel enclosure installed over the main tunnel shaft and gantry crane area during tunnelling would remain in situ during secondary lining.
- S.4.40 The secondary lining of the main tunnel would be constructed by installing steel bar 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.
- S.4.41 It is assumed that the lining of the main tunnel 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-
- S.4.42 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.

Construction of other structures

- S.4.43 Sheet pile walls would be used to provide support within which the underground chambers would be constructed. Walls would be constructed to a depth to minimise ground water ingress into the excavation, but small pumps would be utilised to manage any ground water that does seep through. The pumps would discharge to the tidal Thames after being treated through a settlement system.
- S.4.44 The walls, bases and roofs of the chambers and shallow foundations for above-ground structures would be formed by in-situ concrete techniques. Onsite batched concrete would be pumped or skipped to the chamber.
- S.4.45 It is assumed that piles would be used to support the underground chambers, and would be bored reinforced concrete piles.
- S.4.46 For the above-ground structures, including the kiosk and ventilation columns, the components would be delivered by road and assembled on-site using suitable lifting equipment.
- S.4.47 The new river wall would be built within the temporary cofferdam. It is assumed that the new river wall would be constructed as a piled wall which incorporates both driven tubular and steel sheet piles and a reinforced concrete structure.
- S.4.48 Figure S.4 below provides an illustration of the key functional components of the proposed works. It shows the main tunnel shaft in yellow, the proposed ventilation structures, culverts, chambers and air management equipment in blue and the main tunnel running through the base of the shaft and the Greenwich connection tunnel in pink.

Figure S.4 Functional components diagram



Completion of works and site restoration

- S.4.49 On completion of construction (outlined above) the new river wall would be finished prior to removal of the temporary cofferdam to ensure flood protection.
- S.4.50 Once the new river wall is in place, the bed would be reinstated to match the existing river bed conditions as required and the sheet piling forming the temporary cofferdam would then be removed by pulling upwards.
- S.4.51 On completion of the construction works the permanent works area would be finished in accordance with the landscaping requirements.
- S.4.52 The final paved finish to incorporate the operational area into the proposed residential development would be the responsibility of the developer.

Operation

Drop shaft

- S.4.53 The Chambers Wharf drop shaft would be constructed at an approximate depth of 57m to the northeast of the site. It would have an approximate internal diameter of 25m.
- S.4.54 The shaft would be used to receive the TBM from Kirtling Street, launch the TBM to Abbey Mills Pumping Station and receive the TBM from Greenwich Pumping Station. The shaft would connect flows from the Greenwich connection tunnel which intercepts CSOs at Greenwich

Pumping Station, Deptford Church Street and Earl Pumping Station to the main tunnel.

- S.4.55 Ground level access covers would be installed at the top of the shaft for inspection and maintenance purposes.

Chambers and culverts

- S.4.56 The chamber and related culverts would be required for the ventilation structures and ducts would be required for cables and hydraulic pipelines.

- S.4.57 Ground level access covers would be installed at the top of the chambers for inspection and maintenance purposes.

River wall

- S.4.58 The location of the new river wall is detailed on the Site works parameter plan. It would be constructed along the length of the existing main site foreshore and in front of the new foreshore structures, up to the flood defence level and tied in with existing flood defences at both ends.

Air management structures

- S.4.59 The air management structures at this site would include three ventilation columns serving the shaft. The minimum height would be approximately 4m and the maximum height approximately 8m. The internal diameter of each column would be approximately 1.2m.

- S.4.60 The total cross-sectional area of the signature ventilation columns is dictated by the peak air flow rate. The number and diameter of the ventilation columns are dictated by aesthetic considerations (ie, providing three columns is considered preferable to providing more smaller diameter columns, refer to the *Design and Access Statement*, which accompanies the application, Section 20 for more details). The minimum height of the ventilation columns is designed to meet Environment Agency guidance criteria for odour dispersion and to comply with the Dangerous Substances and Explosive Atmospheres Directive.

- S.4.61 An electrical and control kiosk would be required to control this equipment.

- S.4.62 An underground air treatment chamber containing an air management filter would be connected to the ventilation columns. A ground level access cover would be incorporated on the air treatment chamber for inspection and maintenance purposes.

Electrical and control kiosk

- S.4.63 The location of the above-ground electrical and control kiosk is defined on the Site works parameter plan. The kiosk would contain gas monitors, electrical and control panels and metering equipment. The electrical and control kiosk would be approximately 4m by 2.5m by 2.5m high.

Permanent restoration and landscaping

- S.4.64 The proposed site features plan illustrates the permanent works layout and is detailed within the *Book of Plans*.

- S.4.65 Hardstanding would remain around shaft and above-ground structures to provide operational access for cranes and maintenance vehicles. The existing area of jetty decking would be permanently removed.
- S.4.66 Thames Water would retain a right of access over part of the land to facilitate maintenance access and would provide temporary security fencing in the period between completion of the works and the residential redevelopment of the site. The final finished surface would be the responsibility of those redeveloping the site, once the project is complete. The access covers would be specified to accept a paving treatment later to tie in with the residential development landscaping treatment.

Access and movement

- S.4.67 Permanent access to the operational infrastructure would be from an access at the corner of Loftie Street and Bermondsey Wall East and via hardstanding within the site.

Typical maintenance regime

- S.4.68 Once the project is operational, it is anticipated that Thames Water personnel would visit the site approximately every three to six months to carry out inspections of the air treatment chamber, ventilation columns, and electrical and control kiosk. It is likely that this would involve a visit by staff in a small van. Staff would open access covers to inspect and carry out minor maintenance of below-ground equipment.
- S.4.69 It is anticipated that approximately once every three years the filter media in the air treatment chamber would need to be replaced. This would be carried out via the access covers in the northeast corner of the site and the vehicles required would park on the area of hardstanding.
- S.4.70 It is anticipated that once every ten years, a major internal inspection of the main tunnel and underground structures would be required. It is likely that this would involve an expert team of inspection staff, a small support crew with support vehicles, and two mobile cranes to lower the inspection team and tunnel inspection vehicle into the main tunnel shaft. This process would take several weeks.
- S.4.71 The tunnel inspection vehicle required for the ten-yearly tunnel inspections would enter the main tunnel via a large access opening in the main tunnel shaft cover slab. A four-person cradle would enter via a separate access opening in the same cover slab. A further access opening would be provided for CCTV surveys and secondary man access if required.
- S.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 the use of mobile cranes and vans.

Scheme development

- S.4.73 The Chambers Wharf site was subject to extensive consultation and public engagement. Consultation was undertaken via a variety of methods including interim engagement post phase one consultation; phase two consultation; Section 48 publicity; public meetings; regular meetings with local resident groups; and numerous meetings, forums and workshops

with the London Borough of Southwark, other London Boroughs and relevant strategic stakeholders. The *Consultation Report*, which accompanies the application, contains detailed information on the comprehensive consultation process.

- S.4.74 The Chambers Wharf site was not presented at phase one consultation as planning permission had been granted for a residential development and it was understood that the development would be implemented. At this stage, the preferred site was King's Stairs Gardens, an area of public open space designated as Metropolitan Open Land located approximately 500m to the east of Chambers Wharf, also within the London Borough of Southwark. No other suitable sites were identified in the search area.
- S.4.75 A significant level of negative feedback was received to the proposals put forward at phase one consultation for King's Stairs Gardens. The main reasons for opposition include:
- a. the loss of public open space in a densely populated part of London with limited access to green space
 - b. the impact on residential amenity and property values
 - c. the impact on wildlife, vegetation and mature trees
 - d. the impact on footpaths, including the Thames Path
 - e. the impact of existing heritage features
 - f. the design of the permanent proposals
- S.4.76 The London Borough of Southwark and Greater London Authority specifically objected to the loss of highly valued green space within a unique riverside location and questioned why the use of brownfield sites had not been further explored.
- S.4.77 Towards the end of phase one consultation there was a change in circumstances at Chambers Wharf and the land was put up for sale. The site is a previously-developed, predominantly cleared brownfield site awaiting redevelopment. Subsequently Thames Water purchased the land as a potential alternative site to the use of King's Stairs Gardens.
- S.4.78 Prior to phase two consultation, the comments received concerning King's Stairs Gardens at phase one consultation were considered along with feedback from on-going consultation with stakeholders. Thames Water also continued further technical engineering work, considered any new information that was available and reviewed the site selection and tunnelling strategies to appraise the advantages and disadvantages for each site.
- S.4.79 In April 2011 interim engagement was undertaken on the Chambers Wharf site in order to understand any local issues concerning the potential use of the site. A review was undertaken in which all of the feedback received was considered.
- S.4.80 Following an extensive site selection 'back-check' and review, it was determined that Chambers Wharf should be the preferred site.

- S.4.81 Some of the main considerations that were deemed relevant in arriving at the decision to use Chambers Wharf included:
- a. Chambers Wharf is a previously-developed brownfield site awaiting redevelopment.
 - b. Chambers Wharf has better access to the river than other shortlisted sites.
 - c. Chambers Wharf would not adversely impact Metropolitan Open Land, public open space or require diversion of the Thames Path.
 - d. Chambers Wharf provides a more suitable alignment for the main tunnel.
 - e. The site at Chambers Wharf is located at a point where geological conditions change (from sands and gravels to chalk) and where it is deemed necessary to change the type of TBM used to continue tunnelling east.
 - f. A site is required to receive the Greenwich connection tunnel and transfer associated storm water flows from CSOs at Greenwich Pumping Station, Deptford Church Street and Earl Pumping Station to the main tunnel. This connection cannot be made at nearby sites such as King Edward Memorial Park as a CSO is already intercepted at this site and hydraulic requirements would limit a further connection.
 - g. Chambers Wharf would have more convenient access for road-based transport.
- S.4.82 One issue in particular that was considered in significant detail was the direction of drive for construction of the main tunnel. Initially, it was proposed to drive the tunnel from Abbey Mills Pumping Station to King's Stairs Gardens. However, as a result of the back-check, further technical analysis and review of the drive strategy, Chambers Wharf became the preferred site to drive the tunnel to Abbey Mills Pumping Station. The principle reason for this was that Chambers Wharf has better access to the tidal Thames and can facilitate the use of 1,500 tonne barges, which would significantly reduce road-based traffic requirements associated with the works. Abbey Mills Pumping Station has limited access to the River Lee, which experiences significant tidal fluctuations and can only accommodate smaller barges in restricted numbers, depending on tidal conditions. The barging constraints at Abbey Mills Pumping Station would mean that its use as a main tunnel drive site would lead to increased dependence on road-based transport, which in this instance would be less sustainable and significantly increase disruption to nearby residential properties.
- S.4.83 The designs at Chambers Wharf continued to evolve in response to consultation, which is detailed under the Good design subsection.
- S.4.84 Even though there are considerable benefits for using Chambers Wharf over King's Stairs Gardens, consultation identified issues associated with the proposed works that focussed on temporary construction effects.

- S.4.85 In developing the proposals, all issues raised throughout the pre-application consultation, Section 48 publicity and discussions with stakeholders were taken into account. Full details are set out in the *Consultation Report*. The key issues included:
- a. There is no need for a site to construct the tunnel in this location or the local area: this issue is addressed in the Meeting the need subsection, Section 3 of the *Planning Statement*, and in more detail in the *Final Report on-site Selection Process*.
 - b. The use of the site is generally unsuitable: this issue is addressed in the Meeting the need subsection and in more detail in the *Final Report on-site Selection Process*.
 - c. There would be disruption from construction noise and effects on air quality: this issue is addressed in the Air quality, emissions, dust and odour and Noise and vibration subsections below.
 - d. Disruption from construction traffic would have an effect on residential amenity and schools: this issue is addressed in the Air quality, emissions, dust and odour, Traffic and transport and Noise and vibration subsections below.
 - e. Construction and maintenance traffic would impact on pedestrian/cycle safety during the construction and operational phases: this issue is addressed in the Traffic and transport subsection below.
 - f. Odour and noise would be a concern once the project is operational: this issue is addressed in the Air quality, emissions, dust and odour and Noise and vibration subsections below.
 - g. The proposed structures would give rise to visual effects: this issue is addressed in the Good design and Townscape and visual subsections below.

S.5 Site-specific planning considerations

- S.5.1 This section provides an analysis of the key planning considerations associated with the proposed works at Chambers Wharf. It considers the assessment criteria identified in the NPS and other relevant issues as set out in para. S.4.85 above. Thames Water's design response to each of these issues was informed by extensive consultation with stakeholders, as set out in the *Consultation Report*, and is set out below.

Meeting the need

- S.5.2 The proposed site at Chambers Wharf would successfully meet the specific need of facilitating construction of the main tunnel. The site provides a suitable point at which to connect wastewater flows to the main tunnel from CSOs at the Greenwich Pumping Station, Deptford Church Street and Earl Pumping Station. The works would make a contribution to the wider need for and delivery of the project.
- S.5.3 The necessary works and the scale of the NSIP infrastructure present a series of complex engineering constraints that necessitate specific site attributes and robust engineering design solutions. Key considerations

- include the size of the site required, underlying geological conditions, tunnel alignment and transport considerations.
- S.5.4 A particularly important consideration for large-scale tunnelling projects is changes in geology, the materials in which the tunnel would be driven and the associated tunnelling methods required. These constraints resulted in the requirement for a main drive site in a relatively narrow search zone within a dense urban area. Chambers Wharf and King's Stairs Gardens were the only suitable sites of an appropriate size identified, which are located at the point where the geology changes and where different tunnelling requirements and techniques become necessary. Throughout the site selection and consultation process, it was evident that both sites were sensitive given their location in an urban area in proximity to sensitive receptors.
- S.5.5 The preferred site at Chambers Wharf was selected and tested through a comprehensive, qualitative, and iterative site selection process, and was subject to extensive consultation and engagement. The site selection methodology was subject to consultation with local authorities and key stakeholders, and the comments received at consultation were fully considered in its development.
- S.5.6 The proposed use of Chambers Wharf attracted support from some stakeholders and considerable opposition from others, principally those living in proximity to the site and the London Borough of Southwark. However, there is broad consensus amongst stakeholders including the council, the Environment Agency, the Greater London Authority, the Port of London Authority, English Heritage, the London Wildlife Trust and the Consumer Council for Water, that there is a need to tackle the unacceptable discharges from CSOs along the tidal Thames. The council specifically stated in its Section 48 response that it fully supports the efforts to clean up the tidal Thames to meet the requirements of the Urban Waste Water Treatment Directive. The use of the Chambers Wharf as the preferred site for the proposed works was also supported by a number of stakeholders including the Greater London Authority, the Port of London Authority, and a number of community consultees, as detailed in the *Consultation Report*.
- S.5.7 In general, the opposition at Chambers Wharf centres on the principle that the use of the site would result in unacceptable impacts on nearby sensitive receptors. These issues are assessed below.
- S.5.8 Much of the opposition also centres on a view that the proposed engineering solution is not the best option and the need for a site in this location or borough is challenged. These issues are considered below.
- S.5.9 A worksite is required in this location due to the underlying geological conditions where the strata change from sands and gravels to Chalk. Tunnelling operations inherently contain a degree of risk and it is fundamentally important to reduce risk wherever possible for safety and programme reasons. As such, the engineering assessment determined that the type of TBM should be changed at this location to suit the specific ground conditions to continue the main tunnel drive to Abbey Mills Pumping Station.

- S.5.10 The connection of the Greenwich connection tunnel is another particularly relevant requirement at Chambers Wharf. No CSO would be directly intercepted at this site therefore there would be sufficient capacity to receive flows from the Greenwich connection tunnel and transfer them to the main tunnel. This connection is not suitable at other nearby shaft sites that already intercept CSOs for hydraulic and capacity reasons.
- S.5.11 Therefore, a worksite is required to construct a main tunnel shaft with sufficient attributes to receive and remove the TBM from Kirtling Street, launch a new TBM to continue the drive to Abbey Mills Pumping Station, receive and remove the TBM from Greenwich Pumping Station, and that is suitably designed to transfer flows captured by the Greenwich connection tunnel to the main tunnel. The proposed works at Chambers Wharf are necessary; given the above constraints and requirements, it is not feasible to drive the main tunnel directly from Kirtling Street to Abbey Mills Pumping Station or vice versa due to the changing geological conditions and tunnelling techniques.
- S.5.12 As a result of consultation feedback, Thames Water selected a brownfield site for the proposed works. No suitable alternative sites were put forward by stakeholders and the extensive site selection process did not identify any alternative sites that would be more suitable than Chambers Wharf.

Good design

- S.5.13 The amount, layout and scale of the proposed works at this site are primarily dictated by the key functional requirements, which include:
- a. the need to transfer flows from the Greenwich connection tunnel into the main tunnel
 - b. the size of the shaft required to launch and receive TBMs
 - c. air management requirements and the design of the associated above-ground structures
 - d. Thames Water maintenance requirements.
- S.5.14 Early site analysis and subsequent engagement identified that it was important for the proposals to respond to the following key design opportunities:
- a. Design the above-ground structures with an appropriate scale, form and suitably high quality finish to contribute to future public realm proposals in this prominent riverfront location.
 - b. Design the proposals to be compatible with future residential redevelopment proposals at the site.
 - c. Remove the existing jetty, provide a new river wall and enhance the interface with the tidal Thames.
 - d. Safeguard a suitable alignment for the Thames Path.

- S.5.15 The site-specific design constraints included:
- a. sensitive receptors in close proximity including two schools, residential properties and offices
 - b. the parameters of the approved residential development
 - c. restrictions associated with the alignment of the main tunnel
 - d. the setting of nearby conservation areas and listed buildings/structures
 - e. the designated Site of Importance for Nature Conservation.
- S.5.16 The design of the proposals for the site evolved through consultation and continued engagement with key stakeholders including the Design Council CABE. The design reviews for Chambers Wharf were attended by the London Borough of Southwark and other strategic pan-London stakeholders.
- S.5.17 The Design Council CABE made formal comments on the Chambers Wharf proposals at a sketch review held on 4 May 2011. The panel recognised the need to accommodate the proposed works within the site at Chambers Wharf and viewed it as an opportunity that could benefit both Thames Water and the future implementation of the consented residential scheme (given the proposed site preparation works, removal of the jetty and construction of a new river wall). The panel recommended making the project works a focal point in the proposed area of public realm. It also suggested investigating how to better exploit the generous riverside space.
- S.5.18 Having considered the comments, it was determined that the operational structures were already appropriately located to sit well with future redevelopment plans, proposed areas of public realm and that they would not interfere with proposed alignment of the Thames Path. Therefore there was no need to reposition the structures to be more prominent. Given the limited nature of the above-ground operational structures at this site, the Design Council CABE did not see the need for a further review.
- S.5.19 On completion of the project, the area surrounding the works would be integrated with a future area of public realm as part of a wider residential development to be undertaken by others. The permanent above-ground structures would be minimal, comprising only the ventilation columns and the electrical and control kiosk. All other details, including permanent landscaping, would be the responsibility of the developer and subject to approval of the local authority. The designs were developed to ensure that the materials and finishes of the project structures would be suitably flexible, visually attractive, sustainable, and durable to integrate successfully with the design of the future public realm.
- S.5.20 By transferring CSO flows and improving water quality in the tidal Thames, the proposals would contribute to sustainable development, as detailed in Section 7 of the *Planning Statement*.
- S.5.21 The principal issues from the analysis of site opportunities and constraints, and consultation feedback that influenced the design at Chambers Wharf include:

- a. design development and riverside setting
- b. design of the above-ground structures
- c. interim arrangement of the site
- d. management of construction impacts.

Design development and riverside setting

- S.5.22 As required by the NPS, aesthetics formed a key part of the design development in this location.
- S.5.23 The functional design of the air management infrastructure was modified following phase two consultation to improve its appearance. At phase two consultation, the proposed design featured a raised platform structure positioned against the river wall to house the ventilation equipment. It included stairs and a ramp to enable the public to ascend the structure and enjoy views of the river. It also included two signature ventilation columns and a horizontal vent facing the river.

Figure S.5 Visualisation of the phase two consultation design and the raised viewing platform



- S.5.24 Having reviewed consultation responses, held a design meeting with the London Borough of Southwark, and undertaken further design work, it was concluded that the raised viewing platform was an unnecessary obstruction and the infrastructure should be redesigned without the structure while achieving the required air management.
- S.5.25 Refinements to the design subsequently relocated the ventilation equipment underground and in turn this allowed for the large, raised structure along the riverfront to be removed. Simplifying the design and removing the raised platform would improve panoramic views along the riverfront and enhance accessibility at the site. The above-ground

elements of the revised design were limited to three signature ventilation columns and a smaller electrical and control kiosk.

Figure S.6 Visualisation of the proposed design



- S.5.26 These changes were captured in Section 48 publicity and there were no further significant design developments. The proposed designs are simple and functional but attractive; they would sit comfortably along the riverfront and could easily be integrated into a future area of public realm.

Design of the above-ground structures

- S.5.27 The permanent above-ground structures at Chambers Wharf are limited to three ventilation columns, an electrical and control kiosk, a new river wall and ground-level access covers and a raised ground-level area of hardstanding.
- S.5.28 The ventilation columns would be the project's 'signature' design and introduce three attractive, uniform structures at the site. The signature column was developed to unify the project at prominent locations across London to help celebrate the project and its contribution to managing London's wastewater.
- S.5.29 At Chambers Wharf, the ventilation columns would be a minimum of 4m and a maximum of 8m high, which is comparable to public art installations commonly seen along the riverfront. The appearance of these structures would respect and complement the context and setting at this location, including consideration of the mixed-use residential scheme, new areas of public realm and the proposed Thames Path along the riverfront (all to be provided by the residential developer).
- S.5.30 The electrical and control kiosk would be a small rectangular structure approximately 2.5m high located on the eastern boundary of the site adjacent to the rear garden wall of the residential properties that front Fountain Green Square. In this position, it would be unobtrusive, set away from the boundary wall and would not clutter the public realm or interfere with the riverfront alignment reserved for the Thames Path. Design principle CHAWF.01 would ensure that final cladding material reflects the future use of this part of the site as public realm. The design, scale and siting of this structure is considered appropriate.

- S.5.31 The above-ground structures would be finished with high quality, robust materials and the final detailed materials and finishes would be subject to a Requirement for approval by the local planning authority.
- S.5.32 Ground level access covers would be provided above the main tunnel shaft and associated below-ground infrastructure. Initially, these covers would have a temporary surfacing to enable maintenance access. A final surfacing would then be implemented to match the proposed surfacing for the new public realm (to be implemented by the residential developer). This objective is secured by design principle CHAWF.02.
- S.5.33 The new river wall would be constructed to required Environment Agency specifications for flood defences. Temporary railings are secured by design principle CHAWF.05 and would be provided in the interim. The final finish and railings would be submitted to the local authority for approval as part of the residential redevelopment scheme by others.

Interim arrangement of the site

- S.5.34 There would be a transitional arrangement following construction of the project works and before the residential development commences on-site. During this phase, the site would be inaccessible to the public. Design principle CHAWF.03 ensures that the site would be suitably secured and enclosed during this interim period.
- S.5.35 A temporary access for maintenance of the project infrastructure would be required. The access would be located at the corner of Loftie Street and Bermondsey Wall East.
- S.5.36 In order to create a safe working area for maintenance activities, it is necessary to provide an area of hardstanding around the access covers and above-ground structures. This hardstanding would align with the finished level of the approved planning permission for the residential development. A ramp would be provided to facilitate the connection to Loftie Street for maintenance access.
- S.5.37 During this interim period, a temporary guard rail would be provided on or adjacent to the river wall. This would maintain safety along the riverfront until a permanent landscaping scheme, including railings along the riverfront, comes forward as part of the residential development.
- S.5.38 Interim surface water drainage requirements are secured by design principle CHAWF.07 and would ensure compliance with the National Standards for Sustainable Drainage Systems under the Floods and Water Management Act 2010. Drainage of the interim footprint of the works would be designed to drain rainwater to protect the operational structures.

Managing construction impacts

- S.5.39 The *CoCP* sets out how the environmental effects resulting from the construction of the project would be managed. The *Draft DCO* includes requirements (*CoCP* Part A PW6 and Part B CHAWF1) to ensure the construction works are carried out in accordance with the *CoCP*.
- S.5.40 Design measures to manage the impacts of construction traffic are outlined in the *CoCP* Part A, which includes a provision for site-specific

transport management plans. The plans would set out how vehicular access to the site would be managed to minimise the impact on the local area and communicate this to the council and other stakeholders.

- S.5.41 Further site-specific design measures to minimise temporary construction impacts at this site are outlined in the *CoCP* Part B, including use of site buildings and temporary stockpiles to provide acoustic screening, and sufficient hoarding to achieve appropriate visual screening and noise attenuation with public-facing sections that incorporate artwork to improve its appearance.
- S.5.42 During the main tunnel construction and secondary lining works, which require 24-hour working for health and safety reasons, the construction area around the main shaft would be covered by an enclosure/building to provide acoustic screening. This would be mainly for noise attenuation; however, the structure would also minimise dust and light spill and effectively hide plant, construction materials and gantries.
- S.5.43 During construction, at least 90 per cent of the cofferdam fill (both imported and exported), main tunnel secondary lining aggregates (imported), and shaft, main tunnel and other excavated material (exported) would be transported by barge. These measures would significantly reduce road-based transport and limit impacts of HGVs on surrounding roads.

Design conclusions

- S.5.44 The proposals for Chambers Wharf were carefully developed through a collaborative process of design review to be sustainable, durable and visually attractive. The design and layout respond sensitively to the site's characteristics and its future use as a waterfront residential development.

Water quality, water resources and flood risk

Water quality

- S.5.45 There is no CSO to intercept at Chambers Wharf; however, the works at this site are vital to facilitate construction of the project, which would have direct beneficial effects on water quality within the tidal Thames and contribute to the protection and enhancement of the biodiversity of the Blue Ribbon Network.
- S.5.46 These positive benefits lend strong support to the Government's key policy objectives for improving water quality, public health and environment.

Water resources

- S.5.47 There are no licensed groundwater abstractions from the river terrace deposits or upper aquifer within 1km of the site. However, there are two licensed abstractions from the Chalk at a distance of approximately 1km from the site: one to the west and one to the east. These are licensed for industrial, commercial and public services for non-evaporative cooling or amenity purposes respectively.
- S.5.48 In terms of effects on groundwater, during construction the shaft would pass through the upper and lower aquifers, which are of medium and high value respectively.

- S.5.49 Potential construction effects on the upper aquifer would be limited to the physical obstruction of groundwater, which would not have any significant impacts. Construction effects on the lower aquifer relate to dewatering. The associated contamination risk could impact on groundwater resources and quality.
- S.5.50 As a result of the identified risk, a construction technique called external dewatering would be implemented to minimise groundwater movement. Groundwater conditions would also be monitored during and for a period following construction in agreement with the Environment Agency. Appropriate measures are also outlined in the project-wide groundwater assessment (*Environmental Statement* Vol 3, Appendix H.1).
- S.5.51 In terms of surface water, there is potential for the proposed construction works to impact surface water resources, due to surface water run-off and exposure of the drainage system to contaminants.
- S.5.52 Measures to protect water quality and resources during construction are detailed in Section 8 of the *CoCP* Part A and in the project-wide assessment. The *CoCP* covers activities that are subject to pollution control and refers to good practice, as noted in the considered mitigation set out in the NPS. The *CoCP* Part B seeks to ensure that any hardstanding proposed at the site would be permeable to assist infiltration drainage and reduce surface water run-off.
- S.5.53 As a result of the measures incorporated into the *CoCP*, on-going monitoring of groundwater levels, water quality and the construction techniques proposed, no significant effects on groundwater or surface water are expected during construction.
- S.5.54 Once the project is operational, the effects on groundwater would be negligible. The majority of the area surrounding the above-ground structures would remain cleared awaiting redevelopment. As detailed above, temporary drainage would be secured in accordance with design principle CHAWF.07. Permanent drainage would be implemented as part of the residential development by the developer and secured as part of the approved planning permission.
- S.5.55 The proposed design for the above-ground electrical and control kiosk includes a planted brown roof, which would provide rainwater attenuation and reduce the total volume and peak rate of surface water run-off from the site.
- S.5.56 The design of the proposals at this site and appropriate mitigation would minimise construction impacts on the water environment. Once the project is operational, the effects would be negligible.
- Flood risk**
- S.5.57 The permanent works area at Chambers Wharf would be located within the 'high probability' Flood Zone 3a. However, the entire site is protected by tidal flood defences that run along the bank of the tidal Thames, which reduces the flood risk to residual level.
- S.5.58 A Flood Risk Assessment undertaken in accordance with Section 4.4 of the NPS is included in the *Environmental Statement*. It determined that the

proposed development would be appropriate for the area as flood risk to the development would remain unchanged. Flood risk would be managed through appropriate design measures and the development would not increase flood risk on the surrounding areas. Therefore, no significant flood risk effects are likely.

- S.5.59 During construction, the temporary cofferdam in the foreshore would be within Flood Zone 3b. It would be constructed to at least the same height as the existing flood defences to maintain appropriate flood protection.
- S.5.60 In accordance with the *CoCP* Part A (Section 8), all site drainage during construction would be drained and discharged to the combined sewer. Where this is not practicable, the site would be drained so that accumulating surface water would be directed to holding or settling tanks, separators and other measures prior to discharging to the combined or surface water drains. Foul drainage from the site welfare facilities would be connected to the combined sewer. This design measure would help manage the risk from this flood source during construction but would not reduce the level of risk.
- S.5.61 The permanent operational area would be protected from flooding by the provision of flood defences that would provide the same level of protection as existing defences. The defences would be secured through design principle IRVR.13. In addition, in order to accommodate climate change, the proposed river wall would be designed to be raised to Thames Estuary 2100 Plan levels in the future. This would be secured via project-wide design principle IRVR.02.
- S.5.62 Flood risk from all sources has been managed as far as possible through design and the measures incorporated in the *CoCP*, which satisfied the criteria in NPS para. 4.10. No significant flood effects are likely from the proposed development.

Air quality, emissions, dust and odour

- S.5.63 The project-wide *Air Management Plan*, which accompanies the application, is designed to ensure that the air in the tunnel system is kept fresh, that a low pressure is maintained within the system to prevent unwanted releases and that any air released is treated. This would be achieved by a combination of forced or active ventilation and treatment and passive air treatment. In addition, there would be ventilation structures at all sites to allow air to enter and leave the system.
- S.5.64 When the tunnel system is empty, clean air would be drawn in at specific sites by the extraction of air at other specific sites to keep the air in the system fresh. This means that odours would not build up while the system is empty. As the tunnels fill, displaced air would initially be extracted and treated at the active ventilation sites before release. Later, depending on the level of filling, air would pass through passive carbon filters. These filters would clean the air and remove any odours before release.
- S.5.65 During infrequent, extreme storm events (approximately once in 15 years), the air pushed out of the main tunnel 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

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 odour.

- S.5.66 At Chambers Wharf, a passive ventilation system comprising carbon filters is proposed. The air management system allows air to move into and out of the tunnel, as air is displaced by the tunnel filling or emptying during storm events. At this site, air would be released from the ventilation columns for approximately 40 hours in a typical year and all displaced air would be treated, having passed through the odour control unit.
- S.5.67 The project air management strategy is designed to ensure no significant loss of amenity due to odour from the operational development at any location.
- S.5.68 Chambers Wharf is located in the London Borough of Southwark's Air Quality Management Area, declared for nitrogen dioxide and particulate matter, which covers the northern part of the borough. Local monitoring data indicates that there are currently exceedences of the air quality standard for nitrogen dioxide and particulate matter in the vicinity of the site.
- S.5.69 The nearest sensitive receptors identified are local residents particularly in Fountain Green Square, Luna House, Axis Court and the future residential development to the south of Chambers Street, as well as Riverside Primary School and St Michael's Catholic College.
- S.5.70 An assessment of the air quality impacts of the proposed development during construction and operation is provided in the Section 4 of the *Environmental Statement*. In accordance with the measures included in the *CoCP*, all reasonable steps would be taken to minimise detrimental impacts on air quality and amenity from emissions and dust, as required by the NPS. The measures include appropriately controlling dust and emissions from plant and vehicles and monitoring. With the *CoCP* measures in place, 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 significant on any sensitive receptor.
- S.5.71 The construction and operational effects with regard to air quality and odour would be consistent with the NPS policy objectives (at paras. 4.3.11 to 4.3.15 and 4.11.4 to 4.11.5) to minimise detrimental impacts on amenity and nuisance. Appropriate measures are proposed to ensure that the proposals would not lead to a material deterioration of, or change in, air quality or a significant loss of amenity at this location.

Biodiversity and geological conservation

- S.5.72 The Chambers Wharf site is not designated for its geological 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. The tidal Thames and its foreshore are designated as a Site of Importance for Nature Conservation.

- S.5.73 In respect of aquatic ecology, the main in-river works comprise construction of a temporary cofferdam structure which would extend into the river. The cofferdam is needed to provide an area to undertake the required construction works and would also facilitate barging operations at the site. There would be a loss of intertidal habitat due to the land take. In order to limit temporary impacts, the footprint of the cofferdam was minimised as far as possible while ensuring functionality for the necessary works and barging, in accordance with the NPS (para. 4.5.17).
- S.5.74 On completion of the works at this site, the cofferdam would be removed. It is anticipated that the subsequent excavation and removal of granular fill material followed by substrate reinstatement would enhance the natural recovery of the foreshore. The removal of the existing multi-concrete piled jetty would also create an additional uncovered or undeveloped area of the foreshore and provide an opportunity for enhanced foreshore ecology.
- S.5.75 The *CoCP* includes an ecological management plan that details the approach to managing effects on ecological receptors with reference to aquatic ecology. Part B of the *CoCP* covers the site-specific measures and requires provision of a membrane between the river bed and the temporary back-fill material to prevent contamination of juvenile fish habitat and preserve potential archaeology. The measures also ensure that the areas of foreshore used for the temporary works would be restored to similar condition and material as existing.
- S.5.76 Further, design principle IRVR.11 states that where practicable, aquatic ecology habitat shall be provided at the base of any foreshore structure to encourage retention of sediment in order to promote aquatic ecology. As a result of these measures the proposed works would not result in any adverse effects on aquatic ecology.
- S.5.77 In terms of the terrestrial ecology, the surveys undertaken predict no significant effects at Chambers Wharf.
- S.5.78 Japanese knotweed, an invasive plant, is present on the site and would be appropriately removed as part of the site preparation works as detailed in the *CoCP* Part A (Section 11).
- S.5.79 Covering the roof of the electrical and control kiosk with materials such as low nutrient rubble and gravels would promote natural colonisation of brown field plants of particular value to insects and birds. The *CoCP* contains an ecological management plan, which details the approach to managing effects on ecological receptors with reference to the terrestrial ecology assessment.
- S.5.80 Given the limited extent of the permanent above-ground works, the assessment of terrestrial ecology during operation was scoped out of the *Environmental Impact Assessment* and no effects were predicted.
- S.5.81 In accordance with NPS policy, the proposed development would avoid significant harm to biodiversity and geological conservation interests. Thames Water sought to take advantage of the opportunities to conserve and enhance biodiversity through the *CoCP*; the measures proposed would appropriately protect the foreshore and tidal Thames during construction and restore them on completion of the works.

Landscape and visual impacts

- S.5.82 Chambers Wharf is located within an urban setting with no nationally designated landscapes. Although it is not located within a conservation area, Thames Water took account of the St Saviour's Dock and Tower Bridge conservation area appraisals, produced by the London Borough of Southwark and the *Wapping Wall Character Appraisal and Management Guidelines*, produced by the London Borough of Tower Hamlets.
- S.5.83 The site falls partly within a protected London Panorama from Greenwich Park. The viewpoints to inform the visual assessment were discussed and agreed in advance with the London Borough of Southwark.
- S.5.84 The site has very limited townscape value since it is a previously-developed brownfield site that is predominantly cleared, has an ageing 1950s jetty along the riverfront, and is hoarded off awaiting redevelopment. Most of the components on the site are in need of maintenance and repair. The site does not contribute positively to the character of the area.
- S.5.85 The surrounding townscape is dominated by residential uses on both sides of the river, interspersed with some commercial, retail and leisure uses, particularly towards Tower Bridge to the west. These areas are locally valued and the townscape is considered to be good.
- S.5.86 The approved residential redevelopment proposals for the site were also an important consideration and the project was designed not to affect construction of the development. The approved development comprises buildings of between nine and 11-storeys high along the riverfront, which would significantly change the character and visual appearance of the site and surrounding area both during and following construction.
- S.5.87 Through site selection, extensive consultation, design development and mitigation, the proposed works at this site were refined to minimise impacts on the surrounding townscape and its appearance during construction. Thames Water also sought to provide benefits in terms of visual appearance and high quality design once operational.
- S.5.88 Despite this, the construction works would have some temporary adverse effects on the character of the site itself, the surrounding townscape and local views from construction activities including site clearance, the presence of hoardings, construction plant, the acoustic enclosure over the main shaft and welfare buildings.
- S.5.89 Measures incorporated in the *CoCP* seek to reduce townscape and visual impacts as far as possible. Part B of the *CoCP* outlines site-specific measures and requires a high quality 3.6m high hoarding to be erected around the majority of the site and a 5m high hoarding/barrier on eastern edge during construction. The public-facing sections of the hoardings would incorporate suitable artwork to improve their appearance.
- S.5.90 The construction area around the main tunnel shaft would be covered by an enclosure/building during the tunnel construction and secondary lining works mainly for noise attenuation. However, the structure would also help to control dust and light and hide plant equipment, construction materials

and cranes. Although housing construction plant and screening the site would be beneficial, the structure itself would have a visual presence to the riverfront and be visible from surrounding properties.

- S.5.91 A noise barrier is proposed on the cofferdam, which would be constructed up to 1m above ground level with plywood. The section above the plywood would be transparent plastic to maintain acoustic screening but minimise visual impacts of the structure and maintain views along the river.
- S.5.92 The minimal permanent above-ground structures were carefully designed to provide a beneficial legacy for the local townscape, as detailed above in the Good design subsection. They would have no impact on the character the surrounding townscape and would be insignificant in the context of the approved residential redevelopment and the site as a whole.
- S.5.93 The design of the permanent works was carefully considered to ensure their appearance, scale and layout would appropriately integrate with the approved residential planning permission. The design allows sufficient space to route the Thames Path along the riverfront; once this has been implemented by the residential developer, it would provide an attractive and inclusive public realm.
- S.5.94 Removal of the existing concrete jetty, the reinstatement of the foreshore and site preparation works as part of the project would provide significant townscape improvements. The residential development would capitalise on this legacy; the creation of a new area of public realm next to the river around the project structures, including a new section of the Thames Path, would significantly enhance pedestrian movement, the local environment and townscape.
- S.5.95 While project construction activities would be visible for a temporary period, the NPS recognises that NSIPs are likely to take place in urban environments and have some adverse construction effects on townscape and visual receptors. Large scale construction works are a commonplace feature in central London and the city has a high capacity to accommodate change. The works at Chambers Wharf should be viewed in this context, and particularly in the context of the planned residential development of the site and surrounding area.
- S.5.96 The measures included in the *CoCP* would minimise any temporary harm to landscape and provide reasonable mitigation where possible and appropriate. Any residual effects would be temporary.

Land use including open space, green infrastructure and green belt

- S.5.97 The impact of the proposals on land uses and designations (as identified in the *Core Strategy*, retained policies and the *London Plan*) was a key consideration in the site selection process and on-going design development. The land use plan within Annex S illustrates the land uses of the site and the surroundings.
- S.5.98 The selection of this site included a review of the surrounding land uses and consideration planning permissions for new developments that might be impacted by the proposal.

- S.5.99 A key reason for the selection of this site, in accordance with the published site selection methodology, was the fact that Chambers Wharf is a previously-developed site. The re-use of previously developed land can make a major contribution to sustainable development, as recognised in para. 4.8.3 of the NPS. The alternative King's Stairs Gardens site is a highly-valued public open space designated as Metropolitan Open Land.
- S.5.100 There are no development plan proposals for the Chambers Wharf site.
- S.5.101 A small parcel of land to the north of Fountain Green Square within the LLAU is designated as Borough Open Land. This covers a section of hardstanding within the site along the riverfront that terminates at Chambers Wharf. Once the redevelopment proposals at Chambers Wharf are complete, the designation would facilitate the alignment of the Thames Path west along the riverfront at Chambers Wharf. The project would not adversely impact on this designation.
- S.5.102 The temporary construction site would be partially within the tidal Thames, which is designated as part of the strategic Thames Policy Area in the *London Plan*. The foreshore in this location is not designated as open space in the *Core Strategy* and has limited accessibility. The temporary loss of this foreshore area during construction would not represent a significant loss of open space or recreational facility, given the wider area of foreshore that would remain in the vicinity. Furthermore, the removal of the existing concrete piled jetty that extends out over part of the foreshore would open up and enhance the appearance, quality and usability of the foreshore.
- S.5.103 Planning permission has been granted for a mixed-use residential development at Chambers Wharf. The development comprises the construction of six residential buildings comprising 587 residential units and 275m² of flexible Class A/B1 floor space at ground floor level along Chambers Street, 203m² of Class D1 floor space along Llewellyn Street, service and access roads; works of hard and soft landscaping, as well as other works incidental to the application. Four blocks would be within the LLAU to the north of Chambers Street and two would be to the south of Chambers Street outside of the LLAU.
- S.5.104 The permission includes a new area of public realm adjacent to the tidal Thames and incorporates a new alignment for the Thames Path along the riverfront.
- S.5.105 The project works would not interfere with the construction of the two residential blocks of 180 units to the south of Chambers Street, which would comprise the majority of the affordable housing provision on this site. While work is yet to start, it is expected that this component of the development would be complete by 2016. The implementation of the planning permission for the residential development would not be affected by the use of this site for the project.
- S.5.106 The project was specifically designed and positioned to ensure compatibility with the approved residential development to the north of Chambers Street. This development will comprise market housing, which could not commence until the project works are complete.

- S.5.107 *Core Strategy* Strategic Policy 5 (Providing new homes) seeks provision of 24,450 new homes between 2011 and 2026. If approved, it is anticipated that the project would be complete by 2022/23. The 407 proposed units to the north of Chambers Street comprise less than two per cent of the borough total required over the period 2011 to 2026, and these units could still be constructed towards the end of the plan period. Therefore, there would be no impact on overall housing supply in the borough from the deferment of the latter phases of the residential development.
- S.5.108 As a result of the proposed design principles and parameters, the proposed works at this site would not prevent the continuation of surrounding land uses during construction or operation. Similarly, any extant planning permissions, committed developments, or policy allocations for future development would not be significantly impacted by the works.

Noise and vibration

- S.5.109 The current noise environment at the Chambers Wharf site is predominantly characterised by traffic from local roads and river transport. The nearest locations to the site that are sensitive to noise and vibration are residential dwellings to the east and west of the site and residential dwellings to the south on Chambers Street (it is assumed that these would be completed before project construction commences).
- S.5.110 Although Chambers Wharf would be a main drive site and require some periods of 24-hour working, lorry movements would only take place during the standard day shift of ten hours on weekdays (8am to 6pm) and five hours on Saturdays (8am to 1pm) to minimise noise effects at night. In exceptional circumstances, HGV and abnormal load movements could occur up to 10pm on weekdays for large concrete pours and later at night, in agreement with the London Borough of Southwark. The movement of barges is linked to high tides and would be undertaken when the tide is suitable.
- S.5.111 The *Environmental Statement* provides an assessment of expected noise effects during construction and operation. The noise levels predicted at Luna House and Axis Court were identified as potentially significant, due to their proximity. At Luna House adverse effects are predicted during the daytime for a period of four months and at night-time due to barge movements. At Axis Court adverse effects are predicted during the night-time for a period of 29 months. Some adverse noise impacts are also predicted from barge movements at Fountain Green Square.
- S.5.112 Feedback received from consultation outlined particular concerns in regards to noise effects at St Michael's Roman Catholic College and Riverside Primary School. These receptors were specifically selected for assessment in the *Environmental Statement* in relation to noise from construction and construction traffic.
- S.5.113 At Riverside Primary School a classroom faces onto the site; however, the higher site hoarding on the eastern edge of the site would screen all floors of the building. The impact to this receptor is not predicted to be significant.

- S.5.114 At St Michael's Roman Catholic College, the majority of the school would be screened from the site by the hoarding and site offices. The worst-case daytime noise level detailed in the *Environmental Statement* would occur during site set-up for approximately one month. Although the noise level would increase relative to the ambient noise level and this could be noticeable inside the building, the increase in average noise levels inside the building is not expected to exceed guideline noise levels for classroom use based on typical noise insulation for a façade of this type. Given the duration, the impacts are not predicted to be significant.
- S.5.115 The construction programme would result in varying levels of traffic generation over a six-year period. The *Environmental Statement* predicts that traffic generation including HGV traffic would result in a less than 3dB change during the peak construction period (during shaft construction), which would not be significant for any receptor.
- S.5.116 No noise or vibration issues would arise at Chambers Wharf during operation. Given the predicted noise and vibration effects during the construction phase and in accordance with the NPS guidance, a series of measures detailed in the *CoCP* are embedded in the project design.
- S.5.117 Site-specific measures in the *CoCP* Part B to reduce noise effects include:
- a. The main shaft would be enclosed during main tunnel construction and secondary lining works.
 - b. Noise generating elements of static construction plant including, but not limited to, pumps would be locally screened or located within an enclosure.
 - c. Material handling, storage or treatment areas would be screened by suitable enclosures.
 - d. 2.4m high site hoarding/noise barriers would be provided on the sections of the cofferdam perpendicular to the river wall.
 - e. A noise barrier on the cofferdam would be constructed with transparent plastic (Perspex/ Plexiglas) with a minimum of thickness of 6mm to meet noise attenuation requirements. The barrier up to 1m from the ground would be plywood and the section above would be transparent to minimise visual impact. Baseline noise monitoring would be undertaken for a minimum of 12 months.
 - f. The site hoarding would be 3.6m high except on the eastern boundary where it would be 5m high. The detailed construction site layout prepared by the contractor would consider using site infrastructure, such as office buildings or storage containers to provide noise screening/barriers, particularly on the southwestern corner of the site, where practicable.
 - g. The site gates would be solid panels and, as far as practicable, would remain closed during the daytime, evening and night-time.
 - h. The road excavation and reinstatement activities of the utilities diversion works would be restricted to outside of school hours.

- i. Movement of vehicles on-site outside standard hours would be restricted.
 - j. The barge loading area would be located to address noise impacts on riverside properties both to the east and west of the site.
- S.5.118 The *CoCP* is for approval and would be secured via a DCO Requirement.
- S.5.119 The vibration levels predicted during construction and operation are likely to be lower than those that would cause cosmetic damage to buildings. Therefore, any effects would not be significant. A significant vibration effect is predicted on receptors at Luna House and Fountain Green Square. The *CoCP* Part A seeks to ensure that piling methods that limit noise and vibration are selected where possible (*CoCP* Part A para 6.4.3d). If ground conditions at the Chambers Wharf site are such that these methods could be implemented, the effects would not be significant. However, as the specific ground conditions encountered would not be known until piling is underway; it cannot be guaranteed that these measures could be implemented. Therefore, in the worst case, significant effects would arise from piling at this location.
- S.5.120 The NPS recognises that NSIPs are likely to take place in mature urban environments and to lead to some short-term noise disturbance during construction.
- S.5.121 While some adverse effects are predicted, they would be confined to the temporary construction period and all practical methods of minimising noise and vibration effects would be implemented pursuant to the *CoCP* and in accordance with NPS guidance in paras. 4.9.8 to 4.9.9 and 4.9.12 to 4.9.13.
- S.5.122 The NPS advises that in situations where other forms of noise mitigation have been exhausted, noise insulation to dwellings or, in extreme cases, compulsory purchase of affected properties may be considered in order to gain consent for what might otherwise be an unacceptable development. In the case of the project, no extreme cases were identified at the date of submission of the application that would necessitate the compulsory acquisition of properties due to significant adverse effects. The Thames Tideway Tunnel noise insulation and temporary re-housing policy and the Thames Tideway Tunnel project compensation programme (included in Schedule 2 to the *Statement of Reasons*, which accompanies the application) were developed to offset the effects arising from construction-related disturbance.
- S.5.123 The noise insulation and temporary re-housing policy would be implemented where predicted or measured construction noise levels exceed published trigger levels. The compensation programme was established to address claims of exceptional hardship or disturbance. In relation to construction, eligible works would be directed towards mitigation or other required actions to reasonably reduce disturbance from noise or construction activities. Residential properties at Luna House may be eligible for noise insulation as described under the policy which, if taken up, would reduce the predicted noise effects to a non-significant level. Properties at Axis Court may be eligible for compensation in respect of

noise. If the identified mitigation measures for vibration cannot be implemented, properties at Luna House and Fountain Green Square may be eligible for compensation under the policy.

Historic environment

- S.5.124 No above-ground heritage assets were identified within the site.
- S.5.125 The nearest listed structures and buildings are the Grade II listed 48 Farncombe Street, the Grade II listed Riverside School, the Grade II listed East Lane Stairs, and the Grade II listed 29 and 33 Bermondsey Wall West beyond Luna House and Access Court.
- S.5.126 Although not listed, a wooden ‘dolphin’ structure is located within the river to the east of the site, which is associated with the wharf use of the site. In accordance with requests from the London Borough of Southwark, it is confirmed that this structure would not be affected as a result of the proposed works.
- S.5.127 The site does not lie within a conservation area. The St Saviours Dock Conservation Area is located to the west of the site beyond East Lane. The site lies within the Bermondsey and River Archaeological Priority Zone of the borough.
- S.5.128 There is potential for buried heritage on the site, which could include palaeoenvironmental remains, prehistoric artefacts and remains of post-medieval buildings and riverfront industry.
- S.5.129 Construction of the main shaft would entail deep excavations, while the associated culverts, chambers and cofferdam would require less intensive excavation works. These works would remove any archaeological assets within the footprint of the excavation. This would give rise to some adverse effects on any heritage assets that are present.
- S.5.130 Works associated with site preparation and construction of the foundations for the electrical and control kiosk would require minimal excavation. Any localised impact on any surviving buried remains of 18th and 19th century industrial buildings would not be significant.
- S.5.131 The predicted below-ground heritage assets do not merit permanent preservation *in situ*. Any effects could be acceptably mitigated by a programme or archaeological investigation before and/or during construction. This would be secured via a Requirement for a *Site-specific Archaeological Written Scheme of Investigation* to be submitted and approved by the local authority. Further to this mitigation, the site already has approval for residential development that would involve significant excavation works. The approval includes conditions that also seek to mitigate archaeological considerations associated with development at the site.
- S.5.132 In terms of potential effects on above-ground heritage assets from construction, there would be no direct effects and indirect effects would be temporary and not significant.

- S.5.133 The permanent above-ground structures are of a modest scale and would be finished to a high quality. Therefore, there would be no direct impacts on or loss of significance of nearby designated heritage assets.

Light

- S.5.134 The *Daylight/Sunlight Assessment*, which accompanies the application, identified that there would potentially be some impacts during the temporary construction phases. The acoustic shed over the main tunnel shaft and gantry crane could potentially impact on the residential properties to east of the site (8 to 14 Fountain Green Square) as well as the property to the southwest across Bermondsey Wall East. The proposed three-storey office and welfare block in the southwestern corner of the site would likely impact on 1 to 59 Axis Court, and possibly on 10 to 28 Chambers Street.
- S.5.135 The impact that construction phase 3 would have on 8 to 14 Fountain Green Square and 212 Bermondsey Wall East to the east of the site, 10 to 28 Chambers Street to the southwest, and 1 to 59 Axis Court and Luna House to the west was assessed. Of these properties, only windows at 1 to 59 Axis Court and Luna House that face within 90 degrees of south would potentially be impacted. These were the only properties that required consideration with regard to sunlight.
- S.5.136 The only windows that would not achieve the guideline figures are located on the ground and first floor of 1 to 59 Axis Court, and the first floor of Luna House. The ground floor of Luna house was not assessed as it is not in residential use. The loss of daylight to the ground floor windows at 1 to 59 Axis Court would result in some adverse impacts. There is a balance between minimising noise impacts and impacts on sunlight and daylight and it may not be possible to fully satisfy both requirements. Any residual impacts would be an unavoidable consequence of the scale of construction proposed in this relatively dense part of London. The *CoCP* Part B requires the contractor to consider the massing of structures in front of these windows to mitigate the impact as far as possible.
- S.5.137 The perimeter of the site is currently lit in the evenings by street lighting and light spill from surrounding buildings.
- S.5.138 Limited effects from construction lighting on night-time character are discussed in the *Environmental Statement* (Vol 20, Section 11). Lighting at the site would be highly visible (including lighting of 24-hour barge loading) from a number of nearby residential properties.
- S.5.139 Chambers Wharf is a main tunnel construction site and for practicality and safety reasons, construction must take place over extended periods of time, including working on a 24-hour, seven days a week basis. Contractors would need to obtain prior consent for the appropriate construction works from the local authority under the Control of Pollution Act 1974 Section 61 process. The need for extended working hours does mean that artificial lighting would be required at this site during the tunnel construction and secondary lining phases (lasting approximately 33 months).

- S.5.140 Measures are included within the *CoCP* to ensure that all reasonable steps would be taken to minimise detrimental impact on amenity from artificial light. For example, site lighting during construction would be capped and directional to ensure minimal light spill and lighting would only be used when necessary. Therefore there would be no unreasonable effect on residential properties during the construction period.
- S.5.141 Artificial lighting is not proposed or required during the operational phase at this site and as therefore, there would be no residual effects.
- S.5.142 All reasonable steps have been taken to minimise any detrimental impacts on amenity from artificial light in accordance with the NPS (4.12.7).

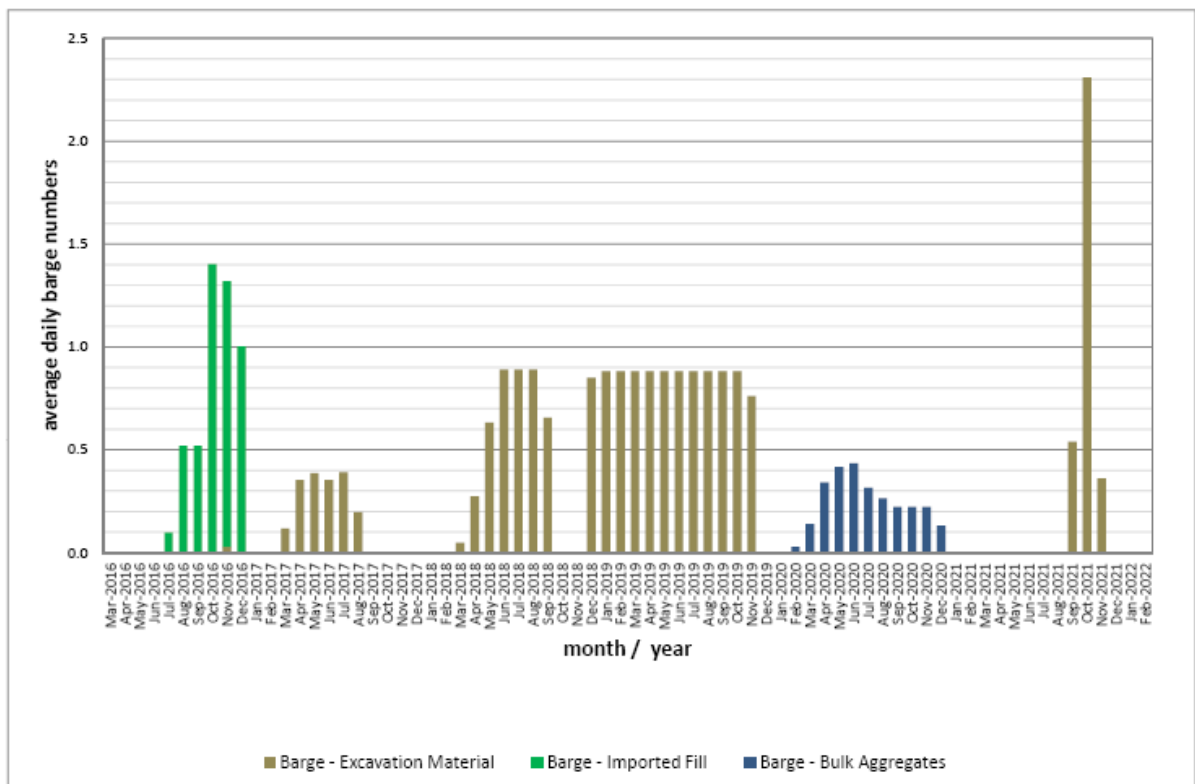
Traffic and transport

- S.5.143 The *Environmental Statement* and *Transport Assessment* consider the likely transport effects of the proposals for the construction and operational phases at this site. The project-wide approach to managing transport is set out in the *Transport Strategy* and travel plan.
- S.5.144 The site is located in an area that has good access to public transport. Bermondsey Underground station, served by the Jubilee Line, is approximately 500m walking distance to the southeast and four daytime and two night bus routes operate within walking distance of the site serving local destinations.
- S.5.145 The main cycle route within the area is National Cycle Network Route 4, which runs along Chambers Street through central London between Chelsea, Lambeth and Southwark. There are bus lanes along Jamaica Road (A200) that can also be used by cyclists. There are proposals to introduce a Cycle Superhighway route CS4 in 2015. This would be a dedicated cycle route between Woolwich and London Bridge, which would pass along Jamaica Road.
- S.5.146 At this site, no parking would be provided within the site boundary for construction workers. As parking on surrounding streets is also restricted and measures to reduce car use would be incorporated into site-specific travel plan requirements, it is highly unlikely that any workers would travel by car.
- S.5.147 Vehicular access during construction would be via an existing access point located centrally on the site frontage off Chambers Street. Vehicles would travel to and from the site via Bevington Street from Jamaica Road. Roads would be constructed internally within the site to allow vehicles to manoeuvre on-site and exit in a forward direction, maximising visibility for vehicles exiting the site and promoting safety in accordance with best practice. The *CoCP* Part B also requires the security barrier to be positioned to allow a standard rigid tipper vehicle to be wholly off the road while awaiting barrier operation and parking from the site entrance to the Bevington Street Junction to be suspended for traffic safety.
- S.5.148 In response to concerns regarding the impact of children travelling to and from Riverside Primary School across Bevington Street, provision was made to construct a traffic island within the LLAU at a suitable point south

of Chambers Street to create a safer crossing point. This measure is included in the *CoCP* Part B.

- S.5.149 During construction, vehicle movements would take place on weekdays between 8am to 6pm and on Saturdays from 8am to 1pm. Up to one hour before and after these hours would be used for mobilisation and demobilisation. Mobilisation may include loading, unloading, arrival and departure of staff, and movement to and from the site. In exceptional circumstances, in agreement with the local authority, HGV and abnormal load movements could occur up to 10pm or later for large concrete pours.
- S.5.150 At this site, a minimum of 90 per cent of cofferdam fill (imported and exported), 90 per cent of shaft, main tunnel and other excavated material (exported), and 90 per cent of main tunnel secondary lining aggregates (imported) would be transported by barge to minimise the use of road-based transport. The peak number of barge movements would occur in Year 6 of construction when the cofferdam fill would be removed with a daily average of three barges. At other times, the number of barges would be lower (refer to Figure S.7). Each barge would remove approximately 85 HGVs from the road therefore during this peak equating to approximately 255 HGVs (510 two-way lorry trips).
- S.5.151 Transporting tunnel excavated materials by barge would make a significant contribution to minimising the use of road-based transport.

Figure S.7 Estimated profile of barges during construction

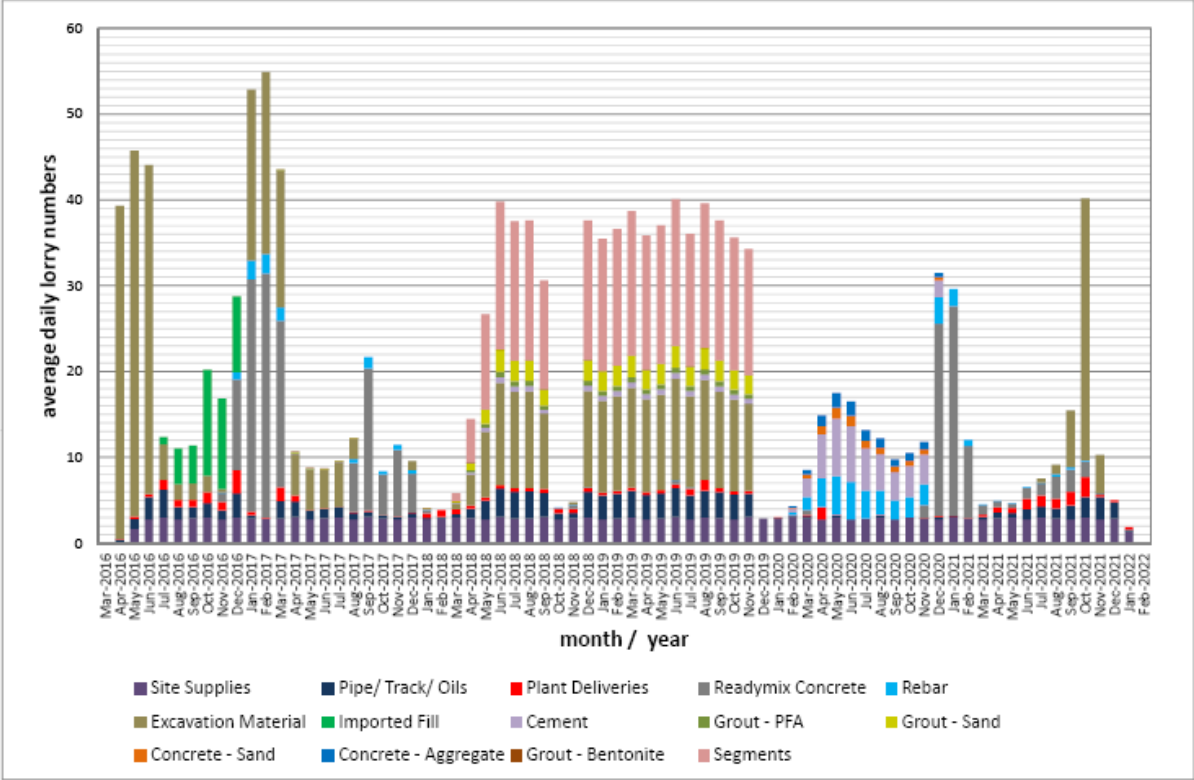


- S.5.152 It is anticipated that an average of approximately 20 HGVs would access the site per day for the majority of the construction period. This would peak at approximately 55 HGVs per day over an estimated three-month period

during the construction of the main tunnel shaft during Year 1 of construction.

S.5.153 At other times, HGV numbers would be lower (refer to Figure S.8).

Figure S.8 Estimated profile of lorries during construction



S.5.154 The construction assessment indicates that during the AM peak hour, the local highway operates above capacity without the project proposals in place and this would continue with the project in place. In the PM peak hour, the junction of Bevington Street and Jamaica Road would continue to operate within capacity. Given the traffic flows projected, some minor delays to journey times might be experienced. However, these impacts would not be significant.

S.5.155 During construction, the footpath on the northern side of Chambers Street would be suspended and pedestrians would be diverted to the southern footpath for safety reasons. The proposed works would not significantly impact pedestrian routes, cycle routes and facilities, river navigation, public transport routes and patronage, parking or the highway network. No significant effects are identified regarding pedestrian and cyclist amenity and safety.

S.5.156 Measures to further reduce transport impacts are detailed in the *CoCP*. These include HGV management and control measures such as designated routes to sites for construction vehicles. There is also provision for management plans for construction worker journeys to and from the site.

S.5.157 The project was designed to limit the issues on the transport networks as far as possible, and many measures are embedded directly in the design

of the project. The *Transport Assessment* indicates that with the embedded measures in place, the expected changes to the transport networks are not significant. Therefore no additional measures are required for the construction phase.

- S.5.158 Once the project is operational, occasional vehicle trips would be required to and from the site for maintenance activities. These would have no significant effect on the surrounding transport networks and mitigation is not required.
- S.5.159 As demonstrated above, the extensive transport work undertaken at this site would ensure that any traffic and transport impacts are limited to an acceptable level due to appropriate mitigation. In accordance with the NPS (4.13.10), the site can benefit from barging during construction to substantially reduce dependence on HGV traffic.

Waste management

- S.5.160 The Excavated Materials Strategy and Waste Strategy were developed to provide a framework for the management of materials and waste that would be produced throughout the construction and operation of the project.
- S.5.161 This ensures that the requirements set out in the NPS (4.14.6) are satisfied.
- S.5.162 The Waste Strategy demonstrates Thames Water's commitment to a zero waste solution for the project. It is proposed that the project would make the most efficient use of resources by minimising demand for new resources and maximising the re-use, recycling and recovery of resources.
- S.5.163 The Waste Strategy sets out further details on the project-wide and site-specific waste management plans.

Socio-economic

- S.5.164 The area surrounding the site is predominantly residential, apart from some mixed uses to the west. Three schools are located within 250m of the site. There are also a number of recreational land uses, including the Thames Path and some areas of green space. The closest green space to the site is an area of residential amenity space in front of Wrayburn House to the southeast. Presently the Chambers Wharf site is not accessible to the public and is a predominantly cleared brownfield site that makes no contribution to the character of the area.
- S.5.165 The *Environmental Statement* states that the effects of construction on nearby amenity space or recreational facilities would not be significant.
- S.5.166 A number of measures were identified to manage any effects on schools and other receptors including the provision of higher hoardings, noise enclosures and a traffic island on Bevington Street. However, some temporary construction effects are predicted on the amenity of immediately adjoining residents from noise and vibration. Mitigation is included within the project proposals in accordance with the *CoCP* and measures include enhanced noise barriers/structures, selecting the most noise/vibration efficient plant/construction techniques and restricting noise

intensive operations to standard hours. These measures are set out in the CoCP Part B.

- S.5.167 No socio-economic effects are expected during the operational phase that would require mitigation. Once construction is complete, it is anticipated that the works to remove the existing jetty and the proposed river wall would improve the existing condition of the space.
- S.5.168 In accordance with the NPS, the *Equalities Impact Assessment* describes the demographics of the area surrounding each of the proposed development sites and assesses whether a disproportionate number of equalities groups would be affected by the generic impacts associated with the project, including air emissions, flood risk, noise and vibration. The assessment also describes the impact on people who live, work or own businesses in the area who may be displaced as a result of the development.
- S.5.169 The *Equalities Impact Assessment* concluded that all potential impacts at this site would be proportionate.
- S.5.170 While the proposed works would result in some short-term inconvenience for some local residents from noise and vibration, these would be of limited duration and mitigated as far as practical. In the longer term, benefits would arise from removal of the jetty, new river wall, improved site hording and security, and site preparation works that would help prepare the Chambers Wharf site for future redevelopment.

S.6 Overall conclusions

- S.6.1 The need and the principle for the project are established at the national level in the NPS. A specific need for using Chambers Wharf is identified as the site would facilitate construction of the main tunnel by receiving the TBM from Kirtling Street and launching a new TBM to tunnel to Abbey Mills Pumping Station. The site is also required to receive the Greenwich connection tunnel that would intercept CSOs in Greenwich and Lewisham. The shaft at Chambers Wharf would provide the means to transfer flows from the Greenwich connection tunnel to the main tunnel. Overall, the site would make a significant contribution to delivery of this essential NSIP.
- S.6.2 The comprehensive site selection and consultation processes clearly demonstrated that the site at Chambers Wharf meets the need for delivering the project and that key issues arising from the use of the site were appropriately considered. They logically set out the reasons why Chambers Wharf is the best site to undertake the required works.
- S.6.3 Given the site's location on the riverfront of the tidal Thames within an urban area, some disturbance during the construction period would be inevitable. While Thames Water sought to minimise any disturbance that would be experienced through sensitive design and mitigation, some negative effects are likely to remain. These comprise:
- a. temporary loss of part of the designated intertidal habitat and intertidal feeding and resting habitat for fish
 - b. temporary townscape and visual effects during construction

- c. noise effects on some residential properties at Axis Court and Luna House
 - d. light to some windows located on the ground and first floor of 1 to 59 Axis Court and the first floor of Luna House
 - e. vibration affecting some properties in Axis Court and Fountain Green Square.
- S.6.4 For each of these effects, the project design was refined and all practicable mitigation applied. The remaining adverse impacts would be an unavoidable consequence of the necessary works at this site to facilitate construction of the project.
- S.6.5 Once the project is operational, the proposals at Chambers Wharf would not give rise to any adverse effects. The Townscape and visual and Historic environment subsections stated that there would be benefits as a result of removing the existing concrete wharf structure and constructing a new river wall.
- S.6.6 The design of the permanent infrastructure was carefully considered to ensure the appearance, scale and layout of the structures would appropriately integrate with the approved residential planning permission. The design allows sufficient space to route the Thames Path along the riverfront. Once this has been implemented by the residential developer, it would create an attractive and inclusive public realm.
- S.6.7 The proposed works at the Chambers Wharf site and the mitigation measures developed and advanced as part of the application 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 leave a positive legacy.
- S.6.8 Section 8 of the *Planning Statement* considers the implications of the local effects of the works at Chambers Wharf and the other sites and describes 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 Chambers Wharf and the project as a whole are compliant with the NPS and that development consent should be granted.

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Annex S: Drawings for Chambers Wharf

List of drawings

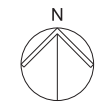
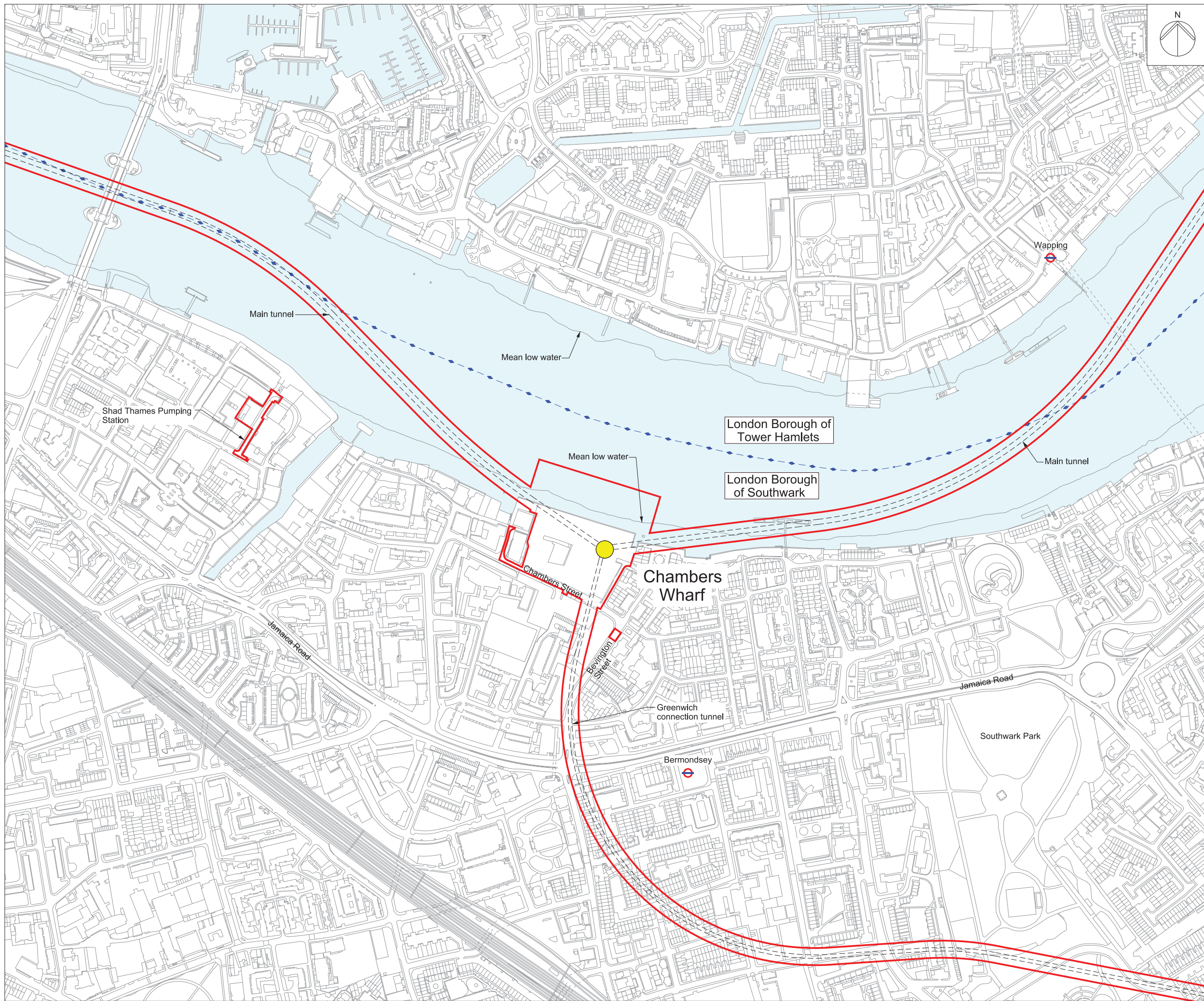
Chambers Wharf: Location plan

Chambers Wharf: As existing site features plan

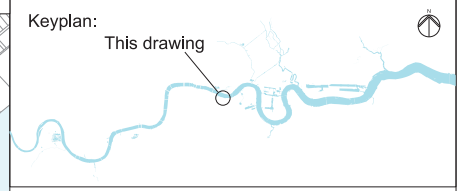
Chambers Wharf: Construction phasing plans

Chambers Wharf: Land use plan

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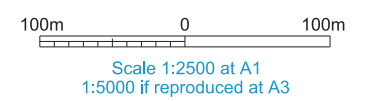


Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

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

Notes:

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



FOR INFORMATION

Location
Chambers Wharf
 London Borough of Southwark

Document Information
Application for Development Consent
 Location plan

Book of plans - section 21
 DCO-PP-19X-CHAWF-210001
 January 2013





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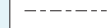

Keyplan:

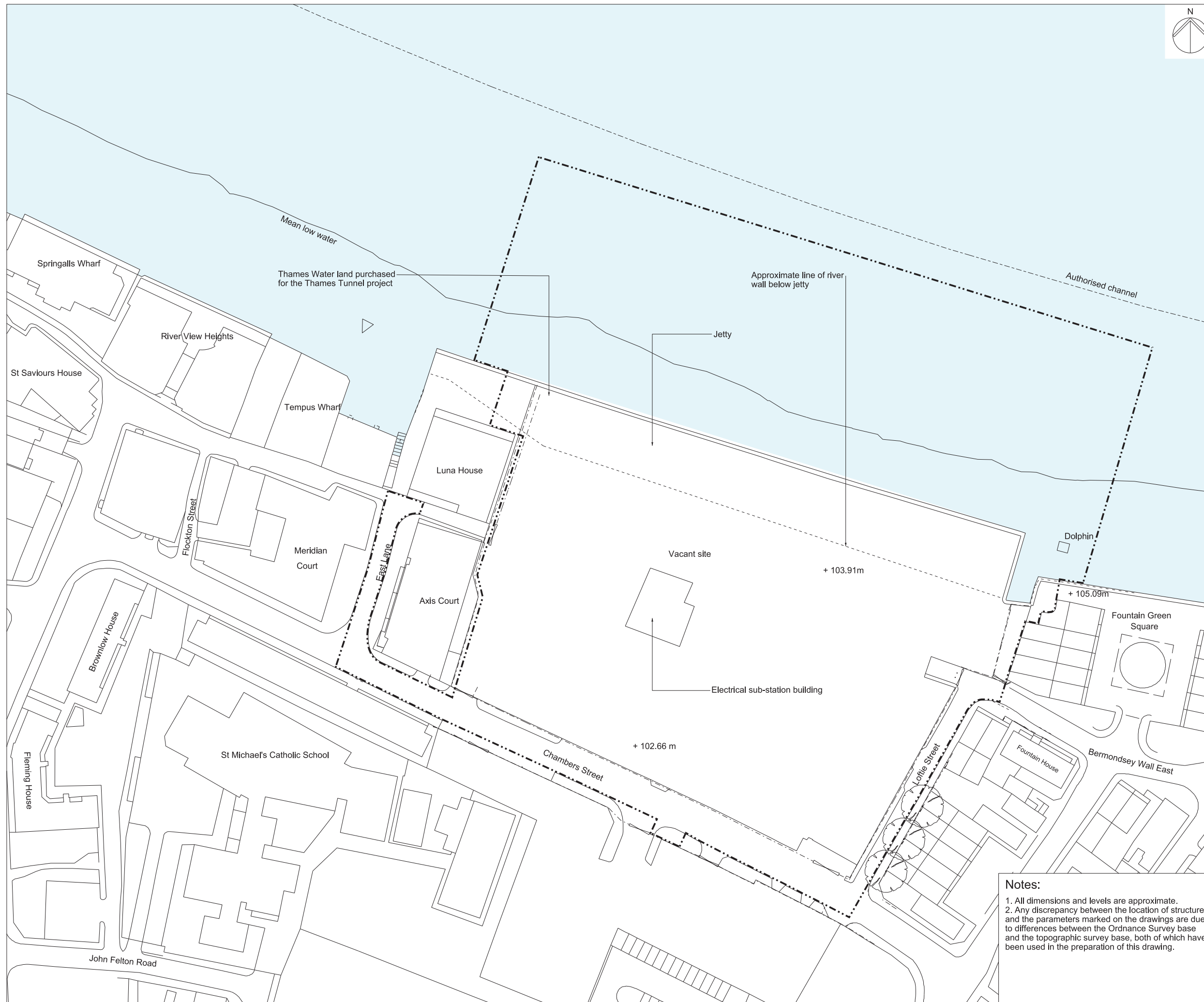
This drawing



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:

-  Limits of land to be acquired or used (LLAU)
-  Authorised channel
- + 105.40m Existing levels (shown in metres above tunnel datum)
-  Existing trees within surveyed area (trunk sizes vary)



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

FOR INFORMATION

Location
Chambers Wharf
London Borough of Southwark

Document Information
Application for Development Consent

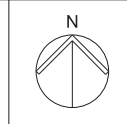
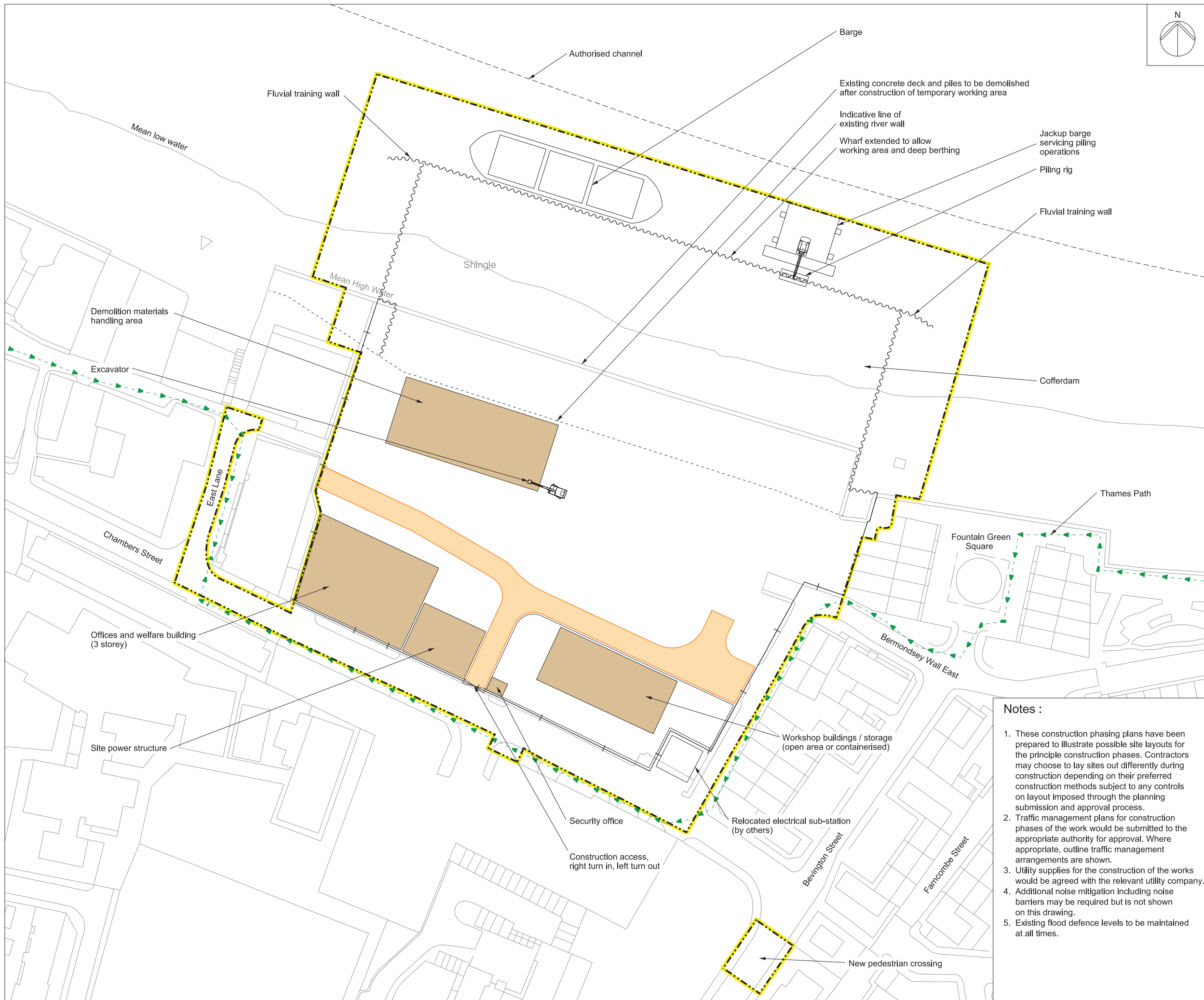
As existing
Site features plan
Book of plans - section 21
DCO-PP-19X-CHAWF-210002
January 2013

Notes:

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

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames





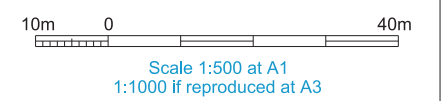
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Key:

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



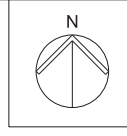
- Notes :
1. These construction phasing plans have been prepared to illustrate possible site layouts for the principle construction phases. Contractors may choose to lay sites out differently during construction depending on their preferred construction methods subject to any controls on layout imposed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

ILLUSTRATIVE

Location
Chambers Wharf
London Borough of Southwark

Document Information
Application for Development Consent
Construction phases - phase 1
Site setup
Book of plans - section 21
DCO-PP-19X-CHAWF-210014
January 2013





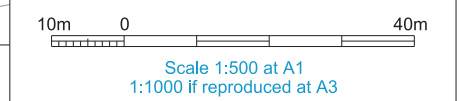
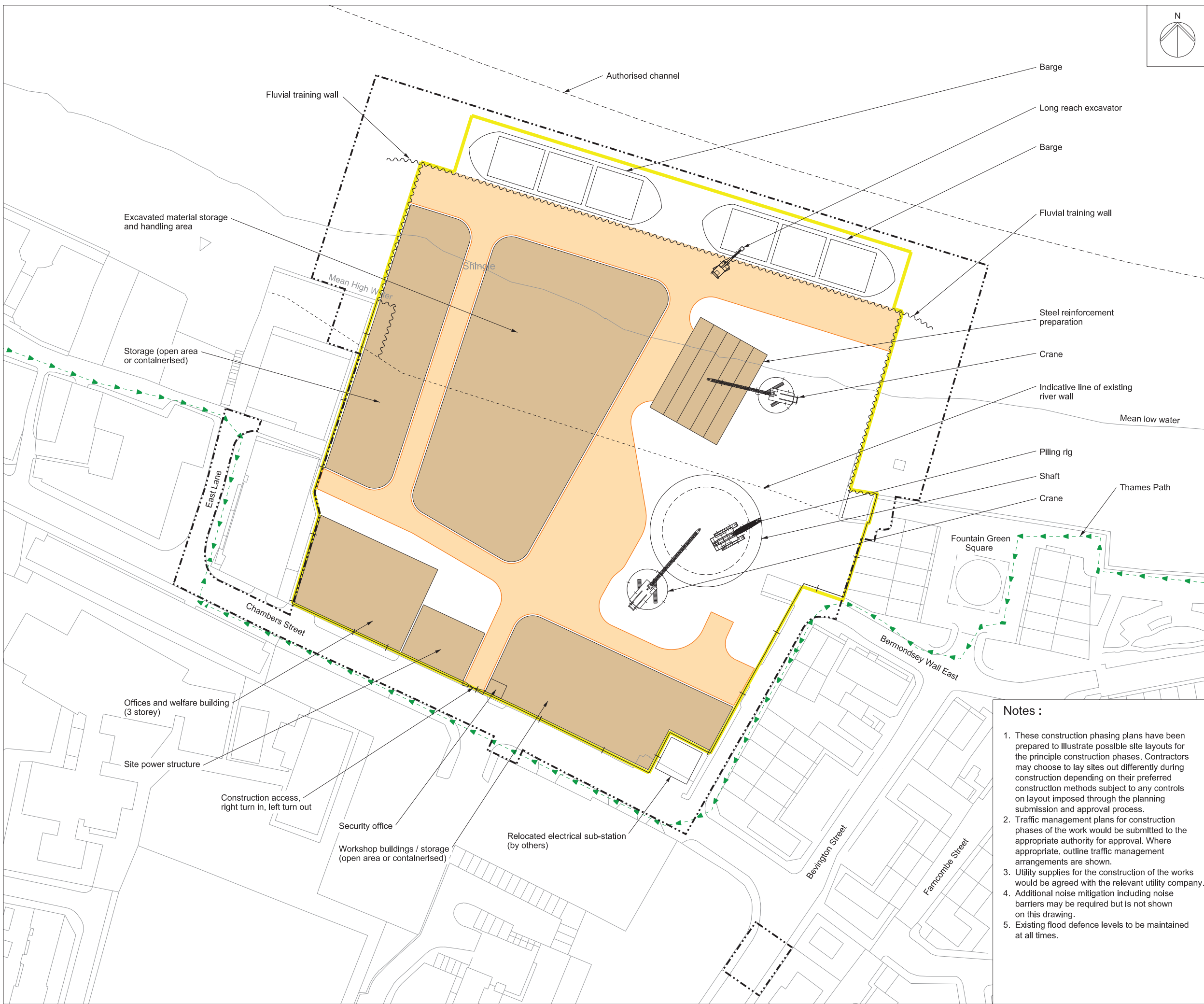
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Key:

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



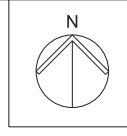
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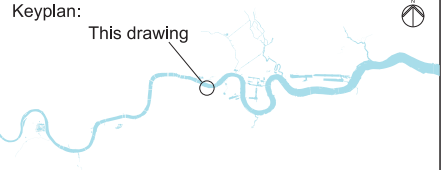
Location
Chambers Wharf
London Borough of Southwark

Document Information
Application for Development Consent
Construction phases - phase 2
Shaft construction
Book of plans - section 21
DCO-PP-19X-CHAWF-210015
January 2013





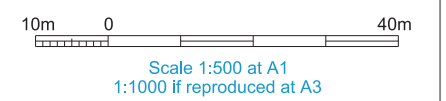
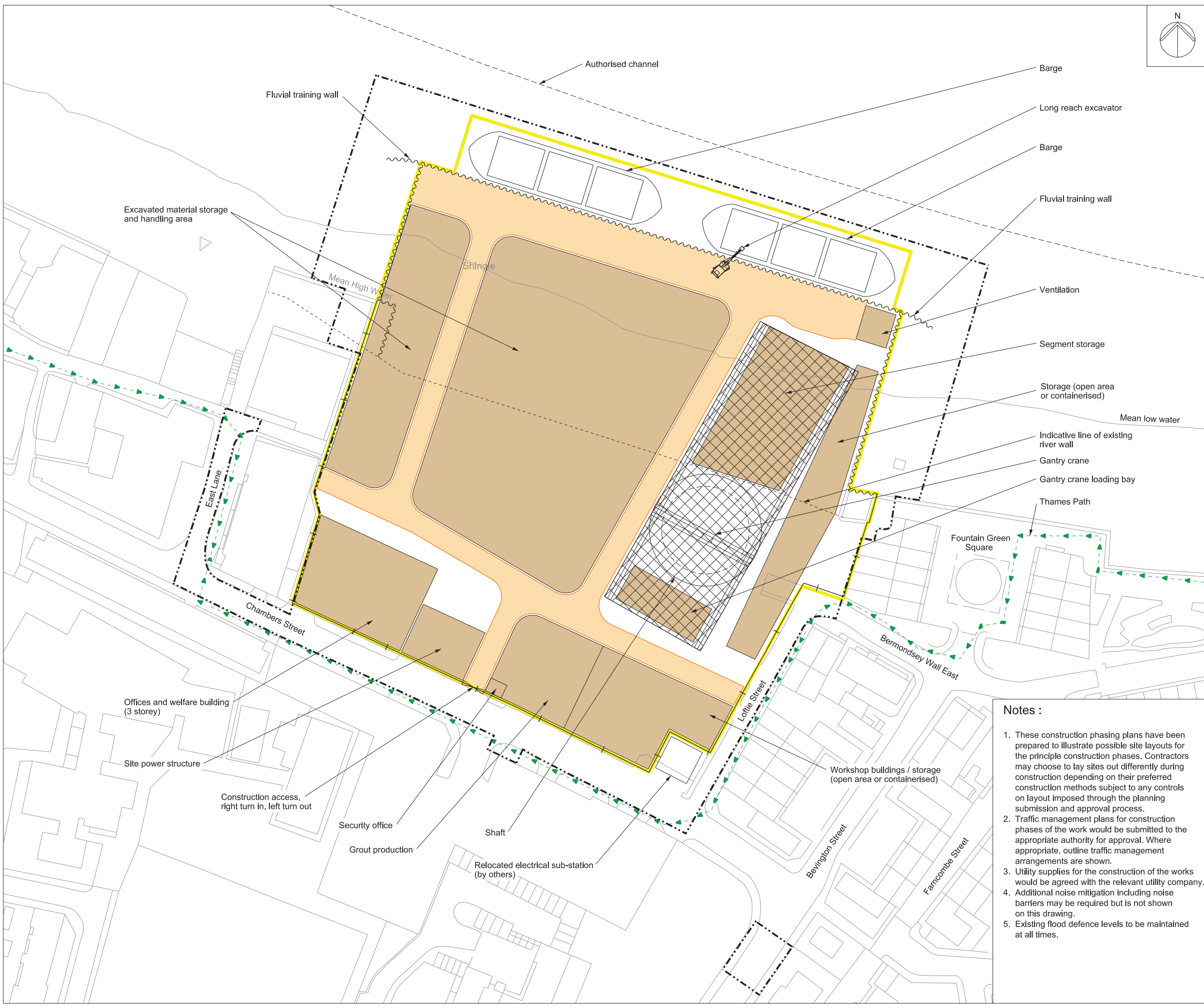
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Key:

	Limits of land to be acquired or used (LLAU)
	Hoarding
	Maximum extent of working area
	Existing public right of way
	Site access
	Access / haul route
	Sheet piles
	Noise enclosure over shaft and gantry crane



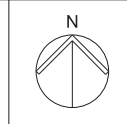
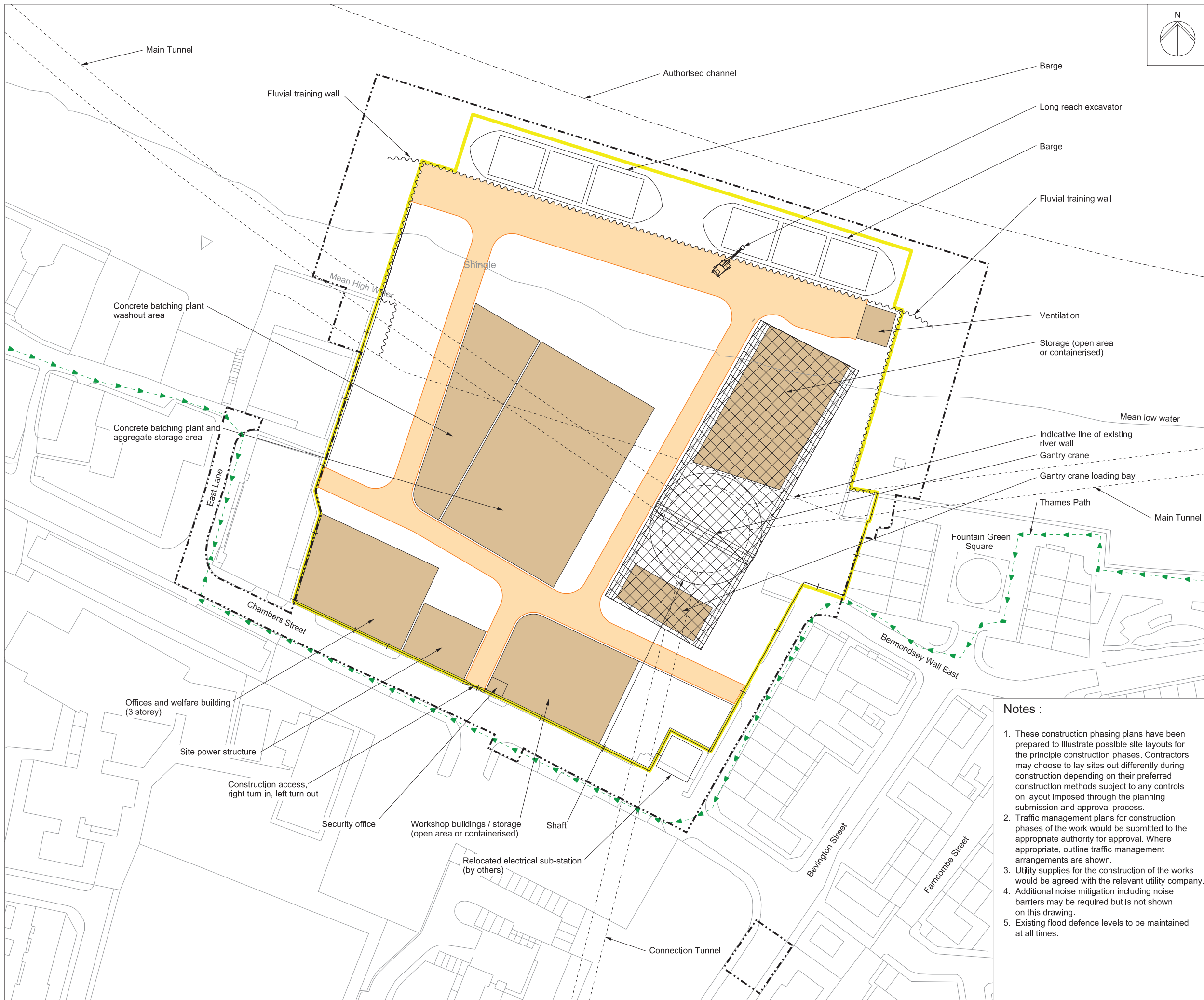
- Notes:**
1. These construction phasing plans have been prepared to illustrate possible site layouts for the principle construction phases. Contractors may choose to lay sites out differently during construction depending on their preferred construction methods subject to any controls on layout imposed through the planning submission and approval process.
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 5. Existing flood defence levels to be maintained at all times.

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Location
Chambers Wharf
 London Borough of Southwark

Document Information
Application for Development Consent
 Construction phases - phase 3
 Tunnelling
 Book of plans - section 21
 DCO-PP-19X-CHAWF-210016
 January 2013





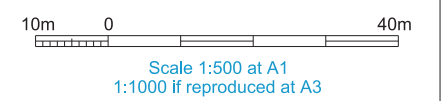
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Key:

	Limits of land to be acquired or used (LLAU)
	Hoarding
	Maximum extent of working area
	Existing public right of way
	Site access
	Access / haul route
	Sheet piles
	Noise enclosure over shaft and gantry crane



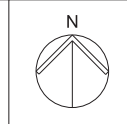
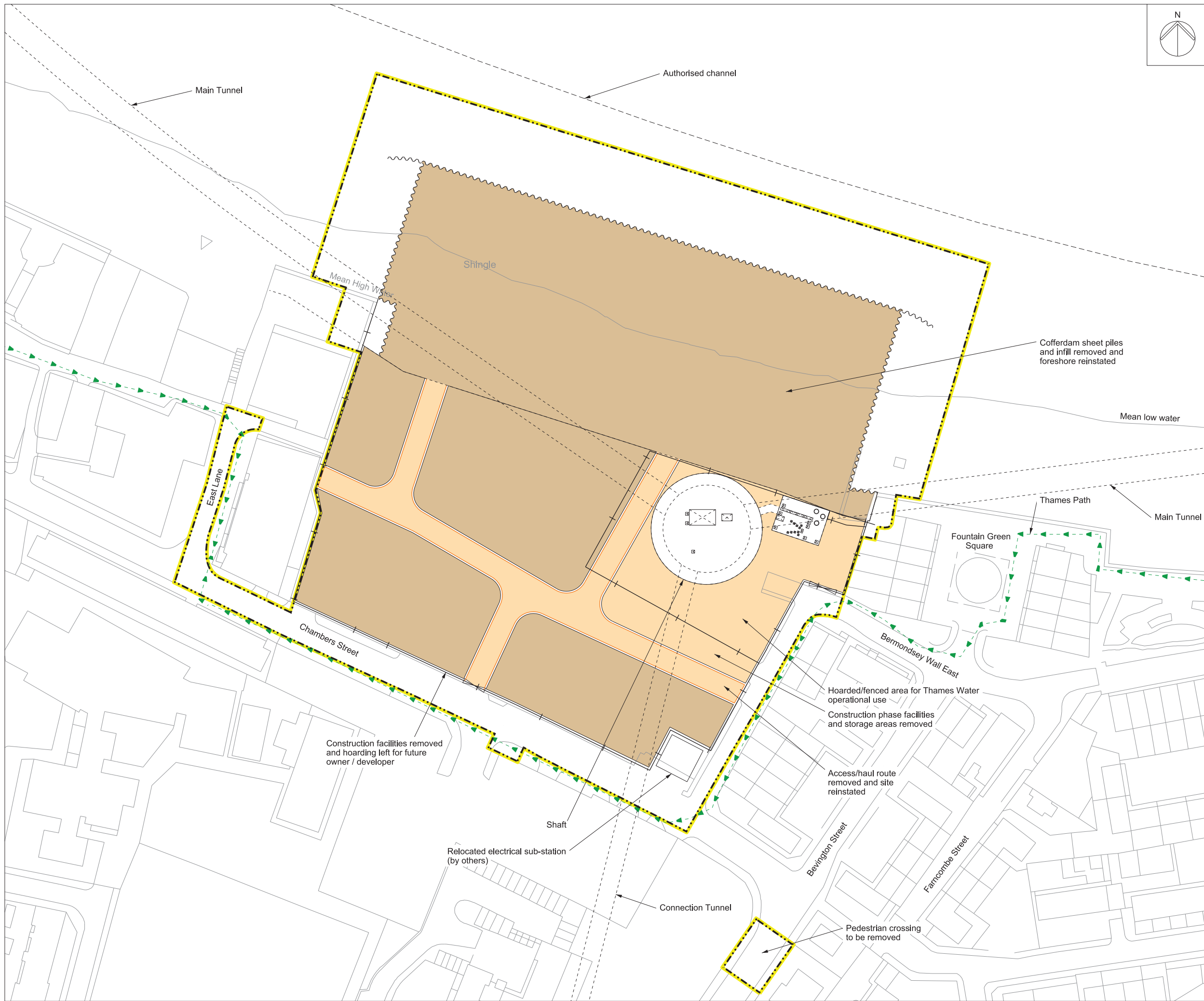
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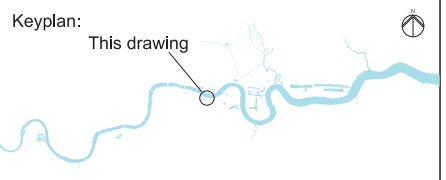
Location
Chambers Wharf
London Borough of Southwark

Document Information
Application for Development Consent
Construction phases - phase 4
Secondary lining
Book of plans - section 21
DCO-PP-19X-CHAWF-210017
January 2013



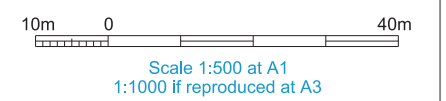


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- Key:**
- Limits of land to be acquired or used (LLAU)
 - Hoarding
 - Maximum extent of working area
 - Existing public right of way
 - Site access
 - Access / haul route
 - Sheet piles

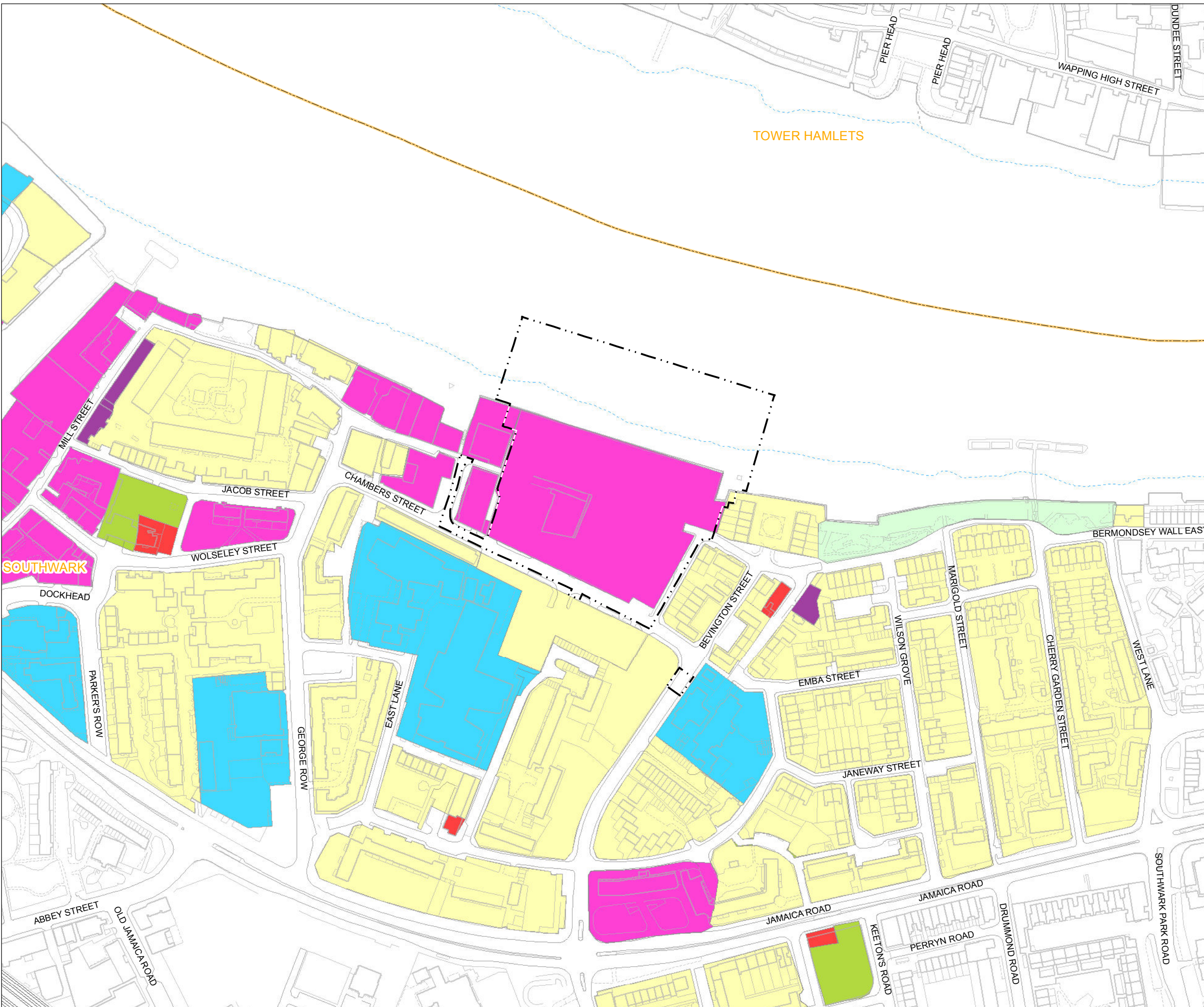


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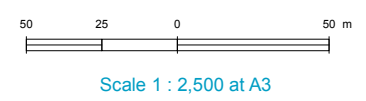
Location
Chambers Wharf
 London Borough of Southwark

Document Information
Application for Development Consent
 Construction phases - phase 5
 Site demobilisation
 Book of plans - section 21
 DCO-PP-19X-CHAWF-210018
 January 2013





- Key**
- Limits of Land to be Acquired or Used
 - Local Authority Boundary
- Land Use**
- Class A1-A5 (Shops, Financial & Professional Services, Restaurants, Drinking Establishments and Hot Food Takeaways)
 - Class B1 (Business (Offices except A2) Research and Development, Light Industry)
 - Class C3-C4 (Dwelling Houses)
 - Class D1-D2 (Non Residential Institutions (Community Facilities) and Assembly and Leisure)
 - Mixed Use
 - Other
 - Open Space



FOR INFORMATION

Location
Chambers Wharf
 London Borough of Southwark

Document Information
Planning Statement
 Land use

1PL03-MG-00810
 January 2013



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