

## Three ♦ The overall development

### DESIGN AND ACCESS PRINCIPLES

3.1 The preceding chapter explained how Southern Water pursued a multi-staged site selection process that took into account a range of relevant factors including:

- i). *operational suitability*
- ii). *effective use of physical resources*
- iii). *land use planning*
- iv). *environmental factors*
- v). *design and mitigation*
- vi). *cost, deliverability and risk*

3.2 Design and mitigation factors that were taken into account during site selection included the need and scope for measures including site boundary adjustment, odour control, noise attenuation, architecture and landscape design, in order to respond to anticipated planning and environmental concerns.

3.3 Having identified a preferred wastewater treatment works site and the associated means of access and flow transfer, Southern Water applied the following general design and access principles, building upon the site selection considerations listed above.

- a). From an operational perspective, it is essential that the proposals can meet Southern Water's obligations as the statutory sewerage undertaker in a reliable and cost-effective way, whilst being able to accommodate potential future modifications to wastewater transfer, treatment and discharge.
- b). The effective use of physical resources was enshrined in a wider concern to achieve a sustainable form of development. The project design should thus make effective use of established infrastructure, including the existing sewerage network and operational sites, and promote the recycling of waste and the recovery of energy.
- c). Where possible, the project design and arrangements for access should work in harmony with established land use planning provisions for sites and their surroundings.
- d). Similarly, the project design and arrangements for access should demonstrate sensitivity to the local environment and amenity, avoid harm to environmental features of known sensitivity and, where possible, deliver environmental enhancements.
- e). To these ends, the project should make proactive use of available design and environmental management methods to deliver an acceptable planning solution, in consultation with representative stakeholder interests.

## DESIGN EVOLUTION

### A linear project

3.4 From a design and access perspective, it is significant that the wastewater treatment project is a linear form of development approximately twelve kilometres in length. The project thus passes through – if largely beneath – a range of environmental settings. At each point along the route of the project, the general design and access principles identified above were applied in a different order of priority to reflect local conditions.

3.5 In particular, it was recognised that the three main above-ground elements of the project, namely the pumping stations at Roedean and Portobello and the wastewater treatment works and sludge recycling centre on the northern edge of Peacehaven, would each occupy a distinctive environmental setting with its own planning policy context, requiring an individual design response. The route of the flow transfer tunnel and the siting of access shafts must reflect local physical and land use constraints and, in many cases, the need to intercept existing sewerage infrastructure and connect it with the new tunnel.

3.6 The overall design process was thus managed in such a way as to allow local considerations to influence individual parts of the project, whilst ensuring that the overall integrity of the project was preserved.

### Consultations

3.7 Southern Water's design and access approach has been to respond flexibly to variable local circumstances whilst keeping in view the project's overall objectives. Similarly, the company recognised that linear projects of this nature pass through a series of distinctive local communities, that there would thus be considerable public interest in the project, and that useful design and access pointers could be identified through an effective programme of stakeholder engagement.

3.8 The consultation process associated with this project began at an early stage in the site selection process. The main stages in the consultation process are shown in table 3.1 overleaf. Various consultation methods were employed, including touring public exhibitions, presentations to councils and community groups, site visits to existing wastewater treatment works, written correspondence and one-to-one meetings. The previous planning application for the project was made available for inspection on Southern Water's website.

**Table 3.1: The principal stages in Southern Water's consultation strategy**

| Project stage / date          | Consultee  | Means of consultation  | Subject of consultation  |
|-------------------------------|--|--|--|
| November 2001 to January 2003 | Local authorities:<br>Brighton and Hove CC<br>East Sussex CC<br>Lewes DC<br>West Sussex DC<br>Adur DC    | Consultative group meetings with SWS   | Site options assessment methodology<br>Location identification<br>Short listing<br>Selection of preferred option |
| August 2002                   | DEFRA<br>Environment Agency<br>English Heritage<br>Countryside Agency<br>Sussex Downs Conservation Board | Meeting  | To advise on SWS site evaluation process and request relevant information  |
| Sept 2002                     | Shoreham Port  | Meeting  | SWS identified Shoreham Port as a shortlisted location and explore the potential for SWS to acquire land         |
| Sept 2002                     | Statutory consultees   | Interim EIA scoping  | Environmental assessment   |
| December 2002                 | Brighton and Hove CC<br>East Sussex CC<br>Lewes DC<br>West Sussex DC<br>Adur DC                          | Presentation to Councillors  | To advise of SWS site search and evaluation and selection of short listed locations                              |
| January 2003                  | Public exhibitions at four locations   | Boards providing written and illustrated material with SWS project team to discuss | Short listed site options  |
| January 2003                  | Public   | Web site   | As above   |
| Jan-March 2003                | Landowners of shortlisted sites  | meetings   |  |
| February 2004                 | Statutory consultees   | EIA scoping report   | Environmental assessment   |
| June 2004                     | Public exhibition<br>Meridian Centre Peacehaven  | Boards providing written and illustrated material with SWS project team to discuss | Peacehaven WTW   |
| May 2005                      | Public exhibition<br>Meridian Centre Peacehaven  | Boards providing written and illustrated material with SWS project team to discuss | Peacehaven WTW   |
| August 2007-Jan 2008          | East Sussex CC<br>Lewes DC<br>South Downs Joint Committee  | Meetings   | The 2007 appeal decision<br>Site selection review<br>Project design amendments                                   |

3.9 Table 3.2 provides a list of the principal organisations consulted. The feedback from the consultation exercise helped to inform siting decisions, access arrangements, the design of individual project elements, the environmental impact assessment of the proposals and the proposed arrangements for construction.

**Table 3.2: List of some of the principal organisations consulted during the project**

*Adur District Council*  
*Brighton and Hove City Council*  
*East Sussex County Council*  
*Lewes District Council*  
*West Sussex County Council*

*Newhaven Town Council*  
*Peacehaven Town Council*  
*Rottingdean Parish Council*  
*Telscombe Town Council*

*Brighton and Hove Economic Partnership*  
*Brighton and Hove Local Community Wildlife Groups Forum*  
*Brighton Urban Wildlife Group*  
*Campaign for Ovingdean Against Sewage Treatment*  
*Countryside Agency*  
*CRAP*  
*Department for Environment Food and Rural Affairs*  
*East Brighton 4u*  
*English Heritage*  
*English Nature*  
*Environment Agency*  
*Friends of Sheepcote Valley*  
*Government Office for the South East*  
*Hanover Community Association*  
*Kemp Town Society*  
*Newhaven Economic Partnership*  
*Parkridge Developments Limited*  
*Peacehaven Residents Association*  
*PROUD*  
*Roedean School*  
*Rottingdean Traders Association*  
*Royal Society for the Protection of Birds*  
*Second Site Property Holdings Ltd*  
*Shoreham Port Authority*  
*Society of Sussex Downsmen*  
*South East England Regional Development Agency*  
*Southwick (Sussex) Society*  
*Surfers Against Sewage*  
*Sussex Area Environment Group*  
*Sussex County Playing Fields Association*  
*Sussex Downs Conservation Board*  
*Sussex Ornithological Society*  
*Village of Ovingdean Residents and Preservation Society*

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## Design iteration

3.10 The project design process followed an evolutionary path that took into account engineering assessments of operational suitability, design cues identified during the site selection exercise, feedback from consultations and the findings of the environmental impact assessment (EIA) process. The design and EIA processes were encouraged to operate iteratively, so that environmental constraints and opportunities could be reflected in emerging designs, and the resulting designs could then be passed back to the EIA team for further assessment.

3.11 For the Peacehaven wastewater treatment works site option, Southern Water identified two route options for the tunnel that would transfer wastewater from the Black Rock interception point. These were a coastal route, following the corridor of the A259 from Black Rock to Portobello and then inland to the treatment works, and an inland route running generally to the north of the coastal towns. Having chosen the coastal route for reasons explained in part D of this document, detailed consideration could then be given to the siting and design of individual tunnel access shafts and pumping stations.

## THE PROJECT IN OVERVIEW

3.12 The layout of the overall project, including those parts within Brighton and Hove that already have planning permission, is summarised below. This section should be read in conjunction with figure 3.1, which shows the position of the individual project elements described. As already explained, those elements of the overall project within Brighton and Hove already have planning permission, and are not the subject of the current planning application or this design and access statement. However, they are described here because they represent a part of the context for the current planning submission.

### Sewerage interception: Brighton Marina

3.13 The primary connection point with the existing sewerage network in Brighton and Hove is proposed to take place at Black Rock, on the coast in Brighton. This connection will be made beside an existing penstock chamber - a type of sluice gate used to regulate wastewater flows in the event of an emergency - which is set into the former promenade beneath the cliffs at the back of Brighton Marina. Above-ground elements would be limited to a low raised plinth into which access covers will be fixed, and a control kiosk.

3.14 Vehicular access to the interception shaft will be gained via the main marina access road and across the car park of the adjacent ASDA superstore. In practice, access will be required only on an occasional basis for maintenance.

### Flow transfer tunnel

3.15 The sewerage interception point at Brighton Marina will be connected to all of the project elements described below by an underground tunnel, 1.8-2.4 metres in internal diameter and lined with interlocking steel or concrete segments.

### **Marine Gate driveshaft**

3.16 From the modified penstock chamber flows would be transferred eastwards to a new pumping station within a traffic island on the A259 Marine Drive at Roedean via a new shaft at Marine Gate. The new shaft would be set within the pedestrian footway and roadside bank between the currently undeveloped land at Marine Gate and the A259. It will be 39 metres deep to invert level and a maximum six metres in internal diameter. The shaft would act as a driveshaft from where the tunnel connections to the penstock chamber to the west and Marine Drive pumping station to the east would be driven. Following construction, the shaft would be capped at ground level with a flush-fitting access cover.

3.17 Access to the shaft would be required for maintenance on an occasional basis, and would be gained directly from the A259 Marine Drive.

### **Marine Drive pumping station, Roedean**

3.18 This pumping station is required to lift wastewater from a lower tunnel to a higher level in order allow it to flow by gravity eastwards towards the wastewater treatment works. The pumping station would be located on undeveloped land in a traffic island on the A259 near Roedean Café. The east and westbound carriageways of the A259 form the north and south boundaries of the site respectively.

3.19 The development will comprise a vertical shaft 44 metres deep and 17.5 metres in internal diameter, topped with a service building set partly into the ground; an access ramp from an existing slip-road to the west, a secure service yard and surrounding walls and mounding; a tunnel boring machine reception shaft located 30 metres to the east of the pumping station, measuring 22.5 metres deep to invert and six metres in internal diameter;

3.20 Access to the pumping station would be gained directly from the A259 Marine Drive.

### **Roedean Way shaft**

3.21 The tunnel would lead from the Marine Drive pumping station to an access shaft approximately 0.4 km to the east, on vacant land east of the junction between Roedean Way and the A259 Marine Drive. This shaft is required to intercept the local wastewater flows from Roedean village. Access to the shaft would be required for maintenance on an occasional basis, and would be gained directly from the A259 Marine Drive.

3.22 The shaft will be 13.5 metres in total depth to invert and up to six metres in internal diameter, will be and fitted with a surface-level access cover and 375 mm pipes connecting to existing sewerage.

3.23 Between this shaft and the next shaft at Ovingdean, the tunnel alignment would follow the route of the A259 corridor for a distance of approximately 1.37 km.

**Ovingdean shaft**

3.24 This shaft would be sited in vacant land immediately west of the junction of A259 and Greenways Road south of Ovingdean. The shaft is required both to facilitate the interception of local sewerage and to serve as the driveshaft for the tunnel drives to the Marine Drive pumping station in the west and the Portobello pumping station in the east.

3.25 The development will comprise a covered vertical shaft 9.5 metres total depth to invert, up to a maximum six metres in internal diameter, fitted with a surface-level access cover and with 600 mm pipes connecting to existing sewerage. Access to the shaft would be required for maintenance on an occasional basis, and would be gained directly from the Greenways Road.

3.26 Between this shaft and the next shaft at Rottingdean, the tunnel alignment would follow the A259 corridor for a distance of approximately 1.1 km.

**Rottingdean shaft**

3.27 This shaft would be located in central Rottingdean at the eastern corner of a car park off West Street. This shaft is required to intercept the local sewer flows and to provide service access to the tunnel. Access to the shaft would be required for maintenance on an occasional basis, and would be gained directly from Marine Drive.

3.28 The development will comprise a covered vertical shaft 9.5 metres in total depth to invert and up to a maximum six metres in internal diameter, with a surface-level access cover; and 600 mm diameter pipes connecting to the local sewerage network.

3.29 Between this shaft and the next shaft at Saltdean, the tunnel route would be aligned beneath the A259 for a distance of approximately 1.22 km.

**Saltdean shaft**

3.30 This shaft would be sited within the verge to the west of Saltdean Park Road, east of Saltdean Lido and beside an area of public open space, and is required to intercept the local sewer flows. Access to the shaft would be required for maintenance on an occasional basis, and would be gained directly from the A259 Marine Drive.

3.31 The shaft will be 13.5 metres in total depth to invert and up to a maximum six metres in internal diameter, and fitted with a surface-level access cover and 375 mm pipes connecting to existing sewerage.

3.32 From this shaft the tunnel alignment follows the A259 corridor towards the administrative boundary between Brighton and Hove and East Sussex. All elements described this far in this summary were granted planning permission by Brighton and Hove City Council in December 2005. The following elements

of the project described below for the subject of the planning application that this design and access statement supports.

### **Saltdean East shaft**

3.33 From the municipal boundary to the Saltdean East shaft site, the tunnel route would continue beneath the A259 South Coast Road. The shaft would be located within the private amenity land at the roadside, approximately 45 metres west from the junction with Hamsey Road. Again, the shaft is required to allow a connection to be made with the local sewerage network, and for maintenance access to the tunnel. Following construction, an access cover would be the only visible feature at ground level.

3.34 Access to the shaft would be required for maintenance on an occasional basis, and would be gained directly from the A259 South Coast Road.

### **Portobello pumping station**

3.35 Between the Saltdean East shaft and Portobello pumping station, the tunnel would be aligned beneath the A259 South Coast Road for a distance of approximately 550 metres before heading south-east to the Portobello pumping station. At Portobello there is an existing Southern Water operational site. It is proposed that a new pumping station would be constructed to lift the wastewater to a higher level so that it can flow by gravity towards the proposed wastewater treatment works at Peacehaven. Wastewater from Peacehaven and Telscombe in the eastern part of the drainage catchment would be combined with the main flow from the west at this point.

3.36 The pumping station will thus comprise a main vertical shaft 27 metres deep to invert and 17.5 metres in internal diameter, topped with a service building set into the ground beside the existing site access ramp and with a grassed roof. In addition, two reception shafts, respectively 27 and 14.5 metres deep to invert and each 6 metres in internal diameter, would be constructed at Portobello to receive the tunnel boring machines from Ovingdean to the west and the Peacehaven wastewater treatment works to the north-east.

3.37 Access to the pumping station site would be gained from the existing headworks access road leading off the A259 South Coast Road.

### **Meridian Centre car park shaft**

3.38 From the Portobello pumping station the tunnel would pass beneath the A259 South Coast Road and heads eastwards beneath residential areas towards the Meridian Centre car park in Peacehaven. This shaft would be located in the south-east corner of the car park at the corner of Greenwich Way and the road to a nearby leisure centre, from which access would be gained. It is required to provide construction and operational access to the tunnel. Following construction, an access cover would be the only visible feature at ground level.

3.39 The proposed development comprises a covered vertical shaft of 32 metres total depth to invert with a maximum six metres internal diameter, fitted with a surface-level access cover.

3.40 From the Meridian Centre car park shaft, the tunnel route continues eastwards beneath industrial areas of Peacehaven and open farmland towards the proposed wastewater treatment works at Peacehaven.

### **Peacehaven wastewater treatment works and sludge recycling centre**

3.41 The works will provide preliminary wastewater treatment to remove solid materials and grease, primary settlement to remove fine solid materials suspended in the wastewater, and secondary biological treatment to treat the active organic content of the wastewater. The solid residue or 'sludge' that is extracted from the wastewater is then recycled through a process known as anaerobic digestion, explained later in this document. The digested sludge would then be dried to form a granular material suitable for use as an agricultural soil conditioner. The digestion process also liberates a methane-rich biogas, which will be used to fuel an on-site combined heat and power plant that would provide approximately a quarter of the treatment works' energy demand. The treatment works would also offer facilities for local cess waste deliveries, and would incorporate an open area for future expansion, should this be required.

3.42 The treatment processes described would employ compact technology, with odorous elements all housed within buildings or under sealed covers. The works would employ advanced odour control technology. As explained later in this document, views of the works from the surrounding area will be contained through the use of a green roof on the main buildings and by a combination of earth mounding and planting. An area of land to the south of the outer treatment works site boundary will be made available for public recreation. The scale and amount of development is described in Part B of this design and access statement.

3.43 The treatment works would have a dedicated road access from Hoyle Road, to the south-west of the site, and new bridleway, cycleway and footpath routes are proposed across the recreational area to the south of the works.

3.44 Treated liquid wastewater would then be passed forward to a long sea outfall for final discharge, via the remaining components of the overall project.

### **Friar's Bay head chamber shaft**

3.45 This shaft would form the work site for the construction of a long sea outfall (LSO) through which the treated effluent will be discharged into Friar's Bay. The site is in open land located between Brighton Road and The Highway. It would receive the tunnel boring machine driving the tunnel from Peacehaven and act also as the drive site for tunnelling to a final shaft on the Friar's Bay undercliff.

3.46 The proposals comprise a covered vertical shaft 39 metres deep to invert and eight metres in internal diameter, fitted with a surface-level access cover; Following construction an access cover would be the only visible feature at

ground level.

3.47 Access to the shaft would be required for maintenance on an occasional basis, and would be gained directly from The Highway, off the A259 South Coast Road

### **Friar's Bay undercliff shaft**

3.48 This shaft would be set into the beach promenade to provide a secondary tunnelling station for construction of the inshore section of the LSO. It would be 12 metres deep to invert and 6.5 metres in internal diameter, and fitted with a surface-level access cover. Access to the shaft would be required for maintenance on an occasional basis, and would be gained via the promenade. Vehicles would reach the site via a ramp that leads from the clifftop to the promenade at Steyning Avenue in Peacehaven, approximately 2 km to the west of the shaft site.

3.49 From the Friars Bay (Head Chamber) shaft, the treated wastewater effluent would continue southwards to connect to the sea through outfall tunnel located below the foreshore.

### **Long sea outfall**

3.50 The LSO would discharge treated effluent to the sea, approximately 2.5 km offshore. Because the LSO would extend well beyond the mean low water mark, it lies outside the jurisdiction of the planning system and is not included in the current planning application. Consents for the LSO have already been secured through the normal procedures for development and discharges offshore.

3.51 Parts B, C and D of this document consider in detail the design and access issues relating to those parts of the project within East Sussex that form the subject of the current planning application. To provide a complete account of the project, appendix III summarises the approach taken by Southern Water with respect to design and access for those elements of the project in Brighton and Hove that already have planning permission.