Hampshire Water Transfer and Water Recycling Project

Environmental Statement - Chapter 3 Description of the Proposed Development

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3 Description of the Proposed Development

3.1 Introduction

3.1.1 This chapter provides an overview of the Hampshire Water Transfer and Water Recycling Project (hereafter referred to as the 'Proposed Development') including a description of its principal components and an outline of construction, operation and maintenance activities. This chapter also sets out a description of the expected decommissioning activities for the purposes of the assessment, however consent for decommissioning is not being sought.

3.1.2 This chapter also explains the level of detail presented to underpin this Environmental Statement (ES) - having regard to the requirement for the Development Consent Order (DCO) to deliver an appropriate level of flexibility - and how this will be assessed and controlled.

3.1.3 The National Policy Statement for water resources infrastructure [1] (NPSWRI) Paragraph 3.2.8 recognises that:

> *"…it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Where this is the case, the applicant should explain in its application which elements of the proposal have yet to be finalised, and the reasons why this is the case."*

3.1.4 Paragraph 3.2.9 requires that:

> *"...where some details are still to be finalised, the Environmental Statement should, to the best of the applicant's knowledge, assess the likely worst-case environmental, social and economic effects of the proposed development to ensure that the impacts of the project, as it may be constructed, have been properly assessed."*

3.1.5 The need for flexibility through the DCO is highlighted by the process of 'direct procurement for customers' (DPC) introduced by the Water Services Regulation Authority (Ofwat) in their 2019 price review (PR19). This requires water companies to competitively tender for a third party to design, build, finance, operate and maintain new water resources infrastructure projects where they are to be delivered using the DPC procurement route. This procurement and delivery route has the potential to provide benefits for customers through innovation and lower whole life costs of projects. It is important to ensure that consenting provides sufficient opportunity to deliver these benefits through detailed design that would be undertaken post-consent.

3.1.6 In assessing the environmental effects of the Proposed Development, the principle of the 'Rochdale Envelope' is therefore applied (in accordance with Planning Inspectorate's (2018) Advice Note Nine: Rochdale Envelope (Version 3) [2] and Planning Inspectorate's (2025) Advice on Preparing Applications for Linear Projects [3]) in order for the assessment to be based on a worst case scenario while maintaining flexibility to address uncertainty of the Proposed Development. The approach to the Rochdale Envelope for the Proposed Development is set out in ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6), and this chapter sets out the parameters that are used for

the basis of a worst case assessment scenario. The assessment establishes those parameters likely to result in the maximum adverse effect (the worst case scenario) and be undertaken accordingly to determine significance of effects.

3.1.7 This chapter is supported by ES Appendix 3.1 Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6).

Development Consent Order Limits

3.1.8 The Order Limits represent the extent of the area within which the development authorised by the Development Consent Order may be carried out, including the permanent and temporary land needed for construction, operation and maintenance activities. The Order Limits are shown on the Works plans (Document reference 2.3, DCO Volume 2).

3.1.9 This ES is based on the Order Limits, as shown in ES Figure 1.1 Location of the Proposed Development and Order Limits, Volume III (Document reference 6.3, DCO Volume 6). Within these Order Limits, there is flexibility for the components of the Proposed Development to be aligned at the very local scale (micro-siting) to account for potential environmental constraints identified from ongoing surveys prior to the commencement of construction. This will be undertaken at the detailed design stage post-consent.

3.1.10 The Order Limits include areas that have been identified for environmental mitigation and potential on-site enhancement proposals.

3.1.11 The Order Limits also include areas of the Proposed Development that do not comprise new development, but where the Applicant is applying for consent to use existing or consented development. These separately consented developments have been considered cumulatively in this ES.

3.1.12 Study areas identified for each ES topic chapter cover a wider area than the Order Limits to ensure potential impacts are fully identified and enable a robust assessment of likely significant effects to be undertaken. The study area for each topic is based on topic specific guidance, and specific receptors or resources under consideration for that topic. The study areas also comply with relevant legislation, policy and guidance, as well as commentary in the Environmental Impact Assessment (EIA) Scoping Opinion (ES Appendix 5.2 EIA Scoping Opinion, Volume II (Document reference 6.2, DCO Volume 6)) and feedback from technical engagement with relevant stakeholders (as set out in section 3 of the topic chapters, ES Chapters 6 to 20, Volume I (Document reference 6.1, DCO Volume 6)). While the Order Limits have been refined since the scoping area was presented in the EIA Scoping Report (ES Appendix 5.1 EIA Scoping Report, Volume II (Document reference 6.2, DCO Volume 6)), the Proposed Development remains materially the same as proposed at the scoping stage.

3.1.13 Environmental designations in relation to the Order Limits for the Proposed Development are presented on ES Figure 3.1 Environmental constraints plan, Volume III (Document reference 6.3, DCO Volume 6).

Parameters and Limits of Deviation

3.1.14 In accordance with the Rochdale Envelope approach, EIA topic assessments are undertaken on the basis of parameters established to accommodate design

refinement and areas of uncertainty. This ensures the assessment is based on a worst case scenario.

3.1.15 Within the Order Limits, Works Areas and Limits of Deviation have been defined. These Works Areas and Limits of Deviation define the extent of the area within which the Water Recycling Plant (WRP), the pipelines and Above Ground Plant (AGP) would be located and within which they may deviate horizontally. This provides the required level of flexibility necessary to ensure deliverability and allow for unknowns that would not arise until the detailed design and construction stages.

3.1.16 This ES is also based on parameters that reflect the maximum footprints and vertical extents within the Works Areas and Limits of Deviation of the WRP site, the AGP and other works including temporary construction compounds. These parameters are set out and secured in the Design Principles Document (Document reference 5.11, DCO Volume 5) (see paragraph 3.1.20) and section 3.3 of this chapter. This chapter sets out the parameters that the ES is based on.

3.1.17 While the DCO does not specify a maximum depth for the pipelines or foundations at the WRP site and AGP sites, the parameters used for the assessment represent the reasonablescenario. Where an unspecified maximum depth for the pipelines, WRP site or AGP sites is relevant to an individual topic assessment in ES Chapters 6 to 20, Volume I (Document reference 6.1, DCO Volume 6), information is provided in the relevant Assumptions and Limitations section of that chapter to explain why the assessment, based on the depths set out in this chapter, would not change as a result of an unspecified depth for the pipelines, WRP site or AGP sites.

3.1.18 The Works plans (Document reference 2.3, DCO Volume 2) detail the locations of the Works Areas and Limits of Deviation for the principal components of the Proposed Development within the Order Limits. The Works plans (Document reference 2.3, DCO Volume 2) show the following:

1. The Works Areas for pipelines, and within these, Limits of Deviation which represent the area within which the pipelines would be located. Where no Limit of Deviation is shown within a pipeline Work Area, the pipelines would be located anywhere within the relevant Work Area.
2. Work Area for the WRP site. A description of the parameters for the WRP site within this Work Area is set out in Table 3-1 and in the Design Principles Document (Document reference 5.11, DCO Volume 5).
3. The Works Areas for the AGP. Within these Works Areas, Limits of Deviation for the AGP are set out in the Design Principles Document (Document reference 5.11, DCO Volume 5). A description of the parameters for the AGP within these Works Areas and Limits of Deviation is set out in paragraph 3.3.74 and the Design Principles Document (Document reference 5.11, DCO Volume 5).
4. The location and Works Areas of other works identified at this stage. Additional information on these other works is set out in section 3.2.

Proposed Development design process and 'design principles'

3.1.19 The approach to developing the Proposed Development is underpinned by the Applicant's overarching Project Vision which emphasises its fundamental role and purpose:

> *"We're transforming the way we source, treat and supply water across Hampshire. Creating a new, resilient and sustainable water supply will protect and enhance the county's rare and sensitive chalk streams, while maintaining supplies for our communities and the local economy".*

3.1.20 The DCO application is based on a preliminary design with the final detailed design being delivered by the Contractor post-consent – noting the need for appropriate flexibility as outlined above.

3.1.21 The final design, delivered by the Contractor, would be in accordance with controls secured through the DCO, which include the extents of the Order Limits, Limits of Deviation, the Works plans (Document reference 2.3, DCO Volume 2), approved parameters, and a suite of documents which capture the design and environmental commitments of the Proposed Development. This includes a Design Principles Document (Document reference 5.11, DCO Volume 5) which sets out design commitments that would be adhered to and developed in the final design that is delivered by the Contractor and developed post-consent.

3.1.22 The Design Principles Document (Document reference 5.11, DCO Volume 5) is therefore 'forward-looking' (i.e. setting commitments that would control the final design that is developed post-consent) including both 'general design principles' (applicable across the Proposed Development) and 'site-specific design principles' (setting out commitments relating to specific component parts of the Proposed Development reflective of their nature and location).

3.1.23 At the pre application stage, good design was embedded into scheme development at the outset by developing a series of preliminary design principles to set out broad design objectives. These underpinned scheme development, the approach to the avoidance of potential likely significant effects and the development of primary (embedded) mitigation. A Design Champion for the Proposed Development was also appointed at the pre application stage. The Design Champion was a Major Projects Technical Manager and their scope was to provide management level oversight and input into:

1. The Proposed Development's vision.
2. Consultation material in relation to the design process.
3. The development of the design principles.
4. The approach to securing good design at the DCO stage and clear mechanisms for further future scrutiny at detailed design stage.
5. Driving project team consideration of good design opportunities.

3.1.24 The general and site specific design principles set out in the Design Principles Document (Document reference 5.11, DCO Volume 5) have regard to the National Infrastructure Commission document *Climate, Places, People, Value: Design Principles for National Infrastructure* [4], the Water Resources All Company Working Group document *Design Principles and User Guidance* [5], and the

Planning Inspectorate's *Nationally Significant Infrastructure Projects: Advice on Good Design* [6]. The design principles set out fundamental design objectives relating to:

1. Safety, function and accessibility – reflecting the essential primary objective of ensuring safety and security through design, ensuring delivery of the required operation and function and promotion of connectivity and active travel.
2. Site layout and building design – including minimising land take, use of sustainable resources and materials, avoidance of sensitive receptors and designations through site/route selection, minimising impacts on residential amenity and reinstatement of land.
3. Environmental considerations – including respecting local distinctiveness, reducing impact on landscape, ecology, heritage and water environment, retention of existing landscape features, enhancement of Green Infrastructure and biodiversity, sustainable drainage and climate resilience.

3.1.25 An Indicative Environmental Masterplan is appended to the Design Approach Document (Document reference 5.12, DCO Volume 5). This provides an indication of how the AGP and WRP site could be delivered in accordance with the design principles set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Primary mitigation

3.1.26 Primary mitigation, considered as embedded within the Proposed Development, forms an inherent part in avoiding and reducing impacts to the environment and communities. The identification of primary mitigation measures as part of the scheme development process, as set out in the ES Chapter 4 Consideration of alternatives, Volume I (Document reference 6.1, DCO Volume 6), is underpinned by the mitigation hierarchy and the preliminary design principles referenced above.

3.1.27 The schedule of primary mitigation (see ES Appendix 3.1 Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6)) sets out the embedded design measures that have been considered and implemented as part of the Proposed Development. These measures are embedded within the design of the Proposed Development and have been carefully considered through the design process.

3.1.28 Overarching primary mitigation commitments are those which apply across the entirety of the Proposed Development's design and are included within ES Appendix 3.1 Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6). These include the commitments made at the start of the Proposed Development to act as guiding principles for design, with relevant commitments set out in the preliminary design principles.

3.1.29 In addition to the overarching commitments, reduced working width locations for construction of the pipelines have been identified through the scheme development process to avoid and/or reduce the impacts on sensitive receptors and to reduce vegetation loss. These locations are set out in ES Appendix 3.1 Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6).

3.1.30 A trenchless crossings schedule is included in ES Appendix 3.1 Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6). This details the specific

locations at which trenchless construction methods have been chosen to avoid or reduce impacts on the environment, communities, or key transport infrastructure.

3.1.31 Individual, site-specific primary mitigation measures are also included in ES Appendix 3.1 Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6), to capture design decisions in relation to avoiding, minimising or mitigating any potential likely significant adverse environmental effects.

3.1.32 The ES is accompanied by a Commitments Register that includes a complete list of primary mitigation measures that are embedded within the design of the Proposed Development (see ES Appendix 5.5 Commitments Register, Volume II (Document reference 6.2, DCO Volume 6)).

3.2 Overview of the Proposed Development

3.2.1 As set out in ES Chapter 1 Introduction, Volume I (Document reference 6.1, DCO Volume 6), the Proposed Development comprises the construction, operation and maintenance of the following principal components:

1. WRP located at a site north-west of Budds Farm Wastewater Treatment Works (WTW) with a maximum output (especially during drought conditions) of approximately 60 megalitres per day (Ml/d) of recycled water. At maximum operation the WRP would also produce a maximum output of approximately 22Ml/d of reject water. Pumping stations would be located at the WRP site to pump process waste to the existing sewer network for transfer to Budds Farm WTW, recycled water to Bedhampton Springs, and source water (from the Havant Thicket Reservoir) to Otterbourne Water Supply Works (WSW).
2. Underground pipelines between Budds Farm WTW and the WRP site. One pipeline would divert treated wastewater flows from Budds Farm WTW and transfer at maximum operation approximately 82Ml/d of treated wastewater to the WRP site. Another pipeline would transfer reject water from the WRP site to the Eastney Long Sea Outfall (LSO) via the Budds Farm WTW site, and this pipeline would be sized to transfer approximately 82Ml/d to ensure sufficient capacity in the unlikely event of an emergency shutdown of the WRP site. A pumping station would be located at Budds Farm WTW to support the transfer of treated wastewater to the WRP site.
3. Pipelines between the WRP site and Bedhampton Springs, connecting to pipelines being delivered by Portsmouth Water between Bedhampton Springs and Havant Thicket Reservoir, to enable the transfer at maximum operation of approximately 60Ml/d of recycled water from the WRP site to Havant Thicket Reservoir and approximately 90Ml/d of source water (water that is used as a source for drinking water) from Havant Thicket Reservoir to the WRP site. Between the WRP and Mill Lane (south-west of Bedhampton Springs), the pipelines would be underground. For the transfers between Mill Lane and Bedhampton Springs the pipelines are expected to be above-ground to avoid the Source Protection Zone at Bedhampton Springs.
4. Underground pipeline to transfer at maximum operation approximately 90Ml/d of source water from the WRP site to Otterbourne WSW.
5. AGP comprising two Intermediate Pumping Stations (IPSs), one Break Pressure Tank (BPT) and one combined IPS and BPT along the Pipeline between the WRP site and Otterbourne WSW.

3.2.2 The Proposed Development would also comprise the use of the following infrastructure:

1. Havant Thicket Reservoir (which has been consented separately by Portsmouth Water and is currently under construction) for the storage of recycled water.
2. The existing Eastney LSO, Eastney Pumping Station (PS), and associated Eastney Transfer Tunnel (TT) for the release of reject water from the WRP site. At maximum operation, approximately 22Ml/d of reject water would be transferred to and released from the Eastney LSO. In the unlikely event of an emergency shut down of the WRP site up to 82Ml/d of reject water would be released from the Eastney LSO.
3. Pipelines and other related works, which have been consented separately by Portsmouth Water, for the transfer of recycled water and source water between Bedhampton Springs and Havant Thicket Reservoir.

3.2.3 The construction and operation of the Proposed Development would be supported by other works which are expected to include, but are not limited to:

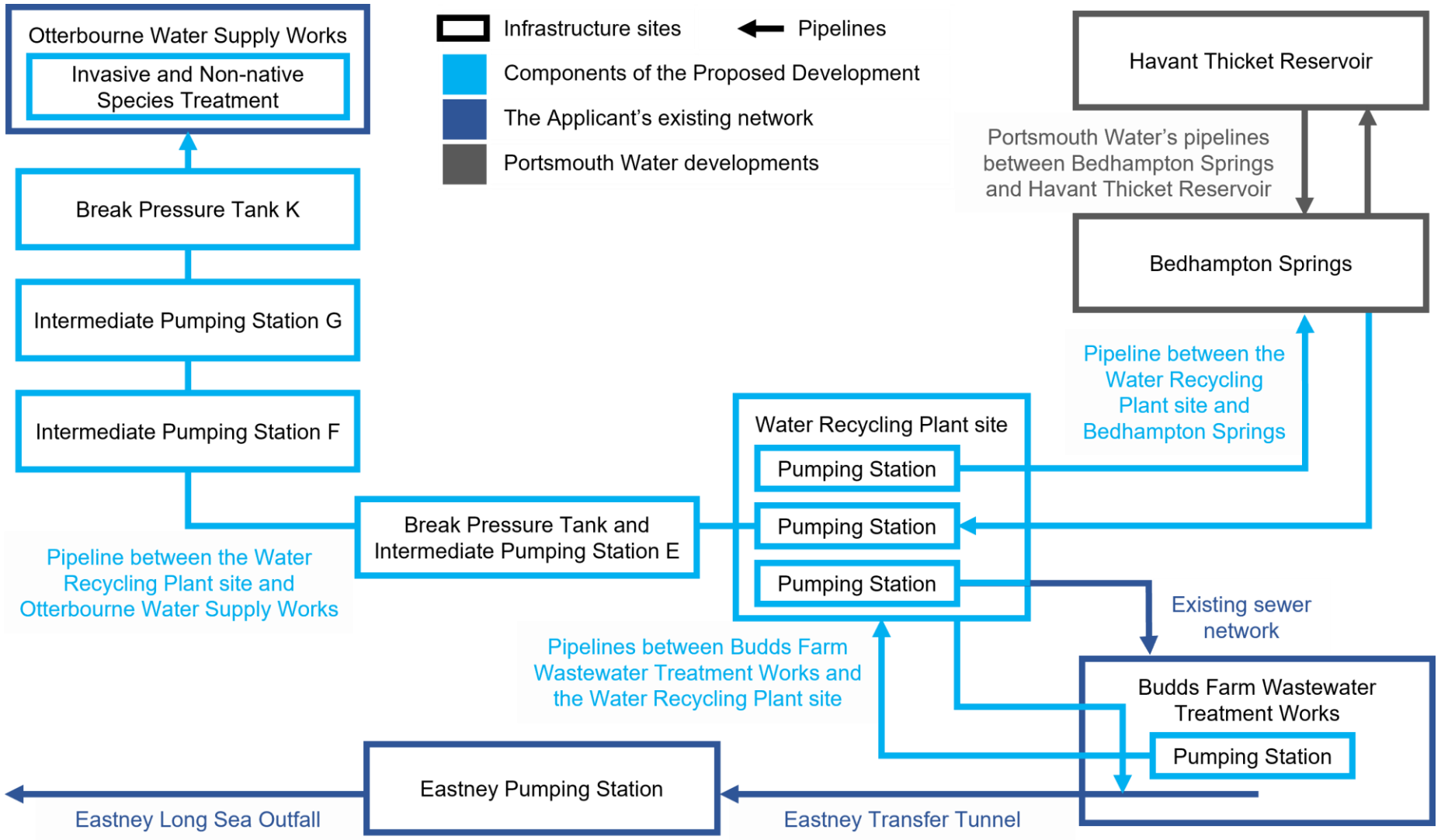
1. Temporary works to support construction including construction compounds, water storage lagoons and temporary access to construction areas.
2. Permanent works to support operation and maintenance including permanent access to the AGP.
3. Isolation, washout and air valves along the length of the pipelines.
4. Highway works and Public Rights of Way (PRoW) diversions and enhancements where required.
5. Landscaping and environmental mitigation, enhancement, and compensation measures.

3.2.4 The Proposed Development would require the demolition, disassembly and/or temporary relocation of a number of small structures.

3.3 Principal components of the Proposed Development

3.3.1 This section provides a description of the principal components of the Proposed Development. Graphic 3-1 provides a schematic of the components of the Proposed Development and how these interface with the Applicant's existing network and developments that are being delivered by Portsmouth Water. This section also provides a description of existing or separately consented infrastructure that is included in the Order Limits and will be used by the Proposed Development. Additional information on the approach to construction for these components is provided in section 3.5. Additional information on the operation and maintenance details of these components is provided in section 3.6. Additional information on decommissioning is provided in section 3.7.

Graphic 3-1 Interfaces between Proposed Development components, Applicant's existing network and infrastructure delivered by Portsmouth Water



Water Recycling Plant site

3.3.2 The location and Works Area for the WRP site is shown on Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.3 The WRP site is located approximately 300m north-west of Budds Farm WTW, to the north of Harts Farm Way, south of the A27 and west of the Hermitage Stream. The WRP site would take in highly treated wastewater from Budds Farm WTW and use advanced treatment techniques to convert the treated wastewater into purified recycled water.

3.3.4 The WRP site would consist of a main process building where the water recycling process would be located and undertaken, kiosks for control equipment, administration buildings and parking facilities. Several large holding tanks and chemical storage units would be required for operation of the WRP site. Access to the WRP site would be provided from Harts Farm Way to the south.

3.3.5 Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2) shows the Works Area for the WRP site and the Design Principles Document (Document reference 5.11, DCO Volume 5) sets out three development zones within the Works Area and the maximum building or structure height within each. The infrastructure anticipated to be located in each zone is as follows.

1. **WRP site Works Area**: represents the extent of the WRP site within which all infrastructure and any associated landscaping would be developed.
2. **Zone 1**: Main process building, administration building, chemical storage units, holding tanks, further plant and equipment, parking, and the pumping station for the transfer of welfare facility waste and process waste from the WRP site to the existing sewer network. This process waste is generated by the WRP process but separate to reject water which is released via the Eastney LSO.
3. **Zone 2**: Chemical storage units, holding tanks, further plant and equipment, the pumping station for the transfer of recycled water to Bedhampton Springs, the pumping station for the transfer of source water to Otterbourne WSW, and parking.
4. **Zone 3**: Further plant and equipment, storage and laydown.

3.3.6 At maximum operation, the WRP site is designed to receive approximately 82Ml/d of treated wastewater from Budds Farm WTW. Once treated, this would provide approximately 60Ml/d of recycled water. Reject water from the water recycling process would be combined with the existing Budds Farm WTW treated wastewater flows (that are generated by the existing operation of Budds Farm WTW), and released via the existing Eastney TT, Eastney PS, and Eastney LSO which are existing wastewater infrastructure components operated by the Applicant used for the release of treated wastewater flows from Budds Farm WTW into the Solent.

3.3.7 The EIA Scoping Report (ES Appendix 5.1 EIA Scoping Report, Volume I (Document reference 6.2, DCO Volume 6) for the Proposed Development set out that the WRP site could be delivered in two separate phases. Since the EIA Scoping Report, the design and requirements for the WRP site in the context of the urgent need case for the Proposed Development has evolved, so that the WRP site would be delivered in one single phase providing a maximum output of

approximately 60Ml/d of recycled water. This change does not impact the scope of the EIA as set out in the EIA Scoping Report.

3.3.8 The utilisation of the WRP in normal and drought conditions is set out in section 3.6. The minimum recycled water output of the WRP is expected to be 10Ml/d to ensure the infrastructure and treatment process remain in regular working order, however, as set out in section 3.6, the WRP is expected to predominantly operate well above this minimum flow.

3.3.9 Three pumping stations would be located at the WRP site:

1. One pumping station would pump recycled water from the WRP site to Bedhampton Springs.
2. The second pumping station would pump process waste (generated by the WRP process but separate to reject water which is released via the Eastney LSO) and welfare facility waste from the WRP site to the existing sewer network for return to Budds Farm WTW.
3. The third pumping station would pump source water transferred from Bedhampton Springs onwards to Otterbourne WSW. This is the first pumping station that would be required along the Pipeline from the WRP site to Otterbourne WSW. It would provide the source water with initial energy to begin the transfer to Otterbourne WSW which includes the need to traverse a number of high and low topographical points.

3.3.10 No pumping station is required to transfer reject water from the WRP site to Budds Farm WTW for release via the Eastney LSO, as these flows would be transferred using a gravity pipeline due to the topography of the two sites.

3.3.11 The WRP site would require external lighting to light access roads, paths and walkways, and areas where operational and maintenance tasks are required. Further external lighting may also be required during emergency events. The lighting design will be progressed as part of the detailed design of the WRP site, which will be subject to further approvals in line with the requirements of the DCO. The lighting design would be designed in line with relevant standards, regulations and guidance and in accordance with the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.12 A permanent access from Harts Farm Way would be created to provide access to the WRP site. Alongside this permanent access, a pedestrian crossing and footpath would be developed to ensure workers can safely cross from the footway on the south side of Harts Farm Way to the WRP site on the north side of Harts Farm Way.

3.3.13 Surface water at the WRP site would be attenuated and treated through a Sustainable Drainage System (SuDS). This would comprise an outfall to discharge surface water into the Hermitage Stream. The outfall would consist of a concrete lined channel running from an attenuation basin within the WRP site to a concrete headwall structure that would discharge into the Hermitage Stream. The concrete lined culvert would be located under the existing PRoW at the eastern boundary of the WRP site. The SuDS outfall to the Hermitage Stream would be designed in line with the Design Principles Document (Document Reference 5.11, DCO Volume 5).

3.3.14 Table 3-1 sets out the maximum parameters of the WRP site. The parameters are also set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Table 3-1 Water Recycling Plant site parameters

Element	Parameter
Maximum building height within Zone 1 of the WRP site Works Area	14.5m
Maximum dimensions of main process building within Zone 1 of the WRP site Works Area	170m x 115m
Maximum building height within Zone 2 of the WRP site Works Area	9.8m
Maximum building height within Zone 3 of the WRP site Works Area	5m

Pipelines between Budds Farm Wastewater Treatment Works and the Water Recycling Plant site

3.3.15 The Works Area for the Pipelines between Budds Farm WTW and the WRP site is shown on Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.16 Two pipelines would be constructed between Budds Farm WTW and the WRP site: one to transfer treated wastewater from Budds Farm WTW to the WRP site and the other to transfer reject water from the WRP site to Budds Farm WTW. The Pipelines would connect to the existing treated wastewater release infrastructure and the reject water would be released via the existing Eastney LSO using the existing Eastney TT and Eastney PS. Reject water from the WRP does not require further treatment at Budds Farm WTW prior to release via the existing Eastney LSO.

3.3.17 The Pipelines would be installed on the same route under the Hermitage Stream and Harts Farm Way and would be approximately 700m in length. The crown (top) of the Pipelines would be a minimum of 2.5m below the lowest point of the Hermitage Stream as set out in the Design Principles Document (Document Reference 5.11, DCO Volume 5). There is flexibility in the final location of the Pipelines within the Order Limits as the exact location that the Pipelines would connect at the WRP site and Budds Farm WTW would be determined at the detailed design stage post-consent. Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2) shows the extent of the area that the Pipelines could be located.

3.3.18 Table 3-2 sets out the parameters of the Pipelines. The parameters are also set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Table 3-2 Pipelines between Budds Farm Wastewater Treatment Works and the Water Recycling Plant site parameters

Location	Minimum depth of pipeline crown	Maximum external diameter
Within agricultural land or other undeveloped land	0.9m below surface level	2.83m casing containing the Pipelines
Watercourse intersections	2.5m below watercourse bed	
Road intersections	1.5m below road surface	

3.3.19 The Pipelines would be designed to transfer approximately 82Ml/d of treated wastewater to the WRP site at maximum operation. The pipeline from the WRP site to Budds Farm WTW would be sized for the same transfer capacity of approximately 82Ml/d as it may be necessary to return the maximum volume of water being treated back to Budds Farm WTW. This ensures that in the event of an emergency, any water in the system can be returned via the reject stream and released via the Eastney TT, Eastney PS and Eastney LSO while shutdown procedures at the WRP site are initiated. It is considered that a water quality failure is a very unlikely occurrence as the WRP site would be designed to ensure that water quality failures are avoided. However, in the event of a water quality failure, the reject water pipeline should be sized so that all water at the WRP site can be released.

3.3.20 Treated wastewater would be pumped to the WRP site by a new pumping station at Budds Farm WTW. The proposed location and Works Area for the Budds Farm WTW pumping station is shown in Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2). Table 3-3 sets out the parameters for the Budds Farm WTW pumping station. The parameters are also set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Table 3-3 Budds Farm Wastewater Treatment Works pumping station parameters

Element	Parameter
Maximum above-ground structure footprint of Budds Farm WTW pumping station within the Works Area	84m^2
Maximum above-ground structure dimensions of Budds Farm WTW pumping station within the Works Area	12m x 7m
Maximum surface and below-ground footprint of Budds Farm WTW pumping station within the Works Area	1,500m^2
Maximum above-ground structure height of Budds Farm WTW pumping station	3.3m

3.3.21 The pumping station would include a kiosk. The remaining elements of the pumping station, which would include a wet well pumping station, would be located above ground at a maximum height of 300mm above the maximum flood level. A permanent access road would also be required to connect to the existing internal access roads within Budds Farm WTW.

3.3.22 Reject water would be transferred from the WRP to the Eastney TT via a gravity pipeline. Works at Budds Farm WTW would include new connections to transfer flows to and from the WRP site.

Pipelines between the Water Recycling Plant site and Bedhampton Springs

3.3.23 The Pipelines between the WRP site and Bedhampton Springs would be located on the same alignment and the Works Area for the Pipelines is shown in Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2). The Pipelines would transfer recycled water from the WRP site to Bedhampton Springs, and source water from Bedhampton Springs back to the WRP site (for onward transfer to Otterbourne WSW).

3.3.24 The transfer between Bedhampton Springs and Havant Thicket Reservoir would utilise Portsmouth Water's pipelines between these sites which are subject to a separate planning consent and will not be constructed under this consent. At maximum operation, the Pipelines would transfer approximately 60Ml/d of recycled water from the WRP to Bedhampton Springs and approximately 90Ml/d of source water from Bedhampton Springs to the WRP site, for onward transfer to Otterbourne WSW.

3.3.25 Table 3-4 sets out the parameters for the Pipelines. The parameters are also set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Table 3-4 Pipelines between the Water Recycling Plant site and Bedhampton Springs

Location	Minimum depth of pipeline crown or casing
Within agricultural land or other undeveloped land	0.9m below surface level
Watercourse intersections	2.5m below watercourse bed
Road intersections	1.5m below road surface

3.3.26 The Pipelines between the WRP site and Bedhampton Springs would be approximately 750m in length. The Pipelines would commence at the WRP site and pass underneath the A27 and Mill Lane. From the boundary of the Bedhampton Springs site, the Pipelines would either be located above-ground or below-ground depending on the proximity to groundwater abstraction at Bedhampton Springs, which is located within a Source Protection Zone (SPZ1), and on operational access requirements. The Design Principles Document (Document reference 5.11, DCO Volume 5) controls the location that the Pipelines would be above-ground.

3.3.27 Where the Pipelines are installed underground, there would either be two pipelines within one single casing with a maximum external diameter of 2.83m, or two parallel pipelines within casings with maximum external diameters of 1.78m and 1.43m respectively. Where the Pipelines are installed above-ground, there would be two parallel pipelines with maximum external diameters of 1.4m and 1.2m respectively. The above-ground Pipelines would have a maximum height of 2m above-ground level, except at the crossing of Old Mill Dam, where the Pipelines would have a maximum height of 3m above-ground level.

3.3.28 Connection infrastructure would be developed at Bedhampton Springs to connect into Portsmouth Water's pipelines between Bedhampton Springs and Havant Thicket Reservoir.

3.3.29 The EIA future baseline takes account of environmental mitigation and enhancement that is secured in the planning application for Portsmouth Water's pipelines between Bedhampton Springs and Havant Thicket Reservoir.

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

3.3.30 An underground pipeline approximately 35km long would transfer approximately 90Ml/d of source water from the WRP site to Otterbourne WSW at maximum operation. AGP would support the transfer of water from the WRP site to Otterbourne WSW. These are set out in more detail from paragraph 3.3.74.

3.3.31 Table 3-5 sets out general parameters of the Pipeline between the WRP site and Otterbourne WSW. The parameters are also set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Table 3-5 Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works parameters

Location	Minimum depth of pipeline crown
Within agricultural land or other undeveloped land	0.9m below surface level
Main River intersections	2.5m below watercourse bed
Ordinary Watercourse intersections	1.5m below the watercourse bed
Road intersections	1.5m below road surface

3.3.32 The diameter of each section of the Pipeline would be determined by the Contractor at the detailed design stage post-consent, and would be informed by the hydraulic profile of the Pipeline and ensuring that the transfer from Havant Thicket Reservoir to Otterbourne WSW meets water quality requirements.

3.3.33 Where open-cut construction is used to install the Pipeline (as described in section 3.5), the Pipeline would have a maximum external diameter of 1.4m. Where trenchless construction is used to install the Pipeline, the Pipeline would be located within a casing with a maximum external diameter of 2.83m, except for Section D: The WRP site to Portsdown Hill of the Pipeline where a casing would have a maximum external diameter of 4m. These maximum external diameters have been used as the maximum parameters for the Pipeline from the WRP site to Otterbourne WSW for the ES.

3.3.34 Due to the length of the Pipeline, it has been divided into sections (Sections D to M). The pipeline sections have been divided at suitable points along the route of the Pipeline informed, where appropriate, by local planning authority boundaries, roads and other geographical features such as watercourses. A description of each section of the Pipeline is set out in the following sections. Section C of the Pipeline has not been included as this comprises the Pipelines between Budds Farm WTW and the WRP site which is already explained from paragraph 3.3.14. Sections A and B of the Pipeline have also not been included as these were previously

sections of a direct transfer between the WRP and Havant Thicket Reservoir, which was no longer progressed following the approval of Portsmouth Water's pipelines, as described from paragraph 3.3.24. There is also no Section I of the Pipeline to avoid confusion with the number one.

Section D: The Water Recycling Plant site to Portsdown Hill

3.3.35 Section D: The WRP site to Portsdown Hill of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 4 to 6 of the Works plans (Document reference 2.3, DCO Volume 2). Section D starts at the WRP site and ends where construction of the Pipeline would transition from tunnelling to open-cut construction north of Portsdown Hill Road (B2177). Section D would be constructed as a tunnel, which would pass underneath Drayton and follow part of the alignment of Portsdown Hill Road (B2177). In Section D, the Pipeline would be located within a casing with a maximum external diameter of 4m.

3.3.36 An access cover will be retained at the location of the tunnel shaft at the ridge of Portsdown Hill to provide access for maintenance and repair during the operational phase. This would be located in agricultural land to the north of Portsdown Hill Road (B2177) within land covered by temporary construction compound E-1 (see ES Figure 1.1 Location of the Proposed Development and Order Limits, Volume III (Document reference 6.3, DCO Volume 6) for location of temporary construction compounds). An intermediate tunnel shaft would be located south of Portsdown Hill Road (B2177) and west of Gillman Road. No permanent access hatch or other above-ground infrastructure would be required for the intermediate tunnel shaft as the shaft would be reinstated following construction.

Section E: Portsdown Hill to Boarhunt

3.3.37 Section E: Portsdown Hill to Boarhunt of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 6 to 10 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.38 Section E comprises the section from the ridge of Portsdown Hill to the boundary between Winchester City Council (WCC) and Fareham Borough Council's (FBC) administrative areas, located west of Boarhunt. Section E is primarily located within agricultural land and intersects a number of roads including New Down Lane, Widley Walk, Mill Lane, Pigeon House Lane, Southwick Road (B2177), Crooked Walk Lane, Portchester Lane and Boarhunt Road.

3.3.39 Break Pressure Tank and Intermediate Pumping Station E (BPT/IPS-E) is located at the eastern end of Section E. Additional details on the BPT/IPS-E are provided in paragraph 3.3.87.

Section F: Boarhunt to Crockerhill

3.3.40 Section F: Boarhunt to Crockerhill is shown in Sheets 10 to 12 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.41 Section F comprises the section from the boundary between WCC and FBC located west of Boarhunt to the boundary between FBC and WCC north of Crockerhill. Section F intersects the River Wallington and Forest Lane. The remainder of Section F is located within agricultural land.

3.3.42 Intermediate Pumping Station F (IPS-F) is located east of Albany Farm within Section F. Additional details on the IPS-F are provided in paragraph 3.3.75.

Section G: Crockerhill to Wickham

3.3.43 Section G: Crockerhill to Wickham is shown in Sheets 13 to 15 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.44 Section G comprises the section from the boundary between FBC and WCC north of Crockerhill to Winchester Road (A334) north-west of Wickham. Section G would intersect Hoad's Hill (A32), Castle Farm Lane, the River Meon and part of this section would be located within Wickham Park Golf Club. The remaining parts of Section G would be located within agricultural land.

3.3.45 The Order Limits for Section G provide for optionality at the trenchless construction underneath the River Meon and within Wickham Park Golf Club. This optionality is being retained so further consideration of the location of the Pipeline within the Limits of Deviation can be undertaken at the detailed design stage post-consent, to reduce effects on the operations of Wickham Park Golf Club during the construction phase.

3.3.46 Intermediate Pumping Station G (IPS-G) is located to the east of Titchfield Lane within Section G. Additional details on the IPS-G are provided in paragraph 3.3.81.

Section H: Wickham to Shedfield

3.3.47 Section H: Wickham to Shedfield is shown in Sheets 15 and 16 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.48 Section H comprises the section from Winchester Road (A334) north-west of Wickham to Winchester Road (B2177) north of Shedfield. Section H would intersect with a number of roads including Blind Lane, Pricketts Hill, High Street and Winchester Road (B2177). The remaining parts of Section H would mostly be located within agricultural land.

Section J: Shedfield to the River Hamble

3.3.49 Section J: Shedfield to the River Hamble is shown in Sheets 16 to 18 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.50 Section J comprises the section from Winchester Road (B2177) north of Shedfield to Botley Road (B3035) north of Treefield Farm. Section J would intersect with St Anne's Lane, Little Bull Lane, Sandy Lane, Curdridge Lane and Botley Road (B3035). The remaining parts of Section J would be located within agricultural land.

Section K: The River Hamble to Lower Upham

3.3.51 Section K: The River Hamble to Lower Upham is shown in Sheets 18 to 21 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.52 Section K comprises the section from Botley Road (B3035) north of Treefield Farm to the boundary between WCC and Eastleigh Borough Council (EBC) east of Ashbourne Stables. Section K intersects with the River Hamble, Winters Hill, Scivier's Lane, Alma Lane and Mortimers Lane (B3037). The Pipeline also

intersects an area of parkland at Winters Hill Hall. The remaining parts of Section K would be located within agricultural land.

3.3.53 Break Pressure Tank K (BPT-K) is located north of Winters Hill Hall and its associated parkland, within Section K. Additional details on the BPT-K are provided in paragraph 3.3.92.

Section L: Lower Upham to Brambridge

3.3.54 Section L: Lower Upham to Brambridge is shown in Sheets 21 to 25 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.55 Section L comprises the section from the boundary between WCC and EBC east of Ashbourne Stables to Highbridge Road (B3335). Section L intersects with Stroudwood Lane, Bow Lake, Winchester Road (B3354) and Bishopstoke Lane. The remaining parts of Section L are primarily located within agricultural land.

Section M: Brambridge to Otterbourne Water Supply Works

3.3.56 Section M: Brambridge to Otterbourne WSW is shown in Sheets 25 and 26 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.57 Section M comprises the section from Highbridge Road (B3335) to Otterbourne WSW. Section M intersects the River Itchen and Kiln Lane.

3.3.58 The Pipeline would be located below the River Itchen including the River Itchen Special Area of Conservation and Site of Special Scientific Interest (SSSI).

3.3.59 Section M also intersects a watercourse that is an upstream tributary of the River Itchen.

3.3.60 Upgrades to Otterbourne WSW are currently planned to address Drinking Water Inspectorate (DWI) water treatment requirements and would facilitate the treatment of flows provided by the Proposed Development. These upgrades are expected to be completed by 2031 well in advance of the operation of the Proposed Development. Upgrades to Otterbourne WSW are subject to a separate consenting process.

3.3.61 Section M would comprise the connection of the Pipeline to Otterbourne WSW and any additional works required to support this connection, which would include an isolation valve. It is expected the Pipeline would connect to a blank flange connection point that would be provided as part of the upgrades to Otterbourne WSW.

Isolation valves, air valves and washout valves

3.3.62 Along the route of the Pipeline, a number of isolation valves, washout and air valve chambers would be required.

3.3.63 Isolation valves would be required at intervals along the Pipelines and both sides of any major infrastructure or water bodies crossings. Isolation valves are required to stop the flow of water through the pipeline to facilitate repair or maintenance. They may be co-located with washouts and air valves and would be designed with an integral bypass for the balancing of upstream and downstream pressure to facilitate operation of the isolation valve.

3.3.64 Washout valves would be located at topographical low points along the Pipelines to facilitate commissioning and emptying a section of pipe for repair and maintenance.

3.3.65 Air valves would be located at topographical high points and in places where the gradient changes, to prevent accumulation of air pockets. Air pockets can cause water hammer, complete flow stoppage, pipe bursts, system noise, and can cause damage to control valves, meters, and other equipment. Therefore, air valves protect pipelines from transient pressures and entrapped air, which are the primary causes of pipeline bursting, collapsing, and fracturing. The proper placement of air valves along the route of the Pipeline helps to smooth the flow in the Pipelines while also lowering maintenance, operation, and replacement costs, energy consumption, and pressure loss.

3.3.66 At locations where trenchless construction methods are used, and therefore the Pipeline is installed at a greater depth, one isolation valve, one washout valve, and one air valve would be required at each side of the section of trenchless construction.

3.3.67 Isolation valves and washout valves would be contained with below-ground chambers sized to ensure access around the pipework and fittings to enable future operation and maintenance. For example, for a 1200mm diameter pipe laid at nominal depth this would equate to approximately a 3x3x3m chamber. Nominal depth is considered to be 900mm above the crown (top) of the pipe. The chambers would be ventilated and the top would stand at least 300mm above-ground level in open land, or at the same level as the road surface when located in road corridors, finished with an appropriately security rated chamber cover.

3.3.68 Air valves would be contained within below-ground chambers. As these are connected to the top of the pipe via a flange, the chamber does not need to encompass the entirety of the pipe. For example, for an air valve on a 1200mm pipe laid at nominal depth, this would equate to a 1.5m diameter chamber 1m deep. The chambers would be ventilated and stand at least 300mm above-ground level in open land, or at the same level as the road surface when located in road corridors, finished with an appropriately security rated chamber cover.

3.3.69 All types of valve chambers would be located to allow for maintenance access and would be marked with an indicator post with an approximate height of 1.1m for identification.

Above Ground Plant

3.3.70 As a result of the length of the Pipeline between the WRP site and Otterbourne WSW, AGPs are required to support the transfer of source water to overcome the topography of the pipeline route. Along the pipeline route there would be two IPSs, one BPT and one combined IPS and BPT.

3.3.71 A number of AGPs have been identified and these are explained in the following sections. Further hydraulic assessment would be undertaken on the final route of the Pipeline within the Limits of Deviation to inform the detailed design post-consent. This would confirm the required configuration of AGP and may identify that not all AGP set out in this chapter are required. At this stage, all potential and described AGP are however being included and assessed as part of this ES as this represents the worst case AGP scenario for the Proposed Development.

3.3.72 As the AGP would be unmanned, lighting would be required intermittently for access, inspection and planned and emergency maintenance. The AGP would require external lighting to light access roads, paths and walkways, and areas where operational and maintenance tasks are required. The lighting design would be subject to the detailed design of the AGP, which will be subject to further approvals in line with the requirements of the DCO. The external lighting would be designed in line with appropriate regulations, standards and guidance, and in accordance with the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.73 Further external lighting may also be required, which would only be used during emergency events where urgent repair or urgent maintenance would be needed. This emergency lighting would also be designed in line with the relevant regulations and standards.

Intermediate Pumping Stations

3.3.74 To accommodate changes in the topography of land, IPSs are proposed at intervals along the pipeline route to re-pressurise the pipe. An IPS is needed where pressure has fallen to the point where the Pipeline between the WRP site and Otterbourne WSW can no longer convey the required flow via gravity.

Intermediate Pumping Station F

3.3.75 The proposed location and Works Area for IPS-F is shown in Sheet 12 of the Works plans (Document reference 2.3, DCO Volume 2). Within this Works Area, the Limit of Deviation for IPS-F is shown in the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.76 IPS-F would be located east of Albany Farm within Section F of the Pipeline between the WRP site and Otterbourne WSW. IPS-F would be located on agricultural land.

3.3.77 A new permanent access road would be developed from Chalk Lane to IPS-F. There is flexibility in the Order Limits to allow for the final location of this permanent access road from Chalk Lane to be determined at the detailed design stage post-consent. This flexibility is required due to uncertainty around detailed design associated with the Welborne Garden Village development.

3.3.78 Surface water drainage, landscaping, planting and other environmental measures would be delivered at the IPS-F site in line with the Design Principles Document (Document reference 5.11, DCO Volume 5) and Outline Landscape and Ecology Management Plan (LEMP) (Document reference 7.5, DCO Volume 7).

3.3.79 The maximum parameters of IPS-F are set out in Table 3-6. These parameters are also set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Table 3-6 Intermediate Pumping Station F parameters

Element	Parameter
Maximum footprint of IPS-F within the Limits of Deviation	6,325m^2
Maximum dimensions of IPS-F within the Limits of Deviation	97.5m x 71.5m

Element	Parameter
Maximum building height of IPS-F	8m

3.3.80 Development of IPS-F will require the permanent diversion of the Fareham 103 PRoW. The PRoW would be diverted approximately 30m to the west of its current route. This diversion will form part of the wider landscape and environmental mitigation at IPS-F and is secured in the Framework Rights of Way Management Plan (RoWMP), appended to the Framework Construction Traffic Management Plan (CTMP) (Document reference 7.2, DCO Volume 7), and the Design Principles Document (Document reference 5.11, DCO Volume 5).

Intermediate Pumping Station G

3.3.81 The proposed location and Works Area for IPS-G is shown in Sheet 14 of the Works plans (Document reference 2.3, DCO Volume 2). Within this Works Area, the Limit of Deviation for IPS-G is shown in the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.82 IPS-G would be located east of Titchfield Lane within Section G of the Pipeline between the WRP site and Otterbourne WSW. IPS-G would be located on agricultural land.

3.3.83 A new permanent access point from an existing access track south-east of Titchfield Lane would be developed to access IPS-G.

3.3.84 Surface water drainage, landscaping, planting and other environmental measures would be delivered at the IPS-G site in line with the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.85 The maximum parameters of IPS-G are set out in Table 3-7. These parameters are also set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Table 3-7 Intermediate Pumping Station G parameters

Element	Parameter
Maximum footprint of IPS-G within the Limits of Deviation	6,990m^2
Maximum dimensions of IPS-G within the Limits of Deviation	90m x 69.6m
Maximum building height of IPS-G	8m

Break Pressure Tanks

3.3.86 BPTs are required at high points along the Pipeline between the WRP site and Otterbourne WSW. Water is pumped from the WRP site or IPSs to BPTs located at high points, where it then flows onwards using gravity from the tank. This reduces the amount of energy required to transfer water. BPTs also reduce the overall maximum pressure in the pipeline system associated with changes in flow rate as a result of topography. System controls would monitor water levels within the BPTs, and overflow outlets would be utilised only in the event of an emergency. It is not anticipated that the overflows would operate during the operation of the Proposed Development.

Break Pressure Tank and Intermediate Pumping Station E

3.3.87 The proposed location and Works Area for BPT/IPS-E is shown in Sheet 6 of the Works plans (Document reference 2.3, DCO Volume 2). Within this Works Area, the Limit of Deviation for BPT/IPS-E is shown in the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.88 BPT/IPS-E comprises a combined BPT with an IPS. BPT/IPS-E could comprise only a BPT or a combined BPT and IPS depending on the final hydraulic design of the Pipeline, however the worst case assumption of the BPT/IPS-E is included in this ES as this represents the worst case scenario in terms of parameters. BPT/IPS-E would be located north of Portsdown Hill Road and east of New Down Lane within Section E of the Pipeline between the WRP site and Otterbourne WSW. BPT/IPS-E would be located on agricultural land.

3.3.89 A new permanent access road would be developed from New Down Lane to BPT/IPS-E.

3.3.90 Surface water drainage, landscaping, planting and other environmental measures would be delivered at the BPT/IPS-E site in line with the Design Principles Document (Document reference 5.11, DCO Volume 5). This includes a landform to the north and the east of BPT/IPS-E to screen the lower levels of the facility and reduce impact on views from promoted routes and residential properties to the north and east. On the landform, landscape integration planting and landscape screening planting will be delivered.

3.3.91 The maximum parameters of BPT/IPS-E are set out in Table 3-8. These parameters are also set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Table 3-8 Break Pressure Tank and Intermediate Pumping Station E parameters

Element	Parameter
Maximum footprint of BPT/IPS-E within the Limits of Deviation	8,890m^2
Maximum dimensions of BPT/IPS-E within the Limits of Deviation	97.5m x 78.95m
Maximum building height of BPT/IPS-E	8m

Break Pressure Tank K

3.3.92 The proposed location and Works Area of BPT-K is shown in Sheet 20 of the Works plans (Document reference 2.3, DCO Volume 2). Within this Works Area, the Limit of Deviation for BPT-K is shown in the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.93 BPT-K would be located north of Winters Hill Hall within Section K of the Pipeline between the WRP site and Otterbourne WSW.

3.3.94 An existing access track from Winters Hill would be used to access BPT-K during the operational phase, and this would be connected to the BPT-K site.

3.3.95 Surface water drainage, landscaping, planting and other environmental measures would be delivered at the BPT-K site in line with the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.96 The maximum parameters of BPT-K are set out in Table 3-9. These parameters are also set out in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Table 3-9 Break Pressure Tank K parameters

Element	Parameter
Maximum footprint of BPT-K within the Limits of Deviation	4,650m^2
Maximum dimensions of BPT-K within the Limits of Deviation	72m x 62m
Maximum building height of BPT-K	5.6m

Invasive Non-Native Species Treatment at Otterbourne Water Supply Works

3.3.97 Works are proposed at Otterbourne WSW as part of the Proposed Development to ensure the addition of source water transferred from Havant Thicket Reservoir would not introduce pathways for the spread of Invasive Non-Native Species (INNS). The Works Area for the INNS Treatment at Otterbourne WSW is shown on Sheet 26 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.98 The INNS Treatment would treat the waste flow that is produced by the existing treatment process at Otterbourne WSW, once all flows have passed through Otterbourne WSW. Following INNS treatment, these flows would be released to the environment via the Applicant's existing network. The INNS Treatment would produce sludge, which would be disposed of via a suitably licensed disposal facility, therefore avoiding the spread of INNS. The INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) sets out the Proposed Development's approach to INNS Treatment and how this would avoid the spread of INNS.

3.3.99 The INNS Treatment would comprise repurposing an existing tank and development of an INNS Treatment plant. The existing tank can be repurposed as this area of the site will become redundant as part of the upgrades to Otterbourne WSW to address DWI requirements as described in paragraph 3.3.60. The INNS Treatment plant would either be housed within an existing redundant building, or a new building would be developed. The maximum parameters for a new treatment plant are set out in Table 3-10.

Table 3-10 Invasive Non-Native Species Treatment at Otterbourne Water Supply Works parameters

Element	Parameter
Maximum footprint of the treatment plant building within the Works Area	288m^2
Maximum dimensions of the treatment plant building within the Works Area	24m x 12m
Maximum height of the treatment plant building	8m

Use of Havant Thicket Reservoir for the storage of recycled water and use of pipelines between Bedhampton Springs and Havant Thicket Reservoir

3.3.100 Havant Thicket Reservoir is shown in Havant Thicket Reservoir Sheet 1A to 1D of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.101 The Havant Thicket Reservoir is a development proposed by Portsmouth Water that received planning permission in October 2021 (Havant Borough Council (HBC) planning application reference APP/20/00990 and East Hampshire District Council (EHDC) planning application reference 51680/001) and has subsequently been amended by a section 73 application (planning application reference HBC APP/24/00312 and EHDC 51680/0012). Following the transfer of recycled water from the WRP site, the recycled water would be combined with water contained within the Havant Thicket Reservoir. The Proposed Development would use the Havant Thicket Reservoir for the storage of recycled water, before transfer to Otterbourne WSW.

3.3.102 The Proposed Development would also use pipelines that have been consented by Portsmouth Water (HBC planning application reference APP/24/00405) between Bedhampton Springs and Havant Thicket Reservoir. These pipelines would transfer recycled water from Bedhampton Springs to Havant Thicket Reservoir, and transfer source water from Havant Thicket Reservoir back to Bedhampton Springs. The Proposed Development would connect into these pipelines as described from paragraph 3.3.24. The pipelines are within the Order Limits and are shown on Sheets 2 to 3 of the Works plans (Document reference 2.3, DCO Volume 2).

Environmental Mitigation and Enhancement

3.3.103 The Proposed Development will deliver environmental mitigation to mitigate adverse impacts. As well as environmental mitigation, the Proposed Development also seeks to provide environmental enhancement within the Order Limits. Locations for environmental mitigation and enhancement are within Environmental Mitigation and Enhancement Areas (EMEAs) which are set out on the Works plans (Document reference 2.3, DCO Volume 2) and in the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.104 The DPD draws a distinction between ‘environmental mitigation’ and ‘additional environmental enhancement’. Environmental mitigation means the Applicant’s proposals to mitigate the potential adverse environmental effects of the Proposed Development that have been assessed and are reported in this ES. Such environmental mitigation can take a number of different forms including habitat creation to mitigate vegetation loss, improving or enhancing existing habitats or planting to screen AGP and provide landscape integration. In each case, the provision of the environmental mitigation is necessary to deliver the Proposed Development within the ‘Rochdale Envelope’ assessed in this ES. The Applicant is seeking appropriate powers of compulsory acquisition to safeguard the delivery of the environmental mitigation. The environmental mitigation is secured in the Design Principles Document (Document reference 5.11, DCO Volume 5).

3.3.105 As well as environmental mitigation, the Proposed Development also seeks to provide additional environmental enhancement (hereafter referred to as environmental enhancements) within the Order Limits, for example habitat improvements adjacent to construction working areas. These enhancements are not necessary for the delivery of the Proposed Development and therefore consent is sought to deliver these environmental enhancements, but these will only be implemented subject to securing agreements with landowners.

3.3.106 Table 3-11 sets out locations where environmental mitigation and enhancement is proposed.

Table 3-11 Summary of mitigation and enhancement areas

EMEA	Purpose	Description
IPS-E	Mitigation	Having regard to the potential for impacts on views from New Down Lane, trees and shrubs will be planted between New Down Lane and BPT/IPS-E where reasonably practicable, dependent on other operational, safety and security requirements. Opportunities to extend and connect any new planting with the existing woodland strip south of BPT/IPS-E along Portsdown Hill Road will be considered, using the same or similar mix of native tree and shrub species. This will improve the local landscape character and create a stronger habitat network. A new landform will be created to the north and the east of BPT/IPS-E to screen the lower levels of the facility and reduce impact on views from promoted routes and residential properties to the north and east. On the landform landscape integration planting and landscape screening planting will be delivered. Planting of the hedge on the west side of the site (east of New Down Lane) will be delivered to fill the gaps in the hedgerow, to screen views from Fort Widley to BPT/IPS-E through the gaps in the existing treeline.
	Enhancement	Outside of the operational area for BPT/IPS-E, chalk grassland habitat will be provided throughout IPS-E to support the Portsdown SSSI to the south. Where practicable, swift boxes will be installed on BPT/IPS-E.
EMEA_E_2	Mitigation	Planting of the existing hedge bordering New Down Lane will be delivered to fill existing gaps in the hedgerow and deliver hedgerow with trees, to help screen views from Fort Widley to BPT/IPS-E. Trees provided will predominantly be located towards the south of the existing hedgerow.
	Enhancement	Creating new chalk grassland to support Portsdown SSSI.
EMEA_E_3	Enhancement	Reinstate and enhance grassland to good condition, either neutral grassland with a sward dominated by false oat-grass or other calcareous grassland to support Motte & Bailey & Chalk Pit Site of Importance for Nature Conservation (SINC).
IPS-F	Mitigation	Woodland and scrub planting will be extended into the north-west and north-east areas of IPS-F. A new woodland will be created, of a minimum of 20m width, along the length of the farm track along the south-east of IPS-F, integrating into the existing woodland. Planting will be designed to allow continued use of the farm track. This planting will provide landscape screening for IPS-F. Existing hedgerows surrounding IPS-F will be enhanced to increase biodiversity, green infrastructure connectivity and landscape pattern. Enhancements will be in keeping with the

EMEA	Purpose	Description
		historic landscape character and dependent on the existing condition of the hedgerow.
EMEA_F_1	Mitigation	The line of trees will be reinstated after construction.
EMEA_F_2	Mitigation	Protected species mitigation will be provided as determined by pre-construction surveys. Creation of woodland to mitigate woodland loss across the Proposed Development.
EMEA_G_1	Mitigation	Loss of woodland will be mitigated through the creation of lowland mixed deciduous woodland within grassland along the existing woodland edge and will consider the Wickham Park Golf Club course landscape character and historic character.
EMEA_G_2	Mitigation	Hedgerow with trees and wet woodland will be reinstated and opportunities for improvement will be sought and will consider the Wickham Park Golf Club course landscape character and historic character.
IPS-G	Mitigation	To provide visual screening for residential areas of Wickham to the east and users of the PRoW to the north, new woodland and scrub planting of a minimum of 15m metres wide, where reasonably practicable dependent on other operational, safety and security requirements, will be planted on the north-east and south-east side of IPS-G, connecting to the existing woodland to the west and existing hedgerow along the farm track to the south To integrate the new landscape screening and improve the landscape, new trees and scrub will be planted east of the landscape screening at the edge of IPS-G. To mitigate for loss of connectivity due to access along Titchfield Lane, hedgerow will be created to the south of IPS-G along the farm track. To increase biodiversity and Green Infrastructure connectivity, a 20m metre wide band of woodland and scrub will be created to connect the visual screening planting to the wooded boundary of Park Place.
	Enhancement	To enhance connectivity and biodiversity, new woodland and scrub planting will be incorporated between the north-west edge of IPS-G and the existing woodland to the west which forms the border of private properties on Titchfield Lane. Landscape enhancement and integration planting will consider the Wickham Park Golf Club course historic character. Existing hedgerows surrounding IPS-G will be enhanced to increase biodiversity, connectivity and landscape pattern. Enhancements will be in keeping with the historic landscape character and dependent on the existing condition of the hedgerow.
EMEA_J_1	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_J_2	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.

EMEA	Purpose	Description
EMEA_J_3	Mitigation	Protected species mitigation to be provided as determined by pre-construction surveys. Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_J_4		
EMEA_J_5	Mitigation	Protected species mitigation to be provided as determined by pre-construction surveys.
EMEA_K_1	Mitigation	Protected species mitigation will be provided as determined by pre-construction surveys.
	Enhancement	Landscape enhancements will be delivered in this EMEA, associated with the River Hamble and to improve connectivity between South Downs National Park (SDNP) and New Forest National Park. River bank restoration and species enhancements and PRoW enhancements will be considered. Where this EMEA borders the park lug, planting will consider impacts to and enhancements of the historic earthworks and planting associated with the Bishop's Waltham deer park.
EMEA_K_2	Enhancement	Landscape enhancements will be delivered in this EMEA, associated with the River Hamble and to improve connectivity between SDNP and New Forest National Park. River bank restoration and species enhancements and PRoW enhancements will be considered. Where this EMEA borders the park lug, planting will consider impacts to and enhancements of the historic earthworks and planting associated with the Bishop's Waltham deer park.
EMEA_K_3		
EMEA_K_4	Enhancement	Creation of other neutral grassland habitat.
BPT-K	Mitigation	The existing treeline adjacent north of BPT-K (running north-west - south-east) will be reinstated and widened to a minimum of 20m through the creation of lowland mixed deciduous woodland. This planting will screen views of BPT-K from within the SDNP and residences in Lower Upham, improve habitat connectivity, integrate BPT-K with the existing historic landscape, and mitigate for the loss of lines of trees and woodland. In the field west and north of BPT-K, the existing grassland will be improved and neutral grassland with a sward dominated by perennial ryegrass and crested dog's tail with scattered trees will be planted. Outside of the operational area for BPT-K, opportunities will be sought to deliver grassland in order to reduce visual impact. Lowland mixed deciduous woodland to the south and east and the ecologically valuable line of trees north-east of BPT-K will be protected, enhanced and widened to increase biodiversity, Green Infrastructure connectivity and landscape pattern. Enhancements will be in keeping with the historic landscape character.
EMEA_K_5	Enhancement	Creation of other neutral grassland habitat.

EMEA	Purpose	Description
EMEA_L_1	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_L_2	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_L_3	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_L_4	Enhancement	Creation and enhancement of grassland areas to moderate condition grassland.
EMEA_L_5	Mitigation	Fielders Farm Meadows SINC will be reinstated and enhanced to good condition to mitigate impacts during construction.
EMEA_L_6	Mitigation	If otter are identified following pre-construction surveys at Bow Lake, otter mitigation will be delivered to provide additional shelter and screening.
	Enhancement	Poor-condition modified grassland will be enhanced.
EMEA_L_7	Enhancement	Creation of new wet woodland to expand the existing woodland parcel.
EMEA_M_1	Enhancement	Enhancement works to the Otterbourne Stream to improve the watercourse to deliver better-quality habitat for southern damselfly, supporting this priority species through targeted hydrological and ecological improvements.
EMEA_M_2	Enhancement	Other broadleaved woodland in this area will be improved to reach good ecological condition.
WRP	Mitigation	The main process building (within Zone 1) will have a green/brown roof, to provide Open Mosaic Habitat mitigation within the facility boundary, improve biodiversity, and to reduce impacts on key views from the south. Open Mosaic Habitat mitigation will be delivered within areas of the WRP site not in active use, additional to the Open Mosaic Habitat that will be provided on the roof of the main process building. Existing vegetation on the south and west of the site boundary will be reinforced as far as reasonably practicable with interplanting and widened with new tree and scrub planting, to help screen views into the site and improve ecological corridors. Existing vegetation along the north of the site boundary and east along Hermitage Stream will be interplanted with resilient species, to reinforce the existing mature trees, protecting mature tree stock.
	Enhancement	Existing vegetation on the west of the site boundary will be reinforced as far as reasonably practicable with interplanting and widened with new tree and scrub planting, to help screen views into the site and improve ecological corridors. Existing vegetation along the north of the site boundary will be interplanted with resilient species, to reinforce the existing mature trees, protecting mature tree stock.

Release from the Eastney Long Sea Outfall

3.3.107 The Eastney LSO, Eastney PS and Eastney TT are shown in Sheets 29 to 30 of the Works plans (Document reference 2.3, DCO Volume 2).

3.3.108 Reject water produced by the WRP site would be returned to Budds Farm WTW by gravity using the Pipelines between Budds Farm WTW and the WRP site. The reject water would then be transferred via a new connection to the existing Eastney TT and Eastney PS to the Eastney LSO. Works on the Eastney TT would include the connection at Budds Farm WTW for the reject water from the WRP site, which are included in the works for the Pipelines between Budds Farm WTW and the WRP site.

3.3.109 In the event of an emergency shut down of the WRP site, water within the WRP would be returned to Budds Farm WTW by opening the run to waste valve. This water would then be released using the existing Eastney TT, Eastney PS and Eastney LSO. The run to waste would also be used to release water that does not meet the water quality requirements at the WRP, however this would not increase the volume of water released from the existing Eastney LSO above the volumes set out in section 3.6.

Utility connections

3.3.110 The Proposed Development would require new utility connections including for power, water and wastewater, at the WRP site and AGP.

3.3.111 These connections do not form part of the Proposed Development and will be developed and delivered by the relevant operators through separate consenting. An assessment of utility connections is included within ES Chapter 20 Cumulative and in-combination effects, Volume I (Document reference 6.1, DCO Volume 6).

3.4 Proposed Development components within host authority boundaries

3.4.1 Table 3-12 identifies which host authority areas (as described in section 2.3 of ES Chapter 2 Planning legislation and policy, Volume I (Document reference 6.1, DCO Volume 6)) the different components of the Proposed Development are located in. Please see ES Figure 1.1 Location of the Proposed Development and Order Limits, Volume III (Document reference 6.3, DCO Volume 6) which shows the Order Limits and host authority boundaries.

Table 3-12 Proposed Development components by host authority

Proposed Development components		Host authority
WRP site		HBC and Hampshire County Council (HCC)
Pipelines between Budds Farm WTW and the WRP site		HBC and HCC
Pipelines between the WRP site and Bedhampton Springs		HBC and HCC
Pipeline between the WRP site and Otterbourne WSW	Section D	HBC, HCC, Portsmouth City Council (PCC) and WCC
	Section E	WCC and HCC

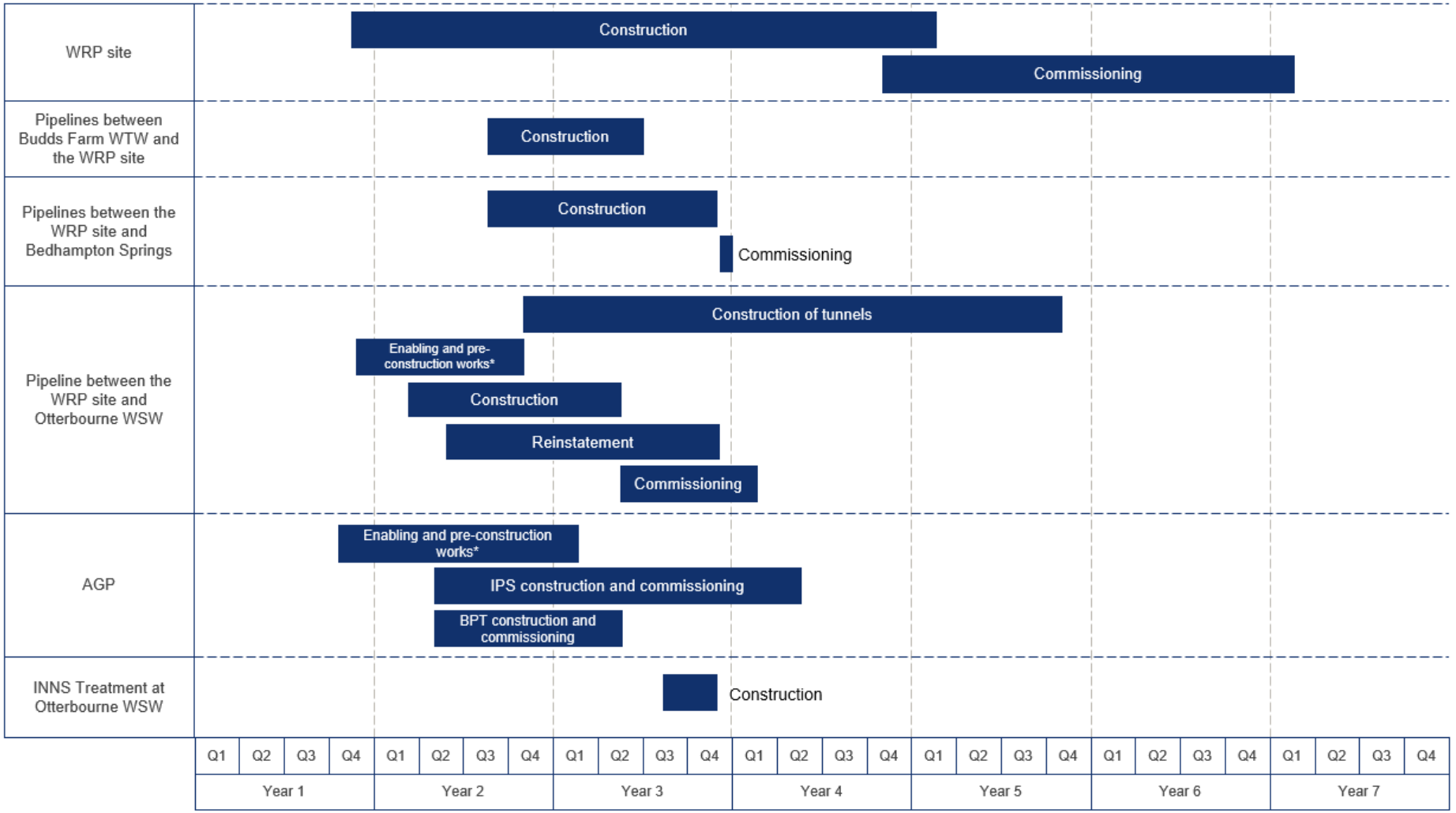
Proposed Development components		Host authority
	Section F	FBC and HCC
	Section G	WCC and HCC
	Section H	WCC and HCC
	Section J	WCC and HCC
	Section K	WCC and HCC
	Section L	EBC, WCC and HCC
	Section M	WCC and HCC
Use of Havant Thicket Reservoir for the storage of recycled water		HBC, EHDC and HCC
AGP	BPT/IPS-E	PCC
	IPS-F	FBC and HCC
	IPS-G	WCC and HCC
	BPT-K	WCC and HCC
INNS Treatment at Otterbourne WSW		WCC and HCC
Release from the Eastney Long Sea Outfall		HBC, HCC and PCC

3.5 Approach to construction

Construction programme

3.5.1 The indicative construction programme for the Proposed Development is set out in Graphic 3-2.

Graphic 3-2 Indicative construction programme



* Enabling and pre-construction works including: site clearance and preparation, crossings of major utilities, construction compounds and trenchless compounds.

3.5.2 Graphic 3-2 sets out that the Proposed Development would be constructed over approximately a five-year period. It is currently expected that construction would commence in 2028 however this is dependent on various elements including the DCO programme and detailed design post-consent.

3.5.3 The standard working hours for construction of the Proposed Development would be as follows:

1. **Monday to Friday (excluding bank holidays)**: 07:00 to 19:00 in summer (April-September) and 07:00 to 17:30 in winter (October-March).
2. **Saturday**: 07:00 to 17:00.

3.5.4 Works outside these standard working hours or overnight (including Sundays and bank holidays) may be required for construction of some aspects of the Proposed Development including, but not restricted to, trenchless works and tunnelling, construction works within or near highways and railways, tidal working and abnormal load deliveries. This may be as a result of ground conditions that require continuous working or for works within highways to reduce traffic disruption.

Construction activities associated with the principal components of the Proposed Development

3.5.5 This section describes the construction activities proposed for the components of the Proposed Development. Additional information on the pipeline construction methods and types of construction compounds is set out from paragraph 3.5.90.

3.5.6 The Guide to Application document (Document reference 1.3, DCO Volume 1) explains how the components of the Proposed Development described in this section relate to those shown in the Works plans (Document reference 2.3, DCO Volume 2).

Water Recycling Plant site

3.5.7 The location and Works Area for the WRP site is shown on Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.8 A temporary construction compound would be located at the WRP site. This would enable the construction of the WRP site and tunnel shafts associated with the various pipelines.

3.5.9 The WRP site is located at a former domestic landfill site, and the wider area is typified by light industrial units, as well as commercial and office space using steel framed construction.

3.5.10 To construct the WRP site, a level surface would need to be created. This would involve a cut and fill operation. The preferred option is to use site won material from the cut to balance the fill. This would help to limit the amounts of waste generated and materials imported. However, due to the previous use of the land as a landfill, it is most likely that at least some imported material would be required, and any contaminated and hazardous materials would be handled and/or removed in line with relevant requirements, standards and guidance. This would create a level surface for a piling mat from which the foundations of the WRP site would be piled. Reinforced concrete slabs would be laid onto the piled foundations. Particular care would need to be taken due to piling into a domestic former landfill.

A detailed Foundation Works Risk Assessment will be undertaken post-consent, which is secured in the Outline Construction Environmental Management Plan (CEMP) (Document reference 7.1, DCO Volume 7). Piled foundations would be cast in situ to reduce the risk associated with landfill leachate, and continuous flight auger piles or other bored method would be used to reduce the potential for the creation of new contamination pathways. Gas protection measures would be implemented at enclosed structures and pressure relief systems would be implemented at areas of hardstanding.

3.5.11 Construction of the WRP site would consist of a main process building, three pumping stations, kiosks for control equipment, administration buildings and parking facilities. Several large holding tanks and chemical storage units would also be constructed above-ground. These would either be pre-cast concrete tanks or glass fused to steel construction.

3.5.12 Construction of the SuDS outfall may temporarily require either a sandbag cofferdam or a sheet piled cofferdam. The cofferdam would extend approximately 2m into the Hermitage Stream, and approximately 4m along the Hermitage Stream. Any water that enters the cofferdam would be over pumped back into the Hermitage Stream, ensuring no contamination enters the watercourse. It is anticipated that the construction duration of the SuDS outfall would be approximately six weeks. Measures to mitigate the potential for environmental impacts as a result of construction of the SuDS outfall are set out and secured in the Outline CEMP (Document reference 7.1, DCO Volume 7).

Pipelines between Budds Farm Wastewater Treatment Works and the Water Recycling Plant site

3.5.13 The Works Area for the Pipelines between Budds Farm WTW and the WRP site are shown on Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.14 The Pipelines (approximately 700m in length) would both be located on the same route within a single casing. The Pipelines would be located under the Hermitage Stream and would be constructed using trenchless construction methods. To facilitate trenchless construction, a temporary construction compound would be located at the Budds Farm WTW and the temporary construction compound at the WRP site would be used. The launch shaft for trenchless construction would be located at the WRP site temporary construction compound, and the reception shaft would be located at the Budds Farm WTW temporary construction compound. The launch shaft at the WRP site would have a diameter of approximately 9m and a depth of approximately 32.5m below-ground level. The reception shaft at Budds Farm WTW would have a diameter of approximately 5.5m and a depth of approximately 19m below-ground level.

Pipelines between the Water Recycling Plant site and Bedhampton Springs

3.5.15 The Works Area for the Pipelines between the WRP site and Bedhampton Springs is shown in Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.16 This component comprises a connection between the WRP site and Bedhampton Springs, which is an existing Portsmouth Water site. Two sections of trenchless construction and one above-ground section of pipeline would be used. Two

sections of trenchless construction are required to account for the change in direction of the route of the pipelines. The first section of trenchless construction would be from the WRP site to temporary construction compound B1-1 located west of Mill Lane and south of the West Coastway Line railway. The shaft for trenchless construction at the WRP site would have a minimum depth of approximately 17m below-ground level and a diameter of approximately 12.5m. The shaft within temporary construction compound B1-1 would have a minimum depth of approximately 8m below-ground level and a diameter of approximately 10.5m. Access to temporary construction compound B1-1 would predominantly be from Mill Lane, with the heaviest construction vehicles accessing the temporary construction compound from an existing access point on the A27 slip road, subject to National Highways approval. The second section of trenchless construction would be from temporary construction compound B1-1 to temporary construction compound B1-2 located east of Mill Lane and south of the West Coastway Line railway. The same shaft at temporary construction compound B1-1 would be used for the first and second section of trenchless construction. The shaft within temporary construction compound B1-2 would have a minimum depth of approximately 7m below-ground level and a diameter of approximately 8.2m. Access to temporary construction compound B1-2 would be from an existing access point on Meyrick Road via the Bedhampton Springs site.

3.5.17 From the temporary construction compound B1-2, part of the pipelines would be constructed above-ground to reduce excavation within the SPZ1 which protects groundwater within Bedhampton Springs. The above-ground section of the pipelines would be constructed to a connection point. At this connection point, the Pipeline would connect to Portsmouth Water's pipelines to enable the transfer between Bedhampton Springs and Havant Thicket Reservoir.

3.5.18 No construction works between Bedhampton Springs and Havant Thicket Reservoir are required as part of the Proposed Development.

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

3.5.19 This section details the construction details for the Pipeline between the WRP site and Otterbourne WSW. ES Appendix 3.1 Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6) sets out the locations where reduced working width areas and trenchless construction will be used.

3.5.20 Paragraphs 3.5.21 to 3.5.66 sets out where trenchless construction techniques will be used. For most of the Pipeline, open-cut trench construction would be utilised, however trenchless construction will be used in the locations identified in this section, for example, at environmentally sensitive locations such as certain watercourses or for major infrastructure such as roads or railways. The assessment in this ES assumes a worst case of trenched open-cut construction for relevant topics, where trenchless or tunnelling construction has not been defined. A schedule of locations where trenchless and tunnelling construction will be used are shown in ES Appendix 3.1 Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6). The use of trenchless construction is secured through the Outline CEMP (Document reference 7.1, DCO Volume 7).

Section D: The Water Recycling Plant site to Portsdown Hill

3.5.21 Section D of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 4 to 6 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.22 Section D would be constructed using tunnelling construction. The tunnel launch shaft would be located at the temporary construction compound at the WRP site. The shaft at the WRP site would have a minimum depth of approximately 21m below-ground level and a diameter of approximately 15m. The tunnel reception shaft would be located at temporary construction compound E-1 located north of Portsdown Hill Road (B2177) which would be accessed directly from New Down Lane. The shaft within temporary construction compound E-1 would have a minimum depth of approximately 11m below-ground level and a diameter of approximately 12.5m.

3.5.23 An intermediate tunnel shaft would be located within temporary construction compound D-1 located south of Portsdown Hill Road (B2177) and west of Gillman Road which would be accessed directly from Gillman Road. The shaft within temporary construction compound D-1 would have a depth of approximately 65m below-ground level and a diameter of approximately 12.5m. This shaft would be backfilled, capped and the surface reinstated to its existing condition following the completion of construction works.

Section E: Portsdown Hill to Boarhunt

3.5.24 Section E of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 6 to 10 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.25 Section E is anticipated to be constructed using trenched open-cut construction, however trenchless construction may be utilised at other environmentally sensitive locations.

3.5.26 Section E includes the reception shaft of the tunnelled section described in Section D.

3.5.27 Table 3-13 sets out the temporary construction compounds that would be required within Section E. There are two options for temporary construction compound E-4 and two options for temporary construction compound E-6. Only one option for each temporary construction compound would be used.

Table 3-13 Section E: Portsdown Hill to Boarhunt temporary construction compounds

Construction compound reference	Location	Construction compound purpose	Access point
Construction compound E-1	North of Portsdown Hill Road (B2177) and east of New Down Lane	Tunnelling construction compound for Section D tunnel reception shaft	New temporary access from New Down Lane
		BPT/IPS-E construction compound	
		Sectional site compound	
Construction compound E-2	North of Portsdown Hill Road (B2177) and west of New Down Lane	Sectional site compound	New temporary access from New Down Lane
Construction compound E-3	West of Pigeon House Farm	Water storage lagoon	Haul road via new temporary access from Southwick Road (B2177)
Construction compound E-4a	East of Southwick Road (B2177)	Sectional site compound	New temporary access from Southwick Road (B2177)
Construction compound E-4b	West of Southwick Road (B2177)	Sectional site compound	New temporary access from Southwick Road (B2177)
Construction compound E-5	West of Portchester Lane	Sectional site compound	New temporary access from Portchester Lane
		Water storage lagoon	
Construction compound E-6a	East of Boarhunt Road	Sectional site compound	New temporary access from Boarhunt Road
Construction compound E-6b	West of Boarhunt Road	Sectional site compound	New temporary access from Boarhunt Road

Section F: Boarhunt to Crockerhill

3.5.28 Section F of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 10 to 12 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.29 Section F intersects with the River Wallington. This intersection would be constructed using trenchless construction methods. Temporary construction compound F-1 and temporary construction compound F-2 would be used to undertake the trenchless construction.

3.5.30 The remaining parts of Section F would be constructed using trenched open-cut construction, however, trenchless construction may be utilised at other environmentally sensitive locations.

3.5.31 Table 3-14 sets out the temporary construction compounds that would be required within Section F.

Table 3-14 Section F: Boarhunt to Crockerhill temporary construction compounds

Construction compound reference	Location	Construction compound purpose	Access point
Construction compound F-1	East of the River Wallington and west of White Dell Lane	Trenchless construction compound	Haul road via new temporary access from White Dell Lane
		Water storage lagoon	
Construction compound F-2	West of the River Wallington	Trenchless construction compound	Haul road via Chalk Lane
Construction compound F-3	East of Albany Farm	Sectional site compound	Chalk Lane
		IPS-F construction compound	

Section G: Crockerhill to Wickham

3.5.32 Section G of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 13 to 15 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.33 Section G intersects with the River Meon, Hoad's Hill (A32) and Winchester Road (A334).

3.5.34 The intersection with the River Meon would be constructed using trenchless construction methods between temporary construction compound G-3 and temporary construction compound G-4 or temporary construction compound G-5. As explained in paragraph 3.3.45, there are two options for the trenchless construction in Section G at the River Meon to support the flexibility for routing of the Pipeline at Wickham Park Golf Club which is north of the River Meon. Only one of these options for trenchless construction would be developed.

3.5.35 The intersection with Hoad's Hill (A32) would be constructed using trenchless construction between temporary construction compound G-1 and temporary construction compound G-2.

3.5.36 The intersection with Winchester Road (A334) would be constructed using trenchless construction between temporary construction compound G-7 and temporary construction compound H-1 (located in Section H).

3.5.37 The remaining parts of Section G would be constructed using trenched open-cut construction, however trenchless construction may be utilised at other environmentally sensitive locations.

3.5.38 Table 3-15 sets out the temporary construction compounds that would be required in Section G.

Table 3-15 Section G: Crockerhill to Wickham temporary construction compounds

Construction compound reference	Location	Construction compound purpose	Access point
Construction compound G-1	East of Hoad's Hill (A32)	Trenchless construction compound	New temporary access from Hoad's Hill (A32)
Construction compound G-2	West of Hoad's Hill (A32)	Trenchless construction compound	New temporary access from Hoad's Hill (A32)
Construction compound G-3	East of Mayles Lane	Trenchless construction compound	New temporary access from Mayles Lane
Construction compound G-4	West of Wickham WTW	Trenchless construction compound	Haul road via existing access from Titchfield Lane
Construction compound G-5	Wickham WTW	Sectional site compound	Haul road via existing access from Titchfield Lane
		Trenchless construction compound	
Construction compound G-6	East of Titchfield Lane	Sectional site compound	Haul road via new temporary access from Titchfield Lane
		IPS-G construction compound	
Construction compound G-7	West of Winchester Road (A334) and south of Titchfield Lane	Sectional site compound	New temporary access from Titchfield Lane
		Water storage lagoon	
		Trenchless construction compound	

Section H: Wickham to Shedfield

3.5.39 Section H of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 15 and 16 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.40 Section H intersects with High Street and Winchester Road (B2177). The intersection with High Street would be constructed using trenchless construction between temporary construction compound H-3 and temporary construction compound H-4.

3.5.41 The intersection with Winchester Road (B2177) would be constructed using trenchless construction between temporary construction compound H-5 and temporary construction compound J-1 (located in Section J).

3.5.42 The remaining parts of Section H would be constructed using trenched open-cut construction, however, trenchless construction may be utilised at other environmentally sensitive locations.

3.5.43 Table 3-16 sets out the temporary construction compounds that would be required in Section H.

Table 3-16 Section H: Wickham to Shedfield temporary construction compounds

Construction compound reference	Location	Construction compound purpose	Access point
Construction compound H-1	East of Winchester Road (A334) and south of Blind Lane	Trenchless construction compound	Haul road via existing access from Blind Lane
Construction compound H-2	South of Blind Lane and west of Mill Lane	Sectional site compound	Existing access from Blind Lane
Construction compound H-3	East of High Street Shirrell Heath	Trenchless construction compound	Existing access from High Street
Construction compound H-4	West of High Street Shirrell Heath	Trenchless construction compound	New temporary access from High Street
		Sectional site compound	
Construction compound H-5	East of Winchester Road (B2177)	Trenchless construction compound	Haul road via New temporary access from High Street

Section J: Shedfield to the River Hamble

3.5.44 Section J of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 16 to 18 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.45 Section J intersects with St Anne's Lane and Botley Road (B3035). The intersection with St Anne's Lane would also be constructed in combination with the trenchless construction that would be used at the intersection with Winchester Road (B2177) as described in Section H.

3.5.46 The intersection with Botley Road (B3035) would be constructed using trenchless construction between temporary construction compound J-3 and temporary construction compound K-1 (located in Section K).

3.5.47 The remaining parts of Section J would be constructed using trenched open-cut construction, however trenchless construction may be utilised at other environmentally sensitive locations.

3.5.48 Table 3-17 sets out the temporary construction compounds that would be required in Section J.

Table 3-17 Section J: Shedfield to the River Hamble temporary construction compounds

Construction compound reference	Location	Construction compound purpose	Access point
Construction compound J-1	West of St Anne's Lane	Trenchless construction compound	New temporary access from St Anne's Lane
		Sectional site compound	
Construction compound J-2	South of Curdridge Lane	Sectional site compound	Existing access from Curdridge Lane
Construction compound J-3	South of Botley Road (B3035)	Trenchless construction compound	New temporary access from Botley Road
		Sectional site compound	

Section K: The River Hamble to Lower Upham

3.5.49 Section K of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 18 to 21 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.50 Section K intersects the River Hamble and Winters Hill. The intersection with the River Hamble would be constructed in combination with the trenchless construction that would be used at the intersection with Botley Road (B3035) as described in Section J.

3.5.51 The intersection with Winters Hill would be constructed using trenchless construction between temporary construction compound K-4 and temporary construction compound K-5. Temporary construction compound K-5 would be set back from the road, as shown on Sheet 20 of the Works plans (Document reference 2.3, DCO Volume 2), to reduce the length of trenched open-cut construction within the parkland landscape associated with Winters Hill Hall.

3.5.52 The remaining parts of Section K would be constructed using trenched open-cut construction, however trenchless construction may be utilised at other environmentally sensitive locations.

3.5.53 Table 3-18 sets out the temporary construction compounds that are would be required in Section K.

Table 3-18 Section K: The River Hamble to Lower Upham temporary construction compounds

Construction compound reference	Location	Construction compound purpose	Access point
Construction compound K-1	North of the River Hamble	Trenchless construction compound	Haul road via existing access from Winters Hill
Construction compound K-2	West of Brooklands Farm	Sectional site compound	Haul road via existing access from Winters Hill
Construction compound K-3	South of Winters Hill	Sectional site compound	Existing access from Winters Hill
Construction compound K-4	South of Winters Hill	Trenchless construction compound	Haul road via existing access from Winters Hill
Construction compound K-5	North of Winters Hill	Trenchless construction compound	Haul road via new temporary access from Winchester Road (B2177)
Construction compound K-6	North of Winters Hill Hall	BPT-K compound	New temporary access from Winchester Road (B2177)

Section L: Lower Upham to Brambridge

3.5.54 Section L of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 21 to 25 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.55 Section L intersects with Winchester Road (B3354), Bow Lake and an upstream tributary of the River Itchen. The intersection with a watercourse and woodland at Store House Gully would be constructed using trenchless construction between temporary construction compound L-2 and temporary construction compound L-3.

3.5.56 The intersection with Winchester Road (B3354) would be constructed using trenchless construction between temporary construction compound L-5 and temporary construction compound L-6.

3.5.57 The intersection with Bow Lake would be constructed using trenchless construction between temporary construction compound L-7 and temporary construction compound L-8.

3.5.58 The intersection with an upstream tributary of the River Itchen would be constructed using trenchless construction between temporary construction compound L-9 and temporary construction compound L-10.

3.5.59 The remaining parts of Section L would be constructed using trenched open-cut construction, however trenchless construction may be utilised at other environmentally sensitive locations.

3.5.60 Table 3-19 sets out the temporary construction compounds that would be required in Section L.

Table 3-19 Section L: Lower Upham to Brambridge temporary construction compounds

Construction compound reference	Location	Construction compound purpose	Access point
Construction compound L-1	South-west of Portsmouth Road (B2177)	Sectional site compound	New temporary access from Portsmouth Road (B2177)
Construction compound L-2	North of Lowhill Farm	Trenchless construction compound	Haul road via new temporary access from Stroudwood Lane
		Water storage lagoon	
Construction compound L-3	West of Store House Gully	Trenchless construction compound	Haul road via existing access from Winchester Road (B3354)
Construction compound L-4	East of Winchester Road (B3354)	Sectional site compound	Existing access from Winchester Road (B3354)
Construction compound L-5	East of Winchester Road (B3354)	Trenchless construction compound	Haul road via existing access from Winchester Road (B3354)
Construction compound L-6	West of Winchester Road (B3354)	Trenchless construction compound	New temporary access from Winchester Road (B3354)
Construction compound L-7	South of Bow Lake	Trenchless construction compound	Haul road via new temporary access from Winchester Road (B3354)
Construction compound L-8	North of Bow Lake	Trenchless construction compound	Haul road via new temporary access from Church Lane
		Water storage lagoon	
Construction compound L-9	East of upstream tributary of the River Itchen	Trenchless construction compound	Haul road via new temporary access from Church Lane
Construction compound L-10	East of Highbridge Road (B3335)	Trenchless construction compound	New temporary access from Highbridge Road (B3335)
		Sectional site compound	

Section M: Brambridge to Otterbourne Water Supply Works

3.5.61 Section M of the Pipeline between the WRP site and Otterbourne WSW is shown in Sheets 25 and 26 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.62 Section M intersects with the River Itchen and an upstream tributary of the River Itchen. The intersection with the River Itchen would be constructed using trenchless construction between temporary construction compound L-10 (located in Section L) and temporary construction compound M-1. The trenchless construction at the intersection of the River Itchen would be at a depth of approximately 15m. The launch shaft for the trenchless construction would be at temporary construction compound L-10, and would have a minimum depth of approximately 13m below-ground level and a diameter of approximately 10.5m. The reception shaft within temporary construction compound M-1 would have a minimum depth of approximately 8m below-ground level and a diameter of approximately 9m.

3.5.63 The intersection with an upstream tributary of the River Itchen would be constructed using trenchless construction between temporary construction compound M-2 and temporary construction compound M-3.

3.5.64 The remaining parts of Section M would be constructed using trenched open-cut construction, however trenchless construction may be utilised at other environmentally sensitive locations.

3.5.65 To ensure access can be gained to temporary construction compound M-3 located south of Otterbourne WSW, upgrades to existing access roads within and to the north of Otterbourne WSW may be required, and a new temporary road may need to be constructed to the east of the INNS Treatment at Otterbourne WSW. The Order Limits provide flexibility for these access options. This flexibility is sought due to requirements set out by the Security and Emergency Measures Direction that are expected to be implemented at Otterbourne WSW, which may mean construction vehicles are restricted from some areas of the operational site. These details are not currently known as the design of the upgrades to Otterbourne WSW are not yet progressed.

3.5.66 Table 3-20 sets out the temporary construction compounds that would be required in Section M.

Table 3-20 Section M: Brambridge to Otterbourne Water Supply Works temporary construction compounds

Construction compound reference	Location	Construction compound purpose	Access point
Construction compound M-1	East of Otterbourne Park Wood	Trenchless construction compound for trenchless reception shaft	Haul road via new temporary access from Kiln Lane
Construction compound M-2	South of upstream tributary of the River Itchen	Trenchless construction compound	Haul road via new temporary access from Kiln Lane
Construction compound M-3	South of Otterbourne WSW	Sectional site compound	Otterbourne WSW via Waterworks Road
		Trenchless construction compound	

Above Ground Plant

3.5.67 This section sets out the construction details for the AGP.

Intermediate Pumping Station F

3.5.68 Construction works for IPS-F would be undertaken within temporary construction compound F-3, which would be accessed from Chalk Lane.

3.5.69 Due to the existing topography of the site for IPS-F, the ground level would be levelled, and a retaining wall would be installed on the eastern side of the site. A cut and fill process would be implemented where any site won material from the cut exercise would balance the fill, to ensure any waste generated is reduced. This will be undertaken in line with a Materials Management Plan (MMP) and a Site Waste Management Plan (SWMP) which will be produced prior to the commencement of construction, as secured in the Outline CEMP (Document reference 7.1, DCO Volume 7).

3.5.70 IPS-F would include a main building housing pumps and associated infrastructure. This building is expected to be constructed as a steel portal frame with insulated cladding. The remaining elements of IPS-F would either be housed in glass reinforced plastic (GRP) kiosks or be located outside any structures.

3.5.71 It is expected that the main building would have piled foundations, and that pad foundations would be used for the remaining areas of the site.

Intermediate Pumping Station G

3.5.72 Construction works for IPS-G would be undertaken within temporary construction compound G-6, which would be accessed from Titchfield Lane.

3.5.73 Minor levelling of the site may be required to provide a level surface for the site, and a retaining wall may be required to support the ground. A cut and fill process would be implemented where any site won material from the cut exercise would balance the fill, to ensure any waste generated is reduced. This will be undertaken in line with a MMP and a SWMP which will be produced prior to the commencement of construction, as secured in the Outline CEMP (Document reference 7.1, DCO Volume 7).

3.5.74 IPS-G would include a main building housing pumps and associated infrastructure. This building is expected to be constructed as a steel portal frame with insulated cladding. The remaining elements of IPS-G would either be housed in GRP kiosks or be located outside any structures.

3.5.75 It is expected that the main building would have piled foundations, and that pad foundations would be used for the remaining areas of the site.

Break Pressure Tank and Intermediate Pumping Station E

3.5.76 Construction works for BPT/IPS-E would be undertaken within temporary construction compound E-1, which would be accessed from New Down Lane.

3.5.77 The site for BPT/IPS-E is located on a hillside, and it would be cut into the sloping ground to reduce visual and landscape impacts. It is expected that a retaining wall of approximately 8m would be installed to support this. Due to the scale of the cut

undertaken for BPT/IPS-E, it is expected that the volume of excavated material will be greater than the fill material. The management of this material will be undertaken in line with a MMP and a SWMP which will be produced prior to the commencement of construction, as secured in the Outline CEMP (Document reference 7.1, DCO Volume 7).

3.5.78 BPT/IPS-E would include a main building housing pumps and associated infrastructure, and a covered tank. The main building is expected to be constructed as a steel portal frame with insulated cladding and the tank is expected to be constructed using reinforced concrete. The remaining elements of BPT/IPS-E would either be housed in GRP kiosks or be located outside any structures.

3.5.79 It is expected that the main building and tank would have piled foundations, and that pad foundations would be used for the remaining areas of the site.

Break Pressure Tank K

3.5.80 Construction works for BPT-K would be undertaken within temporary construction compound K-6, which would be accessed from Winchester Road (B2177).

3.5.81 The site for BPT-K is located on a hillside, and would be partially buried within the hillside. This will require levelling or terracing of the site and a retaining wall would be required to support this. A cut and fill process would be implemented where any site won material from the cut exercise would balance the fill, to ensure any waste generated is reduced. This will be undertaken in line with a MMP and a SWMP which will be produced prior to the commencement of construction, as secured in the Outline CEMP (Document reference 7.1, DCO Volume 7).

3.5.82 BPT-K would include a tank and a valve building. These buildings are expected to be constructed using reinforced concrete or brick. The remaining elements of BPT-K would either be housed in GRP kiosks or be located outside any structures.

3.5.83 It is expected that the tank would have piled foundations, and that pad foundations would be used for the remaining areas of the site.

Invasive Non-Native Species Treatment at Otterbourne Water Supply Works

3.5.84 Construction works for INNS Treatment at Otterbourne WSW would be undertaken within the existing Otterbourne WSW site and would utilise temporary construction compound M-3. These works would be accessed via Waterworks Road.

3.5.85 An existing tank within the site would be repurposed as described in paragraph 3.3.99. The treatment plant would be located within an existing building or within a new building. Should a new building be required, this will require the establishment of a level surface, and the base of the building would be sunk into the ground to provide a ground level floor slab. No piled foundations would be required. The building would be constructed as a steel portal frame with insulated cladding.

Construction lighting

3.5.86 During the construction phase, temporary lighting would be required when construction is undertaken during periods of low light. The Outline CEMP (Document reference 7.1, DCO Volume 7) secures principles for lighting during the construction phase.

Highways works

3.5.87 To facilitate access for construction of the Proposed Development, temporary highway works would be required to ensure safe and adequate construction vehicle access to working areas.

3.5.88 The Order Limits include areas where known highway works are required to support the safe movement of construction vehicles along the existing highway network. It is currently anticipated that these works would comprise temporary realignment of kerbs, temporary removal of traffic islands and street furniture, and temporary amendments to stop lines. These works would be limited to the existing extent of the highway and would be reinstated to their existing condition. The following locations have been identified for highway works:

1. West Street and Meyrick Road junction in Havant, shown on Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2).
2. Bedhampton Road and Brookside Road junction in Havant, shown on Sheet 4 of the Works plans (Document reference 2.3, DCO Volume 2).
3. Winchester Road (A334), Titchfield Lane and Blind Lane junction north of Wickham, shown on Sheet 15 of the Works plans (Document reference 2.3, DCO Volume 2).
4. Main Road and Kiln Lane junction south of Otterbourne, shown on Sheet 26 of the Works plans (Document reference 2.3, DCO Volume 2).
5. A334 and Botley Road junction east of Botley, shown on Sheet 27 of the Works plans (Document reference 2.3, DCO Volume 2).

3.5.89 An additional area of works is included in the Order Limits at the Portsdown Hill Road (B2177) and Widley Walk junction for temporary works related to a temporary PRoW diversion, which is shown on Sheet 6 of the Works plans (Document reference 2.3, DCO Volume 2).

Construction methodology

Pipelines

3.5.90 A number of pipeline installation techniques are expected to be used to construct the pipelines. The locations that these techniques would be used in are set out for the pipeline components from paragraph 3.5.16. The area required to utilise these pipeline installation techniques has been included in the Order Limits, so that the Order Limits provide the required space for the construction of the pipeline.

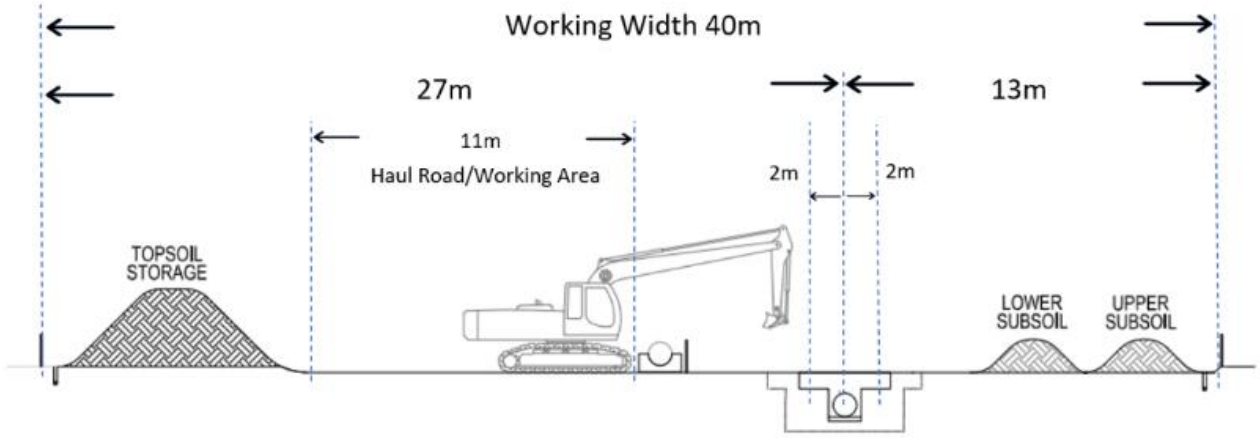
3.5.91 The selection of the pipeline installation techniques and methodologies at environmentally sensitive locations has been subject to engagement with relevant statutory consultees and other stakeholders to determine the most suitable pipeline installation technique at these locations.

Trenched open-cut method

3.5.92 The installation of most of the Pipeline would be constructed using trenched open-cut excavation in open and less constrained areas, such as fields. The maximum working width for trenched open-cut construction of the Pipeline would be 40m (secured through the Outline CEMP (Document reference 7.1, DCO Volume 7)).

This would provide space for a haul road, construction working areas, storage areas, pipeline trench and soil storage areas. An indicative maximum working width for trenched open-cut construction is shown in Graphic 3-3 for illustrative purposes only.

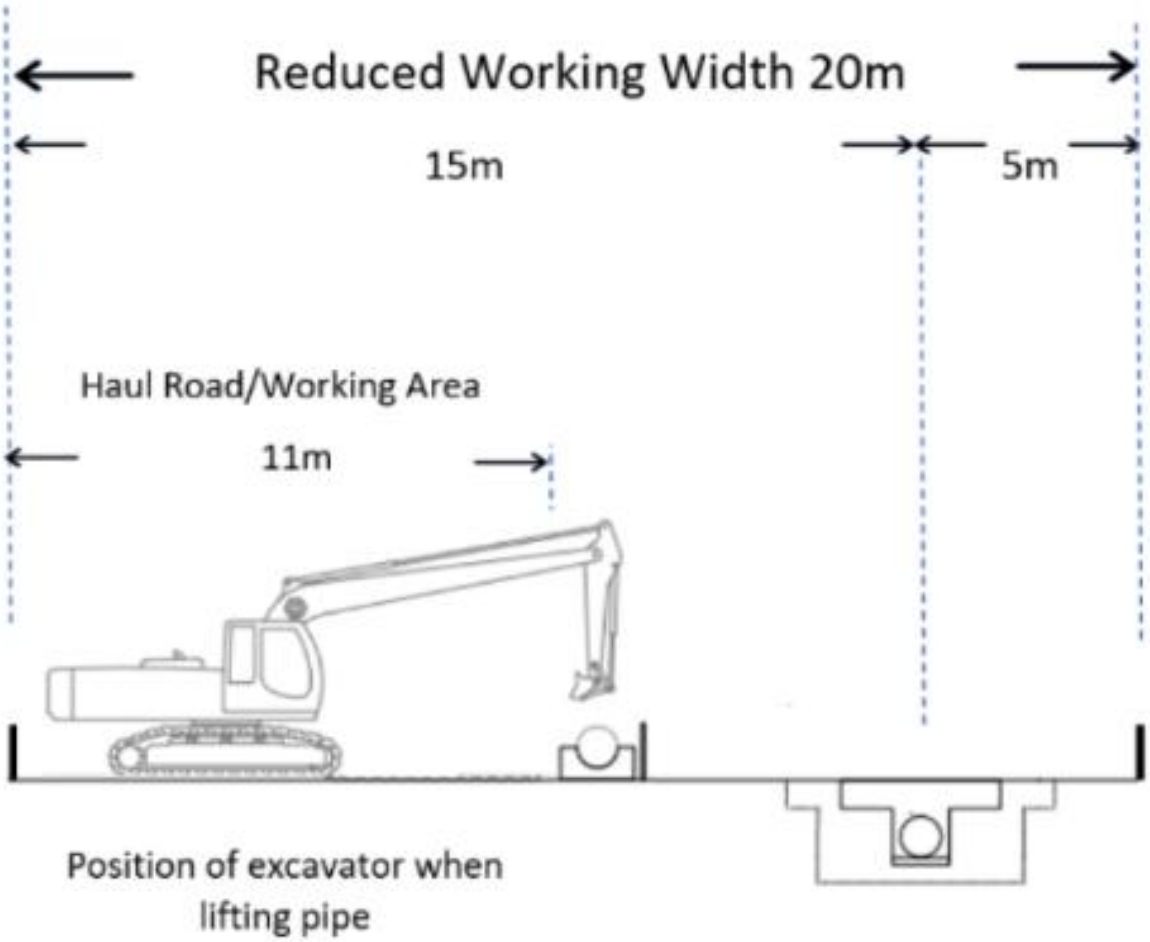
Graphic 3-3 Indicative maximum working width for trenched open-cut construction



3.5.93 A reduced working width of 20m has been identified when intersecting sensitive constraints, including vegetation, roads and other features where required. ES Appendix 3.1 Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6) sets out where a reduced working width would be used (secured through the Outline CEMP (Document reference 7.1, DCO Volume 7)). Due to the need for storage areas for topsoil, upper subsoil and lower subsoil, it is not possible to use a reduced working width for the whole length of the Pipeline. This would require a significantly higher number of additional temporary construction compounds for storage and an increase in construction traffic. Where a reduced working width of 20m is used, there would be no space available to store excavated material. Therefore, in these areas, the Contractor may require the working width either side of the length where the width is reduced to be widened up to 50m for a maximum length of 42m (to be provided at one or the other end of a reduced working width or be split across each side of the reduced working width). This is to provide sufficient space for the storage of materials excavated along the pipeline route including the areas where there is a reduced working width. The need for widened working widths would be determined on a case-by-case basis and applied only where necessary to safely facilitate construction activities. These temporary widened widths would remain within the Order Limits and would be subject to the environmental control principles set out in the Outline CEMP (Document reference 7.1, DCO Volume 7).

3.5.94 An indicative reduced working width for trenched open-cut construction is shown in Graphic 3-4 for illustrative purposes only.

Graphic 3-4 Indicative reduced working width for trenched open-cut construction



3.5.95 The location of pipelines have been designed to reduce vegetation removal by utilising existing gaps and reducing the working width, where reasonably practicable. Where vegetation removal is necessary to construct the pipelines, this vegetation would be removed. The working width would be clearly marked with demarcation fencing or stockproof fencing erected in areas grazed by livestock.

3.5.96 Stiles, gates or gaps would be incorporated into the temporary fencing where reasonably practicable to maintain access to farm tracks and, where required, to maintain access to PRoWs. Where feasible, additional access points would be provided to allow access across the pipeline and thereby mitigate field severance.

3.5.97 The topsoil would be stripped across the working width, using appropriate earth moving equipment. The width of topsoil to be stripped would cover the pipeline trench, the haul road, the storage areas, construction areas and the area required for storage of soil. The full depth of the topsoil would be stripped and stored carefully at one side of the working width in such a way that it is not mixed with subsoil or trafficked over by vehicles or plant.

3.5.98 The topsoil storage areas would be approximately 8m wide and up to 4m high to avoid compaction from the weight of the soil. Storage areas would be laid out to reduce the risk of flooding and ponding. Uncultivated soil, for example topsoil stripped from hedgerow banks, road verges, the banks of watercourses or woodland strips would be stored separately from other excavated material. As

presented in paragraph 3.5.91 this has been subject to engagement with relevant statutory bodies to determine the most suitable approach.

3.5.99 Following topsoil stripping, some areas of the working width may need to be levelled or graded to enable safe working.

3.5.100 The material excavated from the pipeline trench would generally be stored on the opposite side of the working width from the topsoil to prevent mixing of subsoil and topsoil, which might hinder reinstatement. The pipeline trench would be left open for the minimum length of time as practicable so that the pipeline would be laid soon after excavation of the pipeline trench.

3.5.101 If sufficient space is available in the pipeline trench the excavation would be battered back at a safe angle dependant on soil characteristics. If it is not possible to batter the sides of the excavation, a ground support system would be installed as the trench is dug.

3.5.102 Following trench excavation, the pipe would be carefully lowered into the trench either in joined lengths if welded or as individual pipes.

3.5.103 The pipe trench would then be backfilled, where reasonably practicable, with the material taken from the trench in the reverse order to which it was excavated. Sand (or similar material) may be used to protect the pipe if the backfill material is particularly unsuitable and in areas of rock.

3.5.104 The backfilled materials would be consolidated in layers by tamping or rolling to ensure consolidation comparable with the adjacent subsoil. Any excess material may be spread within the working width, and to 'crown' the trench to allow for settlement and to aid consolidation.

3.5.105 The depth of the pipeline within the trench would be dependent on location and may vary. However, it is assumed that for the majority of the pipeline, the pipeline would be laid with a minimum 0.9m coverage of material above the crown of the pipeline. Table 3-5 sets out the minimum depths of the Pipeline between the WRP site and Otterbourne WSW.

3.5.106 At Ordinary Watercourses where open-cut trench construction would be used, methods to maintain flows would be installed, ensuring capacity is sufficient to reduce upstream impediment. Where the haul road is required to cross watercourses when open-cut trench construction is being utilised, the watercourse would also be culverted underneath the haul road.

Tunnelling

3.5.107 Tunnelling is to be utilised in areas where the pipeline is required to pass through populated residential areas where the length is too long for trenchless construction. Section 3.3 sets out where tunnelling construction will be used. Tunnelling sections would be constructed utilising a segmental tunnel solution which reduces the number of access points along the routes of the tunnelled sections and would be constructed using a Tunnel Boring Machine (TBM).

Tunnel shafts

3.5.108 Tunnel shafts would be sunk at each end of the tunnel section comprising a launch shaft from where the TBM would start and a reception shaft where the TBM would

emerge and finish. The diameters for each shaft are set out in the description of construction activities in paragraphs 3.5.14 to 3.5.23. These diameters have been determined considering the pipelines, supporting framework and access arrangements required. The diameter of the launch shaft is larger than the reception shaft to accommodate additional launch equipment for the TBM.

3.5.109 Where a tunnel shaft is used for more than one TBM launch, the diameter of the launch shaft will be larger, and these diameters are set out in the description of construction activities in paragraphs 3.5.14 to 3.5.23. This would be required at the WRP site to facilitate the construction of the Pipelines between the WRP site and Bedhampton Springs, and in Section D.

3.5.110 The approximate depths of tunnel shafts are set out in the locations where tunnelling is identified in section 3.5.

3.5.111 The construction method for the tunnel shafts would be determined by the Contractor at the detailed design stage post-consent. It is anticipated that segmental lined shafts, secant piled shafts or diaphragm wall shafts would be used. The worst case construction method is assessed for each environmental topic in this ES.

1. **Segmental lined shafts**: Segmental lined shafts are constructed using either open caisson sinking techniques or underpinning. Open caisson sinking techniques involve the shaft structure being progressively sunk under its own weight or with the aid of caisson jacks. A concrete guide collar slightly larger than the shaft diameter is cast at surface level. Pre-cast segments are added to form rings as the excavation proceeds. Each ring is bolted to the ring previously constructed below. This technique is suited to shaft constructed in weak soils, high-plasticity clays, silts, sands and gravels, particularly below the water table. Graphic 3-5 shows an example of open caisson sinking tunnel shaft construction. Alternatively, underpinning could be used where the rings of pre-cast segments are built underneath the last one. The first ring would be cast in a concrete collar to prevent movement when excavation begins. Underpinning is best suited to shaft construction through good soils with low plasticity and no particular groundwater issues. Graphic 3-6 shows an example of underpinning shaft construction.
2. **Secant piled shafts**: Secant piled shafts utilise a series of overlapping circular alternating reinforced and unreinforced concrete columns or piles. This involves the use of a continuous flight auger drilling rig to excavate the pile opening and simultaneously pour concrete. The reinforcement in the form of a rebar cage or steel beam is then pushed through the concrete immediately after placement. On completion of the piles a ring beam is cast around the top of the piles. This method has a limit to the maximum depth that can be achieved due to the vertical tolerances associated with pile installation and typically the maximum depth would be between 20m and 25m. Graphic 3-7 shows an example of secant piled tunnel shaft construction.
3. **Diaphragm wall shafts**: Diaphragm wall shaft construction involves the construction of vertical walls through deep trench excavations. Stability of the excavation is maintained by the use of a drilling fluid, usually a bentonite suspension. The walls are constructed in discrete panel lengths ranging typically between 2.5m and 7m using purpose built grabs or, in appropriate circumstances, milling machines (hydromills). Excavation is typically carried out

using either rope-suspended mechanical or hydraulically operated grabs. Standard grabs range in weight from 8-20 tonnes. The grabs are mounted on 80-120 tonne hydraulic base crane units providing stability and suitable line pull. Specific applications and ground conditions demand the use of hydromills – hydraulically operated reverse circulation trench cutters where the excavation technique is by 'cutting' as opposed to 'digging'. This technique is appropriate for deeper diaphragm walls and walls located in granular materials and soft rock. Where panels are constructed in a line, abutting one another to form a retaining wall, the term diaphragm walling applies. Purpose made stop ends are used to form the joints between adjacent panels and a water bar can be incorporated across these joints. Where additional bending moment capacity or wall stiffness is required more complicated arrangements can be constructed, e.g. 'L' shaped or 'T' shaped panels. Standard widths of diaphragm walling equipment are 600, 800, 1000, 1200 and 1500mm although greater can be provided. Depths are typically constructed up to a maximum of 50m using grabs and up to 80m using standard hydromills. One significant advantage of using diaphragm walling is the facility to incorporate floor slab connections and recessed formwork into the walls. Graphic 3-8 shows an example of diaphragm wall shaft construction.

Graphic 3-5 Open caisson sinking tunnel shaft construction

Graphic 3-6 Underpinning tunnel shaft construction

Graphic 3-7 Secant piled tunnel shaft construction

Graphic 3-8 Diaphragm tunnel shaft construction

Tunnel construction

3.5.112 The TBM would be delivered to the tunnel launch shaft in small components. Depending on the space available at the tunnel launch shaft, the TBM would either be assembled near the tunnel entrance or as a staged launch within the tunnel launch shaft. In a staged launch, the TBM would be set up and advanced until sufficient length of the tunnel is constructed to allow the remaining equipment to be assembled in the tunnel. A crane would be used to lower the TBM into the shaft.

3.5.113 Once the TBM is launched, the following construction cycle would begin:

1. The TBM would excavate the length of a tunnel ring.
2. The tunnel lining ring segments would be built behind the TBM within the tail-skin using a mechanical erector to form a complete ring.
3. The TBM pushes off the newly completed tunnel lining ring using hydraulic jacks while excavating. Once this advance is complete the next tunnel lining ring would be built in front of the last tunnel lining ring.

3.5.114 A laser guidance system would be used to give the TBM driver a real time position of the TBM, and the TBM would be steered by varying the pressures of the hydraulic rams on the rear of the TBM as it advances.

3.5.115 Drilling fluid would be used to support TBM construction. The type of drilling fluid used would be informed by the environmental sensitivities of the location of tunnelling construction.

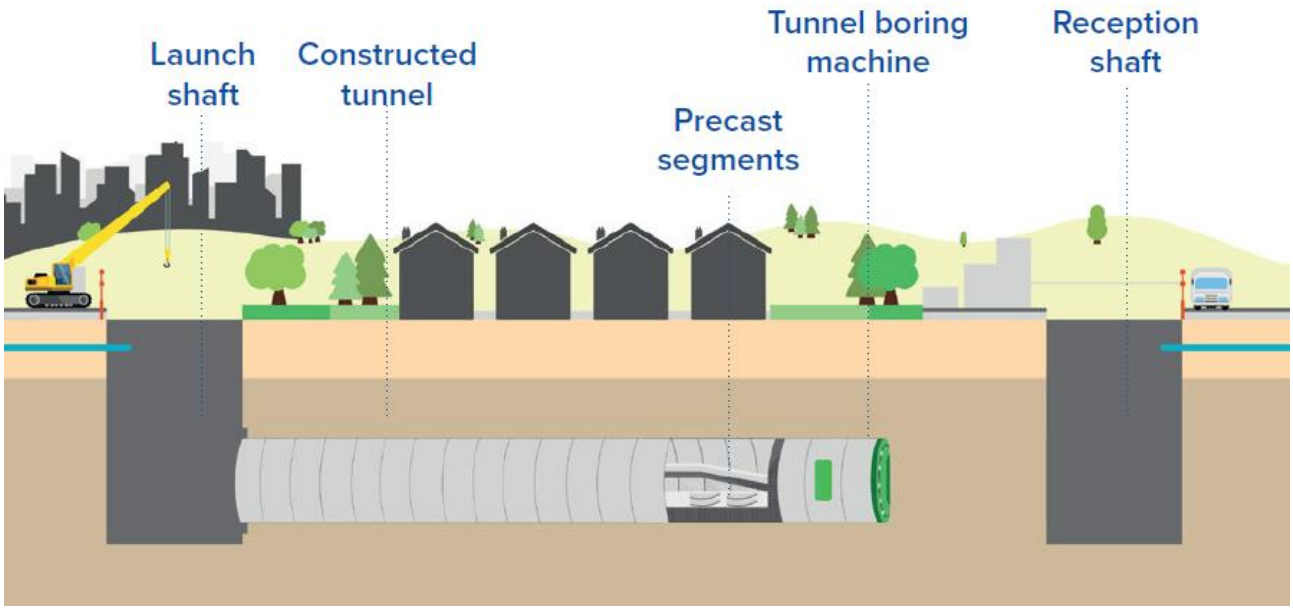
3.5.116 The material excavated by the TBM would either be removed in the form of a slurry to transport the excavated material to the surface, or it would be transported using conveyors and lifted to the surface. If a slurry TBM was used, once the slurry has been transported to the surface the liquid and solid would be separated at the launch shaft temporary construction compound, which is described at paragraph 3.5.140. The liquid that is separated from the slurry would be recirculated to the TBM for reuse. When the liquid is changed or no longer needed, it would be disposed of via the sewer or a suitably licensed disposal facility.

3.5.117 Materials (such as tunnel lining rings and grouts) would be delivered to the TBMs by a narrow-gauge construction railway within the tunnel, special tunnel vehicles or other systems such as pumping from the surface. Excavated materials may be removed by the in-tunnel railway, specially designed rubber tyre vehicles, conveyors or pumps, depending on the type of TBM and the length of the tunnel.

3.5.118 On completion of the tunnel, the TBM would advance into the reception shaft where it would be dismantled and removed. Following completion of the tunnel the water transfer pipelines would be installed within the tunnel.

3.5.119 Graphic 3-9 provides a cross section of segmental tunnel construction.

Graphic 3-9 Segmental tunnel construction



Trenchless methods

3.5.120 For some sections of the pipeline there are areas that are not generally suited to open-cut excavation. Examples of these are where the pipeline crosses roads, railways, waterways, sensitive environmental areas, and other areas where construction could be restricted. Microtunnelling would be used for trenchless construction as a result of the diameter of the pipeline and the lengths of the sections of trenchless construction. Where currently identified, section 3.3 and ES Appendix 3.1, Primary mitigation, Volume II (Document reference 6.2, DCO Volume 6) set out the locations that trenchless methods of construction will be used.

3.5.121 Microtunnelling is carried out from a pit or shaft with a jacking frame to allow insertion of the pipes. It can be carried out in a broad range of ground conditions from soft alluvial soils to hard rock. There are variants of machine type, face support and spoil management to deal with unstable soils and high groundwater heads.

3.5.122 Microtunnelling is a trenchless pipeline installation technique that utilises microtunnel boring machines (MTBMs). These are usually remote controlled from the surface.

3.5.123 The MTBM is guided by a steering system which allows the operator to follow the desired route by using steering pistons located behind the cutterhead. The guidance system may be line of sight laser or other technology specially designed to allow curved bores.

3.5.124 The MTBM is advanced through the ground using specially manufactured jacking pipes which are placed in a jacking frame in a launch shaft at one end of the pipeline route. Pistons in the jacking frame push the pipe and MTBM forward at a controlled rate to ensure effective and safe progress of the MTBM as it cuts the soil.

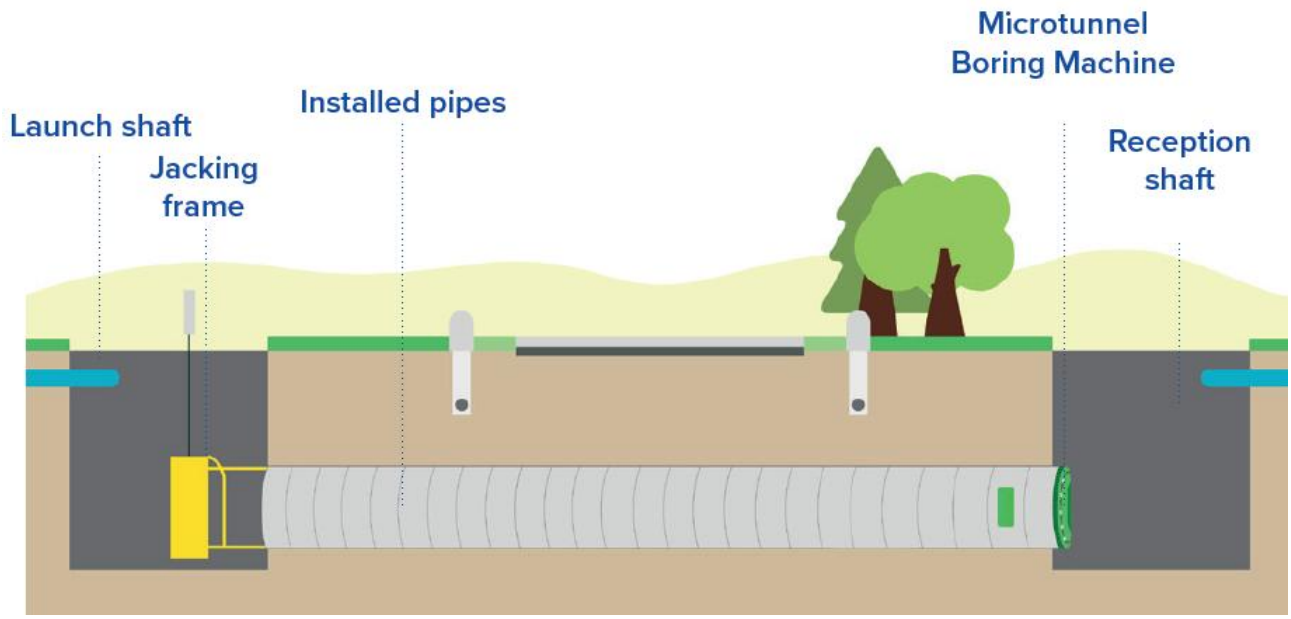
3.5.125 As the MTBM advances one pipe length at a time, the pistons of the jacking frame are withdrawn to allow the next pipe section to be added to the pipe string. This process continues until the MTBM reaches the reception shaft at the far end of the route.

3.5.126 Drilling fluid would be used to support MTBM construction. The type of drilling fluid used would be informed by the environmental sensitivities of the location of trenchless construction.

3.5.127 The material excavated by the MTBM would either be removed in the form of a slurry to transport the excavated material to the surface, or it would be transported using conveyors and lifted to the surface. If a slurry MTBM was used, once the slurry has been transported to the surface the liquid and solid would be separated at the launch shaft temporary construction compound, which is described at paragraph 3.5.140. The liquid that is separated from the slurry would be recirculated to the MTBM for reuse. When the liquid is changed or no longer needed, it would be disposed of via the sewer or a suitably licensed disposal facility.

3.5.128 Graphic 3-10 provides an indicative cross section of microtunnelling.

Graphic 3-10 Indicative cross section of microtunnelling



Construction compounds

3.5.129 This section details the types of construction compounds that would be temporarily required to support construction. Temporary construction compounds would be located at intervals along the pipelines, where trenchless or tunnelling construction methods are proposed and for construction of the AGP. In some locations, more temporary construction compounds have been identified to provide flexibility for the Contractor to construct the Proposed Development. This flexibility and optionality is set out from paragraph 3.5.21 to paragraph 3.5.66. This ES comprises an assessment of all temporary construction compounds identified in this chapter and shown on the Works plans (Document reference 2.3, DCO Volume 2). Locations for temporary construction compounds are identified for each component of the Proposed Development from paragraph 3.5.5.

3.5.130 The types of temporary construction compounds required to construct the Proposed Development are as follows:

1. Sectional site compounds: Located at intervals along the pipelines for storage, welfare and parking.
2. Trenchless construction compounds: Required where trenchless construction will be undertaken.
3. Tunnelling construction compounds: Required to accommodate tunnel launch, intermediate or reception shafts.
4. AGP and WRP site temporary construction compounds: Land required to facilitate construction of the AGP and WRP site.
5. Water storage lagoon temporary construction compounds: To facilitate testing and commissioning of the water transfer pipelines.

3.5.131 A construction workers hub would also be required to support the construction of the Proposed Development. Additional information on the construction workers hub is provided from paragraph 3.5.146.

3.5.132 Opportunities to co-locate different types of temporary construction compounds have been sought in identifying the locations of temporary construction compounds. This reduces the land take required for temporary construction compounds.

3.5.133 Some smaller temporary construction compounds may be required along the pipeline routes for storing smaller plant or equipment, pipe fittings, parking and welfare, as works along the pipeline route progress. These temporary construction compounds would be contained within the working width for construction of the pipeline, and access would be provided by the temporary construction haul routes which run along the route of the pipeline and form part of the working width.

Sectional site compounds

3.5.134 Sectional site compounds would comprise office buildings for up to approximately 20 construction employees, welfare facilities, parking spaces for approximately 50 vehicles, and storage areas. Where required, and depending on the pipeline construction methodology being used, the sectional site compounds may also house the launch or reception shafts required for tunnelling or trenchless construction activities.

3.5.135 Sectional site compounds would also be used as staging sites for construction workers to arrive from the construction workers hub (described from paragraph 3.5.146) and travel to other temporary construction compounds and working areas along the haul road.

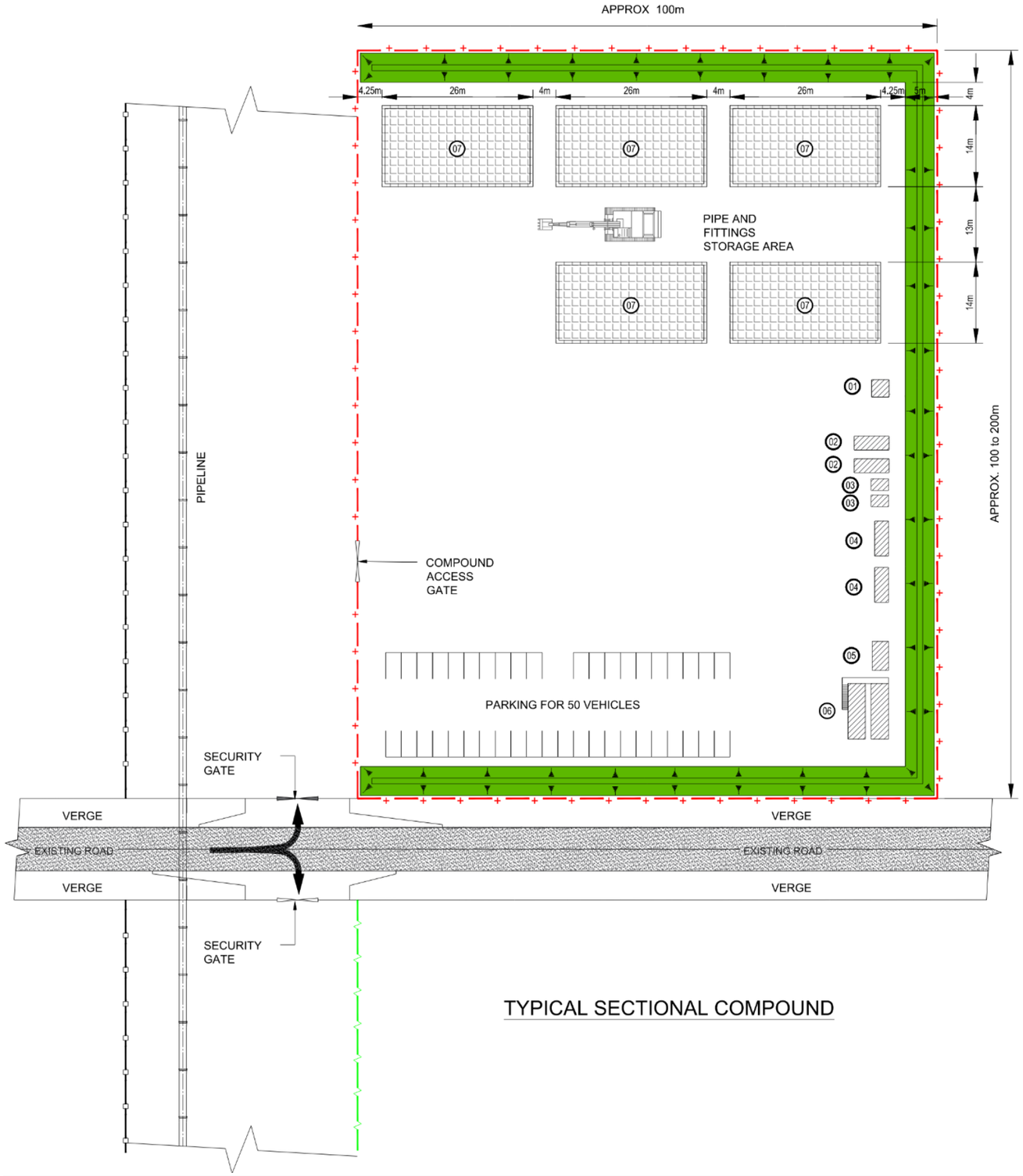
3.5.136 Sectional site compounds would be located adjacent to the road network where reasonably practicable. However, in some locations this may not be possible due to the rural nature of the Pipeline. In these cases, the sectional site compounds would be accessed from the road network via the haul road within the working width for the pipelines.

3.5.137 The sectional site compounds would provide space for construction vehicles to turn and access the road network and haul road safely and efficiently, which would be undertaken in the open space remaining in the compound as shown in Graphic 3-11.

3.5.138 The maximum building height within all sectional site compounds would be 8m.

3.5.139 Graphic 3-11 provides an indicative plan of a typical sectional site compound layout.

Graphic 3-11 Indicative plan of a typical sectional site compound layout



TYPICAL SECTIONAL COMPOUND

COMPOUND DIMENSIONS ARE APPROXIMATE AND MAY BE SHAPED TO FIT WITH TOPOGRAPHICAL FEATURES - HEDGEROWS, EXISTING GATES, DITCHES AND SERVICES ETC.

TRENCHLESS COMPOUND SITE KEY	
ITEM	DESCRIPTION
01	GENERATOR APPROX 3m x 3m x 1 5m HIGH
02	STORAGE CONTAINER APPROX 6m x 2 4m x 8m HIGH
03	SKIP
04	WELFARE CABIN APPROX 7 5m x 3m
05	3+1 TOILET BLOCK APPROX 5m x 3m x 3m HIGH
06	SITE CABINS - WASHING & DRYING FACILITIES, OFFICE AND MEETING ROOMS. APPROX 10m x 3m x 7m HIGH
07	PIPE STORAGE 26m x 14m

LEGEND

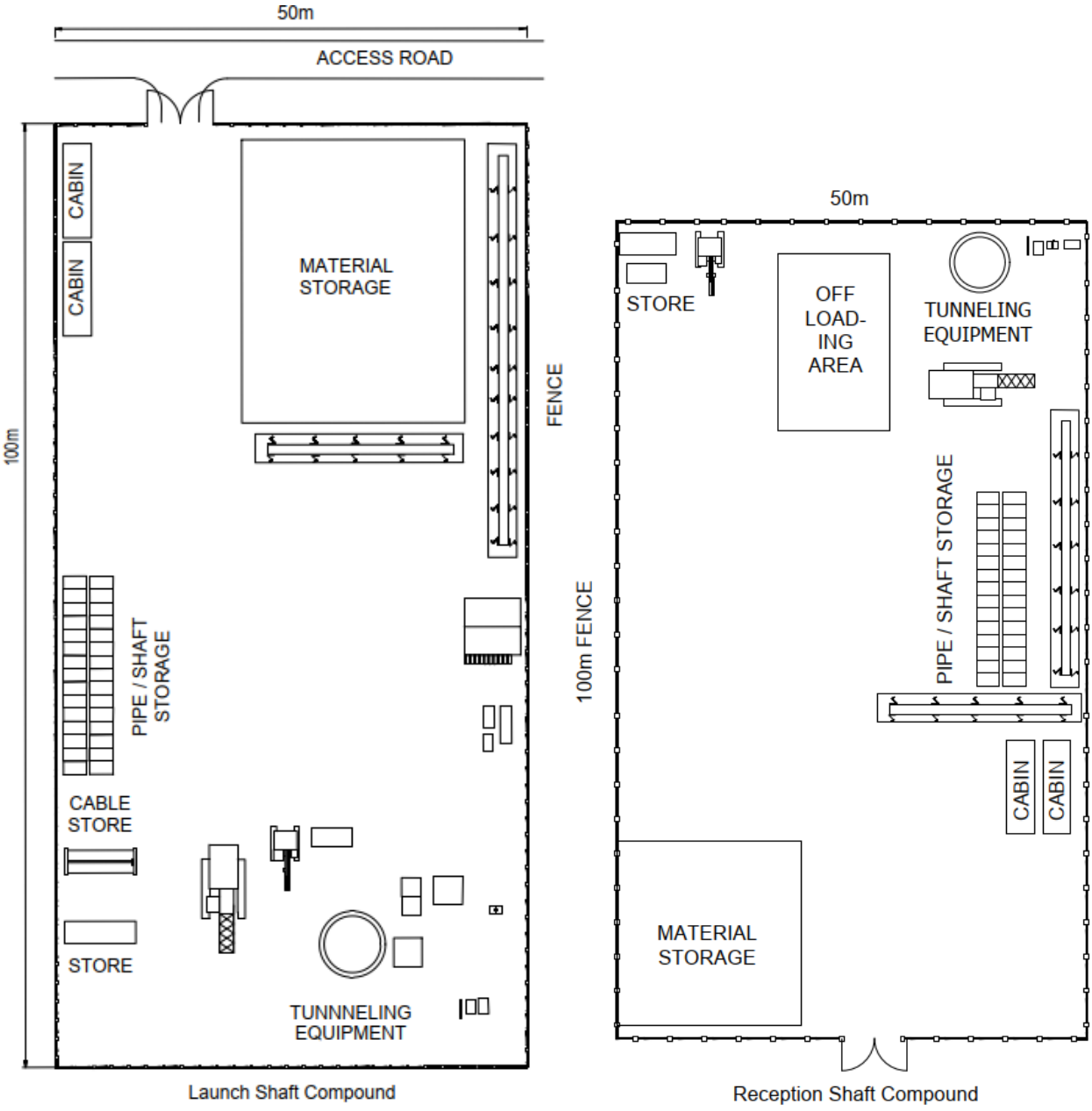
- DEMARCATION POSTS WITH CDM SIGNAGE (MAX SPACING 50m APART)
- POST AND ROPE FENCING
- HERAS FENCING
- PROPOSED PIPE ROUTE
- HARDSTANDING / MATERIAL STORAGE AREA
- SITE CABIN AREA
- EXISTING ROAD
- TOPSOIL STOCKPILE BUNDS 5m WIDE, 2m HIGH
- ACCESS POINT

Trenchless construction compounds

3.5.140 Temporary trenchless construction compounds would be utilised when trenchless construction is proposed. A launch compound and a reception compound would be required on either side of the feature that is being crossed by trenchless construction.

3.5.141 Graphic 3-12 provides an indicative plan of typical construction compounds for trenchless construction. The maximum building height within all trenchless construction compounds would be 8m. No parking would be provided for construction workers at trenchless construction compounds, workers would be transported from sectional site compounds.

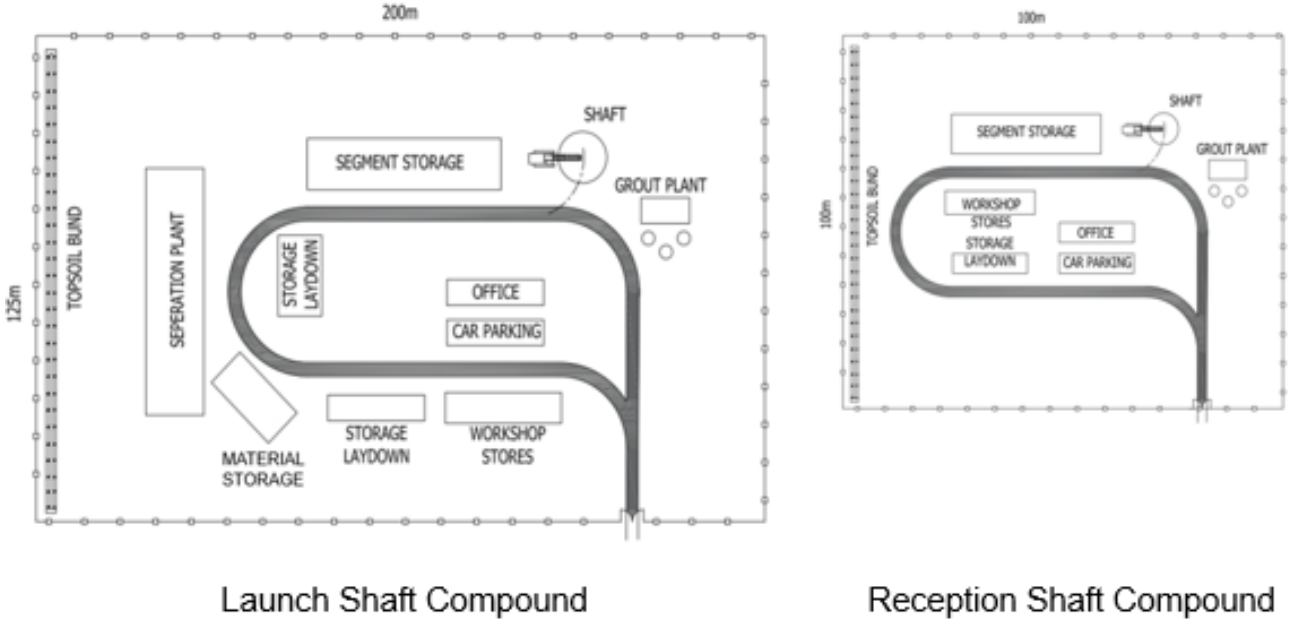
Graphic 3-12 Indicative plan of typical trenchless launch and reception shaft construction compounds



Tunnelling construction compounds

3.5.142 Temporary tunnelling construction compounds would be located where tunnelling construction is utilised. The maximum building height within all tunnelling construction compounds would be 8m. No parking would be provided for construction workers at tunnelling construction compounds, workers would be transported from sectional site compounds. Graphic 3-13 provides an indicative plan of typical temporary construction compounds for tunnel construction.

Graphic 3-13 Indicative plan of typical construction compounds for tunnel construction



Launch Shaft Compound

Reception Shaft Compound

Water storage lagoon construction compounds

3.5.143 During the testing of the installed Pipeline between the WRP site and Otterbourne WSW, water storage lagoons would be required. Testing of the installed Pipeline involves filling and pressurising sections of the Pipeline to check for leaks or other operational issues prior to final commissioning of the section of pipeline. Water storage lagoons are not required for other pipeline components of the Proposed Development as the WRP site and Havant Thicket Reservoir can be used for this purpose. The water storage lagoons would be used to contain the potable water used for the testing of the Pipeline and the cleaning of this water using a silt buster. The temporary construction compounds that the water storage lagoons would be located in are set out in the description of the Pipeline between the WRP site and Otterbourne WSW from paragraph 3.5.21 to paragraph 3.5.66. They would comprise a lined shallow bunded area of land with a volume that would vary depending on commissioning requirements. Additional information on commissioning of the Proposed Development following construction is set out from paragraph 3.5.168.

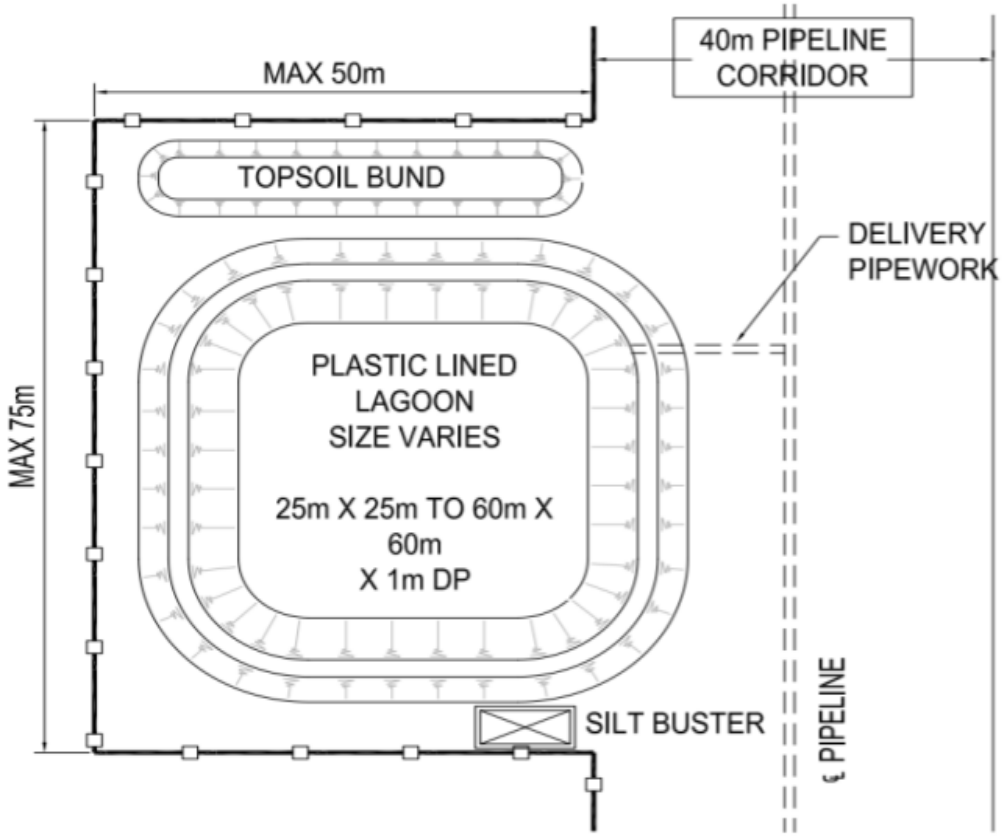
3.5.144 Table 3-21 sets out the maximum parameters of a water storage lagoon.

Table 3-21 Maximum water storage lagoon parameters

Element	Parameter
Maximum footprint of water storage lagoons	3,600m^2
Maximum dimensions of water storage lagoons	60m x 60m
Maximum depth of water storage lagoons	1m
Maximum volume of water storage lagoons	3,400m^3

3.5.145 Graphic 3-14 provides an indicative plan of a water storage lagoon.

Graphic 3-14 Indicative plan of water storage lagoon



Construction workers hub

3.5.146 A construction workers hub may be temporarily required during the construction phase to act as a main project hub. It would provide an office building accommodating approximately 60 employees during construction working hours (set out in paragraph 3.5.3), with welfare, parking and security facilities. The purpose of the construction workers hub would be a central point for construction workers to assemble prior to transportation to the temporary construction compounds. The construction workers hub would not be used to store materials, plant or other equipment.

3.5.147 The area required for the construction workers hub would be up to 15,000m^2 and it would be located within 10km of the Pipeline between the WRP site and Otterbourne WSW. It would be located in close proximity to the strategic road network to ensure adequate access. The construction workers hub would also

require connection to utilities including power, water and sewerage. Due to uncertainty over timing and availability of potential temporary construction workers hub sites, the temporary construction workers hub would be identified by the Contractor, during the construction phase, and it is assumed that it will use an existing suitably consented site for the activities to be undertaken there. The construction workers hub is therefore not included in the DCO Order Limits.

3.5.148 Any required environmental assessment will already have been undertaken on the existing consented site, and no construction works will take place at that site, therefore the development of the construction workers hub is not assessed in this ES, aside from the following exceptions. ES Chapter 12 Land use and agriculture, Volume I (Document reference 6.1, DCO Volume 6), considers effects of the construction workers hub on land use. In addition, the following ES chapters listed below consider effects related to the mini-bus vehicle movements between the construction workers hub and the temporary construction compounds:

1. ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6)
2. ES Chapter 12 Land use and agriculture, Volume I (Document reference 6.1, DCO Volume 6)
3. ES Chapter 15 Noise and vibration, Volume I (Document reference 6.1, DCO Volume 6)
4. ES Chapter 17 Socio-economics, tourism and health, Volume I (Document reference 6.1, DCO Volume 6)
5. ES Chapter 18 Traffic and transport, Volume I (Document reference 6.1, DCO Volume 6)

3.5.149 To estimate the worst case vehicle trip generation for the Proposed Development (including arriving and departing from the construction workers hub), the following assumptions have been made:

1. 60no. employees would be based at the hub, most of which would arrive by car.
2. Between 15 (average) and 60 (peak) no. construction workers would travel to the construction workers hub by car and be transported to other construction compounds by minibus.
3. The construction workers would be transported to the various compounds by 1 to 4 no. minibuses.
4. There would be up to 40 vehicle movements throughout the day, including lunch and visitor trips.

3.5.150 Based on the above assumptions, the construction workers hub would generate between 22 and 25 vehicle trips in the AM and PM peak periods (07:00-09:00 and 16:00-18:00), 40 vehicle trips between these periods, and the remaining trips before 07:00 and after 18:00. This equates to an average of 128 and a peak of 224 weekday vehicle trips and is reflective of the vehicle trips generated by an office of a similar size to that required at the construction workers hub.

Demolition, disassembly and removal of existing structures

3.5.151 Construction of the Proposed Development would require the demolition, disassembly and/or temporary relocation of a number of small structures. This would not result in the demolition, disassembly or removal of structures that are used for residential, community or recreational purposes.

Materials management and waste generation

3.5.152 Construction of the Proposed Development would involve the management of soils and other material. This will be managed in line with the Outline CEMP (Document reference 7.1, DCO Volume 7) which secures the approach and principles for management of materials and waste. Suitable excavated material would be retained for re-use. Where material is deemed unsuitable for re-use and requires disposal off-site, for example as a result of contamination, it would be handled in accordance with the SWMP that would be prepared by the Contractor.

3.5.153 It is anticipated that the Proposed Development would generate approximately 594,736m^3 of waste during the construction phase. Of this, 536,310m^3 is expected to be non-hazardous (including the inert portion). The final quantities of waste generated by the Proposed Development would be identified once the detailed design has been finalised post-consent, however the above quantities are considered to represent a worst case scenario, based on the current level of design.

3.5.154 The total water use during the construction phase would be approximately 29,300m^3 and would be sourced from the existing water network.

Water Recycling Plant site

3.5.155 Construction of the WRP site would include levelling of the site to create a working platform and the construction of piled foundations. It is anticipated that approximately 64,370m^3 of material would be generated through these processes, with approximately 16.5% estimated to be hazardous and unsuitable for reuse within the Proposed Development.

Above Ground Plant

3.5.156 For construction of the AGP, it is anticipated that a cut and fill process would be implemented where suitable site won material from the cut exercise would balance the fill to reduce waste generation. Paragraph 3.5.77 sets out that this would not be achievable at BPT/IPS-E. It is anticipated that the Proposed Development would generate approximately 5,432m^3 of material from construction of the AGP, with approximately 36.5% being hazardous and unsuitable for reuse.

Pipelines – open-cut trench construction

3.5.157 Where the Pipelines between the WRP site and Bedhampton Springs and the Pipelines between the WRP site and Otterbourne WSW would be constructed using trenched open-cut construction methods, the majority of excavated material would be backfilled to the pipeline trench or retained and reused on-site as part of reinstatement works associated with the pipelines. It is anticipated that

construction of the pipelines would generate approximately 3,230m^3 of potentially hazardous material, which would be unsuitable for reuse.

Pipelines – trenchless and tunnelling construction

3.5.158 Material excavated from trenchless and tunnelling construction would be removed from the tunnel launch shafts. The locations of tunnel and trenchless launch shafts are identified in paragraphs 3.5.14 to 3.5.66. For trenchless and tunnelling construction, it is anticipated that approximately 107,445m^3 of material would be generated. No hazardous material is anticipated to be generated. Materials generated from construction of tunnel shafts at the WRP site have been included in the material generation totals for the WRP site, set out in paragraph 3.5.155.

3.5.159 In the first instance, suitable material excavated during tunnelling would be re-used as part of reinstatement or enhancement elements of the Proposed Development. Where this is not possible opportunities to use this non-waste material in other projects local to the Proposed Development would be sought.

Land reinstatement post-construction

3.5.160 Following construction, ground levels where construction of the pipelines and other temporary works are undertaken would be reinstated. Tunnel shafts would be capped and an access hatch would be installed for maintenance. Any vegetation that is removed to facilitate temporary construction works would be reinstated, including existing grass swards. Guidance on planting would be implemented that controls what species can be used within certain distances from a water main, which would apply to the Proposed Development [7]. This guidance has informed the Outline LEMP (Document reference 7.5, DCO Volume 7). The Outline LEMP (Document reference 7.5, DCO Volume 7) sets out how the reinstatement of existing vegetation would contribute to the wider Green Infrastructure strategy for the Proposed Development to realise the design vision. It includes an outline specification for proposed planting, informed by the baseline landscape character assessment set out within ES Appendix 13.3 Landscape baseline and effects, Volume II (Document reference 6.2, DCO Volume 6). It also details how this planting would be maintained to ensure that it successfully establishes and how it would be managed in the long term.

Public rights of way during the construction phase

3.5.161 The pipelines intersect several PRoW. During the construction phase, these may need to be temporarily closed or diverted to facilitate construction of the Proposed Development. The Access and Public Right of Way plan (Document reference 2.4, DCO Volume 2) show the PRoW intersected by the Proposed Development and identifies the intended approach which may include:

1. Temporary closure
2. Partial temporary closure (e.g. open at weekends)
3. Temporary and permanent diversion
4. Keep open

3.5.162 The Framework RoWMP, appended to the Framework CTMP (Document reference 7.2, DCO Volume 7), sets out how the Proposed Development intersects

with PRoWs and how this will be managed. Where PRoWs are required to be closed for a period of time, diversions or a safe alternative route will be provided. Closures are identified in the Framework RoWMP (appended to the Framework CTMP (Document reference 7.2, DCO Volume 7)) as either 'short term closures' (maximum of four weeks duration) and 'temporary closures' (maximum of six months duration).

3.5.163 The Order Limits incorporate land required to divert PRoW that are intended to be diverted.

Construction environmental management

3.5.164 To limit disturbance to local communities from construction activities as far as reasonably practicable, construction would be undertaken in accordance with an Outline CEMP (Document reference 7.1, DCO Volume 7).

3.5.165 The Outline CEMP (Document reference 7.1, DCO Volume 7) provides details of how the environmental effects of the Proposed Development would be managed during construction by detailing controls, measures and standards to be implemented through the construction period.

3.5.166 The Outline CEMP (Document reference 7.1, DCO Volume 7) is secured by a requirement in Schedule 2 to the draft DCO (Document reference 3.1, DCO Volume 3). A detailed CEMP(s) that sets out plans and method statements for certain construction activities will be produced and submitted for approval in accordance with the corresponding requirement in Schedule 2 to the draft DCO (Document reference 3.1, DCO Volume 3).

3.5.167 Various construction traffic management plans are included in DCO Volume 7 of the DCO application:

1. Framework CTMP (Document reference 7.2, DCO Volume 7) – details how impacts of construction traffic would be reduced.
2. Framework CWTP which is appended to the Framework CTMP (Document reference 7.2, DCO Volume 7) – details measures to be implemented to reduce the number of single occupancy car trips during construction.
3. Framework RoWMP which is appended to the Framework CTMP (Document reference 7.2, DCO Volume 7) – sets out how/when PRoWs would be impacted and details measures to reduce impacts.
4. Traffic Management Strategy (Document reference 7.3, DCO Volume 7) – details how and when works would be completed in the public highway.

Commissioning of the Proposed Development

3.5.168 Following the completion of construction works, commissioning of the principal components of the Proposed Development would be required to ensure the components have been installed correctly prior to the commencement of operation. This would firstly comprise pressure testing the pipelines following construction, followed by full system testing.

3.5.169 Pressure testing of the Proposed Development would comprise passing water through all sections of the Pipeline as follows:

1. The Pipelines between Budds Farm WTW and the WRP site would use treated wastewater from Budds Farm WTW.
2. The Pipelines between the WRP site and Bedhampton Springs would use potable water from Otterbourne WSW.
3. The Pipeline between the WRP site and Otterbourne WSW would use potable water from Otterbourne WSW.

3.5.170 The water storage lagoon temporary construction compounds described in paragraph 3.5.143 would store potable water used for commissioning of the Pipeline between the WRP site and Otterbourne WSW. Water would be passed through the pipeline using temporary pumps and pipes, either directly to the Pipelines or using installed washout valves. Once pressure testing has been completed, and the potable water within the water storage lagoons is no longer required, it would be transferred to tankers for de-chlorination and then disposal at a suitably licensed facility. Treated wastewater used for pressure testing of the Pipelines between Budds Farm WTW and the WRP site would be returned to Budds Farm WTW for release from the Eastney LSO.

3.5.171 Full system testing of the Proposed Development would take place as follows:

1. The Pipelines between Budds Farm WTW and the WRP site would use treated wastewater from Budds Farm WTW.
2. The Pipelines between the WRP site and Bedhampton Springs would use recycled water.
3. The Pipeline between the WRP site and Otterbourne WSW would use source water from Havant Thicket Reservoir.

3.6 Operation and maintenance

Utilisation of the Proposed Development

3.6.1 The Proposed Development is required to address a water supply deficit during both normal and drought conditions. As set out in the Government's Water Resources Planning Guidance 2023 [8], the Applicant is required to plan for how it will provide water in drought conditions, including up to a 1-in-500 year (extreme) drought as part of its water resource planning statutory obligations. The need to address the water supply deficit in an extreme drought has defined the maximum flows and output of the Proposed Development.

3.6.2 At this maximum operation, the Proposed Development would transfer approximately 60Ml/d of recycled water to Bedhampton Springs (for onward transfer to Havant Thicket Reservoir) and extract approximately 90Ml/d of source water from Bedhampton Springs for transfer to Otterbourne WSW. This maximum operating scenario forms the basis of the environmental assessment, other than for the carbon assessment as described in ES Appendix 10.1 Carbon assessment methodology, Volume II (Document reference 6.2, DCO Volume 6).

3.6.3 Table 3-22 sets out the approximate maximum flows and output of the Proposed Development.

Table 3-22 Approximate maximum flows and output of the Proposed Development

Proposed Development component	Approximate maximum output/flow
Pipelines between Budds Farm WTW and the WRP site	82Ml/d of treated wastewater transferred from Budds Farm WTW to the WRP site
	22Ml/d of reject water transferred from the WRP site to Budds Farm WTW and onwards to the Eastney TT, Eastney PS and Eastney LSO (or in the event of an emergency, 82Ml/d of treated wastewater would be transferred from the WRP site back to Budds Farm WTW and onwards to release via the Eastney LSO).
WRP	Produces 60Ml/d of recycled water generated from 82Ml/d of treated wastewater from Budds Farm WTW. 22Ml/d of reject water is also produced (as above).
Pipelines between the WRP site and Bedhampton Springs	60Ml/d of recycled water from the WRP site to Bedhampton Springs (for onward supply to Havant Thicket Reservoir) and 90Ml/d of source water from Bedhampton Springs (sourced from Havant Thicket Reservoir) to the WRP site.
Pipeline between the WRP site and Otterbourne WSW	90Ml/d of source water

3.6.4 In an extreme drought, the Proposed Development is forecast to predominantly operate at this maximum operation. In normal weather conditions (i.e. outside of drought) the Proposed Development is required to meet forecast daily water supplies given the scale of supply deficits facing the Applicant's Hampshire supply area.

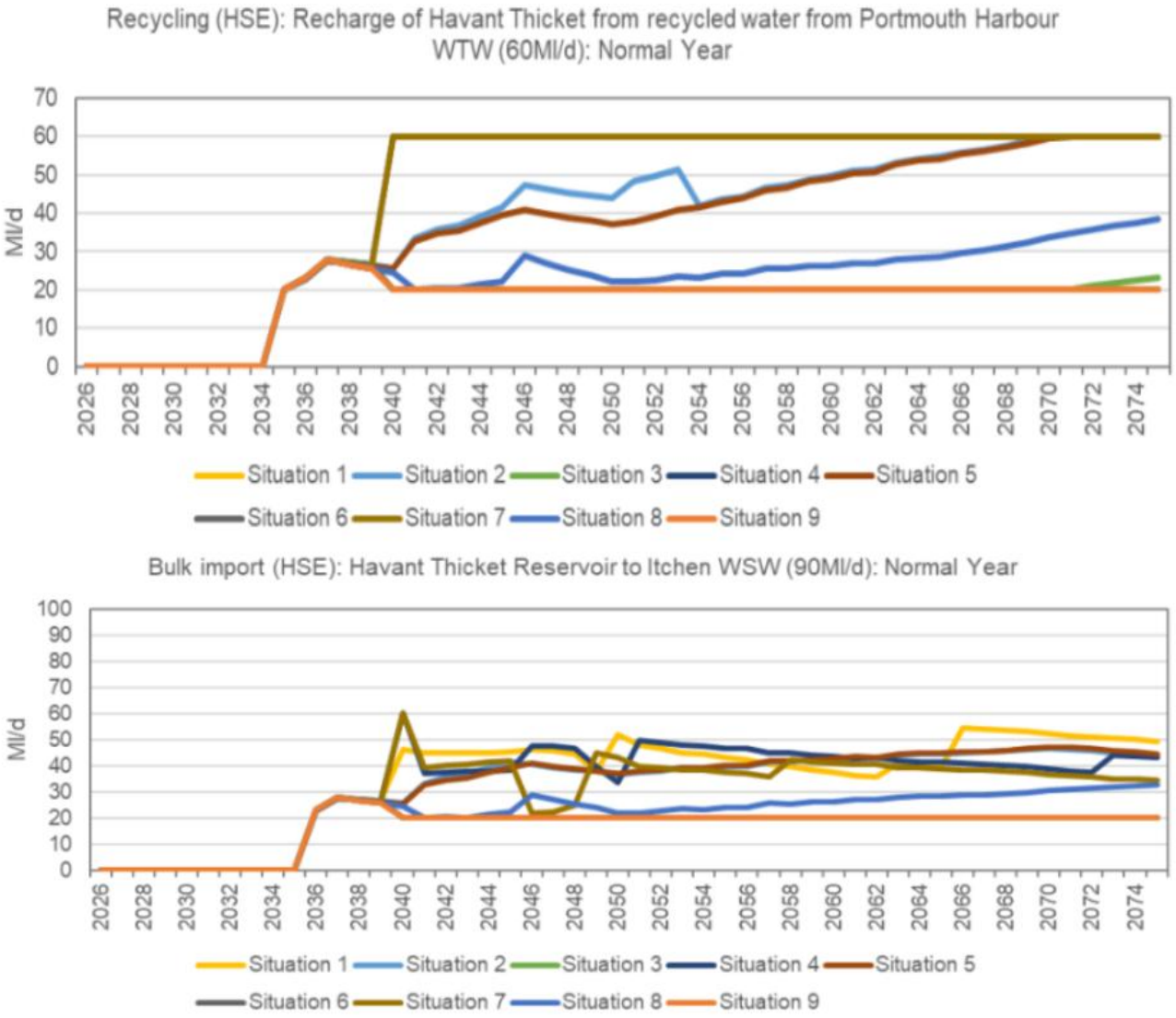
3.6.5 The Applicant's emerging Water Resources Management Plan (WRMP) 2024 (WRMP24) [9] provides forecasts for the utilisation of the Proposed Development for both normal and extreme (1:500) drought conditions under a number of different future scenarios, known as 'situations', which consider different assumptions around population growth, climate change and environmental ambition (e.g. abstraction reductions). Situation 4, which is one of the nine future scenarios considered, is used by all water companies in the South East as a central baseline scenario of forecast supply demand balance for future investment modelling purposes, i.e. it provides the basis for their investment plans. The forecasts in WRMPs are regularly reviewed as part of the five year WRMP cycles and hence may change over time. In assessing the maximum operation of the Proposed Development for the purposes of environmental assessment (other than for the Carbon assessment – see ES Appendix 10.1 Carbon assessment methodology, Volume II (Document reference 6.2, DCO Volume 6)), this provides some flexibility to accommodate future changes in how the Proposed Development might be utilised within that envelope.

3.6.6 Situation 4 in the emerging WRMP24 shows that utilisation of the Proposed Development increases over time in both normal and drought conditions in response to increased water scarcity, principally due to reductions in abstractions. The WRP component of the Proposed Development is expected to operate predominantly at maximum output (approximately 60Ml/d) in both scenarios from the early 2040s onwards. The transfer flow to Otterbourne WSW is expected to

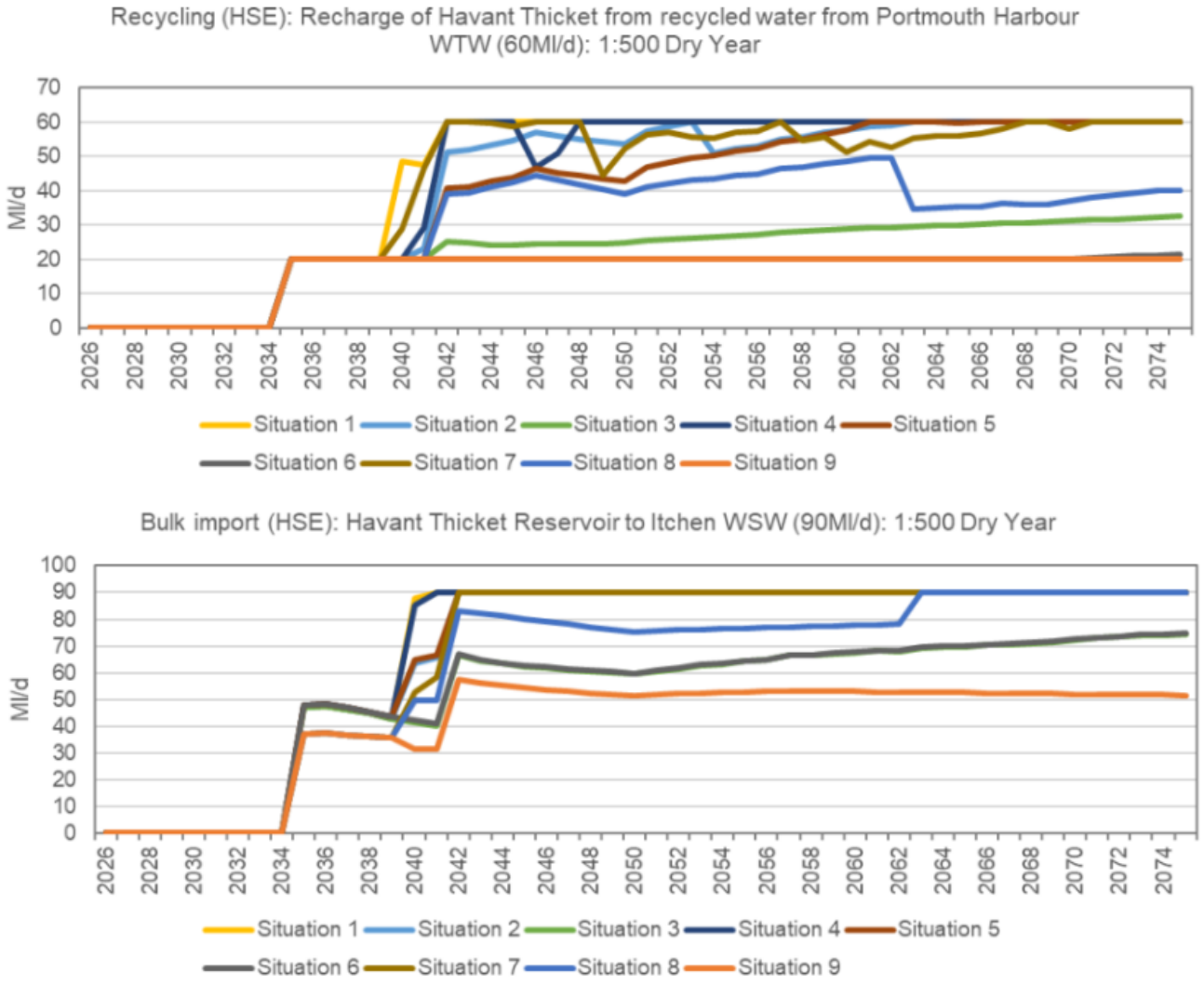
reach its maximum flow (approximately 90Ml/d) in extreme drought conditions from 2040 onwards, when drought orders/permits on the Rivers Test and Itchen (which enable increased abstractions during drought) are assumed to be no longer available. To support essential daily water supplies during normal conditions, the transfer flow to Otterbourne WSW is expected to increase from approximately 23Ml/d in 2034/35 to almost 50Ml/d by 2050, with flows fluctuating thereafter between 40Ml/d and 50Ml/d up to 2075. Note that these are annual average figures and it is likely that the transfer will operate at capacity every year, on some days in the year, i.e. the capacity of 90Ml/d is not just required in an extreme drought events.

3.6.7 These utilisation scenarios for the WRP to Otterbourne WSW transfer components of the Proposed Development are contained within the emerging WRMP24 [9]. Extracts of the figures from the emerging WRMP24 are reproduced below in Graphic 3-15 and Graphic 3-16 for the normal year and 1:500 drought year utilisation scenarios respectively. In these graphics, references in the figures to 'Portsmouth Harbour WTW' refer to Budds Farm WTW, and references to 'Itchen WSW' relate to Otterbourne WSW.

Graphic 3-15 Expected Normal Year utilisation of WRP and Otterbourne Transfer



Graphic 3-16 Expected 1:500 Dry Year (Extreme Drought) utilisation of WRP and Otterbourne Transfer



3.6.8 The average daily demand of chemicals used by the Proposed Development during operation is set out in Table 3-23 below.

Table 3-23 Average daily demand of chemicals during operation

Chemical	Average demand per day
Hydrochloric acid	1.22 m^3
Citric acid	0.21 m^3
Sodium hypochlorite	0.12 m^3
Sodium bisulphite	0.34 m^3
Sodium hydroxide	0.20 m^3
Powdered lime	3.57 m^3
Antiscalant	0.02 m^3
Hydrogen peroxide	0.08 m^3

Chemical	Average demand per day
Sodium dodecylsulphate	0.00 m^3
Carbon dioxide	1667.6 kg

3.6.9 The use of potable water at the WRP Site would be up to approximately 180m^3/day for welfare facilities and the reverse osmosis process. The use of potable water by Proposed Development outside of the WRP Site would be negligible during operation as it would be limited to welfare facilities at the AGP sites. Other water used by the Proposed Development constitutes treated wastewater and source water as described in sections 3.3 and 3.6.

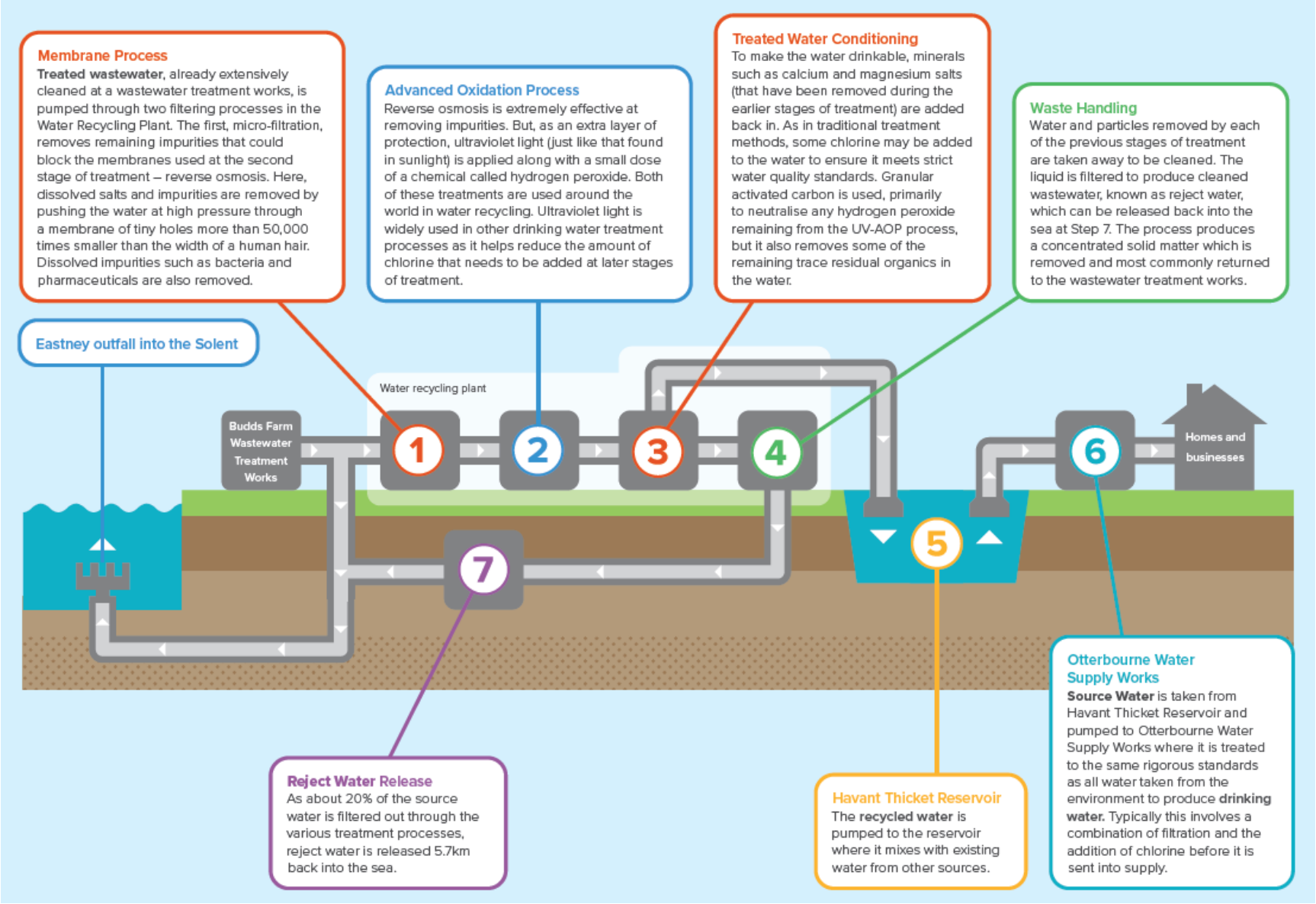
Water Recycling Plant site

3.6.10 The WRP site would receive treated wastewater from Budds Farm WTW. Within the WRP site, the treated wastewater would be pumped through two filtering processes. The first of these, micro-filtration, is to remove remaining impurities that could block the membranes during reverse osmosis. The reverse osmosis process removes dissolved ions, phosphorus, impurities, bacteria and pharmaceuticals. The next stage within the water recycling process would be the advanced oxidation process involving the use of ultraviolet light and hydrogen peroxide to break down any remaining impurities. To ensure the water is stable for onward pumping and blending, minerals such as calcium and magnesium salts removed during the earlier stages of treatment would be added back in.

3.6.11 The water recycling process would reduce the phosphorus content of the recycled water to levels determined by the Environment Agency, and this would be subject to an environmental permit. Phosphorus would be removed using reverse osmosis membranes within the WRP site.

3.6.12 The water recycling process that would be used by the WRP site is shown in Graphic 3-17.

Graphic 3-17 Water Recycling Plant site water recycling process



3.6.13 During maximum operation, the WRP site would treat approximately 82Ml/d of treated wastewater into approximately 60Ml/d of recycled water for transfer to Bedhampton Springs (for onward transfer to Havant Thicket Reservoir). Under minimum flow operation, the WRP site would treat 14Ml/d of treated wastewater and produce 10Ml/d of recycled water.

3.6.14 The impurities removed through the water recycling process produces wastewater known as reject water. This reject water would be released via Budds Farm WTW through the existing Eastney TT, Eastney PS and Eastney LSO. During maximum operation, approximately 22Ml/d of reject water would be produced and released, and during minimum operation approximately 4Ml/d of reject water would be produced and released.

3.6.15 The WRP site would be operational 24 hours a day and it is assumed that operatives would be in attendance 24 hours a day with approximately five operatives during the day and three during the night. The delivery of chemicals is required for the operation of the WRP site, which is expected to comprise approximately 80 Heavy Goods Vehicle deliveries within a 30-day period when operating at maximum operating output of 60Ml/d.

3.6.16 External lighting provided by the WRP site during operation would consist of internal access road lighting and task lighting. Additional information on the external lighting at the WRP site is available at paragraph 3.3.11. Internal lighting would be provided within the WRP site buildings.

3.6.17 An emergency generator would be provided as part of the WRP site which would be used when required. The emergency generator would be a fuel powered generator used to create electrical power in an emergency situation, for example during lack of power. In these events, the emergency generator would run until power to the WRP site is returned. The emergency generator would be tested for a short period during daytime hours on a weekday once a month to ensure the emergency generator is operating normally.

3.6.18 As all the pumps and equipment in the pumping stations at the WRP site are equipped with remote monitoring and control, attendance by an operative would be required approximately once per month for planned maintenance and monitoring.

3.6.19 The WRP would have a design life of approximately 60 years. During this period, routine maintenance would be required comprising monitoring, testing and the replacement of equipment. Proposed maintenance activities include:

1. Calibration and/or replacement of instrumentation for sampling and control.
2. Media regeneration such as Granular Activated Carbon.
3. Replacement of membranes.

3.6.20 Table 3-24 sets out the design life of specific assets within the WRP site. At the end of the design life of these assets, maintenance and upgrade activities would be required. It is assumed that assets would be replaced like for like. At the end of the periods set out in Table 3-24, the condition of assets would be reviewed to determine the requirement for any maintenance activities.

Table 3-24 Water Recycling Plant site assets design life

Asset	Expected design life
Concrete structures	50 years
Tunnel shafts	100 years
Chambers and manholes	100 years
Masonry and steel framed buildings	60 years
Secondary steelwork	30 years
General GRP	30 years
GRP covers	20 years
Steel tanks	20 years
Steel fencing	25 years
Timber fencing	15 years
Mechanical and electrical components	20 years
Instrumentation, control and automation components	10 years
Pipework within the WRP site	20 years
Flexible hose	10 years
Gearboxes	20 years
Bearings	100,000 hours
Other mechanical moving parts	75,000 hours
Pumps	20 years
Screens and screenings handling	Minor overhaul required every 5 years, major overhaul required every 10 years
Blowers, compressors and fans	7.5 years
Control panels and motor control centres	20 years
Programmable Logic Controllers and Supervisory Control and Data Acquisition	10 years
Switchgear	25 years
Variable speed drives	15 years
Detectors (gas, fire, intruder)	10 years
Closed circuit television	10 years
Batteries	3 years
Lightning protection	40 years
Internal lighting	15 years
External lighting	10 years
Valves	2,500 opening and closing cycles

Pipelines

Pipeline protection and land rights

3.6.21 For pipelines constructed using open-cut construction methods, a protective strip of land either side of the entire alignment would be required for the following reasons:

1. Ensure space and access to enable maintenance and repair.
2. Protect the integrity of the pipeline from external influences, for example loading.
3. Protect third party assets from potential damage in the event of a burst.

3.6.22 The protective strip would restrict the landowner or occupier from undertaking certain activities that would restrict access to or affect the integrity of the pipeline. This includes restricting the following activities:

1. Erecting, constructing or placing any building wall or other structure whether permanent or temporary.
2. Undertaking of any piling or percussive works.
3. Alteration of ground levels.
4. Planting of trees, shrubs or other species other than as set out by the Applicant's 'Guide to Tree Planting near Mains and Sewers' [7] or other relevant standards.
5. Construction or laying of new pipe duct or cable across the pipeline at an angle of less than forty-five degrees formed by the pipeline and the new pipe duct or cable.

3.6.23 Relevant landowners will be advised of the extent of the protective strip on their land. This will be determined by the depth and location of the pipeline.

Maintenance

3.6.24 The pipelines would have a design life of approximately 100 years. The condition of the pipelines would be monitored and checked throughout the operation phase. At the end of this design life, the pipelines would be reviewed to determine whether maintenance activities are required.

3.6.25 The tunnels that form part of the pipeline would have a design life of approximately 100 years. The condition of tunnels would be reviewed at the end of this period to determine whether maintenance activities are required.

Isolation valves, air valves and washout valves

3.6.26 During maintenance, the isolation valves, air valves and washout valves would be inspected and tested to check the valves are operational. Permanent access roads would not be required to facilitate access. However, the specific activities that would be permitted relating to their maintenance would be discussed with relevant landowners.

3.6.27 Testing of washout valves during maintenance could require the release of source water within the pipelines. Any releases of source water resulting from the testing of washout valves would be collected directly by a tanker, with no source water

discharged to the environment (land or watercourse). This could require the installation of temporary works to connect the tanker to the washout valve. Testing of a washout valve would result in the release of approximately 4.5m^3 of source water from the pipelines, requiring only one tanker. Testing of washouts would be required a minimum of every six months, or in accordance with the relevant operating regime.

3.6.28 In an emergency scenario, such as in the event of damage to the Pipeline, sections of the Pipeline may need to be drained using the washout valves to facilitate repair. These events are considered operationally exceptional and are not expected during the operation of the Proposed Development.

3.6.29 It is expected that valves would have a design life of 2,500 opening and closing cycles. Therefore, if valves are to be tested every six months, the valves would not need replacing during the intended lifetime of the Proposed Development unless testing identified the need for replacement.

Above Ground Plant

3.6.30 It is expected that the IPSs would have a structural design life of approximately 60 years, applicable solely to the primary building structure. Mechanical plant and minor civil components would have shorter, asset specific design lives as per Table 3-25. It is expected that the BPTs would have a design life of approximately 100 years. The AGP would be monitored throughout operation, with its condition reviewed at the end of the expected design life for each asset to determine any required maintenance. Table 3-25 sets out the expected design life of specific assets within the AGP which may have different design life periods.

Table 3-25 Above Ground Plant assets expected design life

Asset	Expected design life
Concrete structures	50 years
Tunnel shafts	100 years
Chambers and manholes	100 years
Masonry and steel framed buildings	60 years
Secondary steelwork	30 years
General GRP	30 years
GRP covers	20 years
Steel tanks	20 years
Steel fencing	25 years
Timber fencing	15 years
Mechanical and electrical components	20 years
Instrumentation, control and automation components	10 years
Pipework within AGP	20 years
Flexible hose	10 years
Gearboxes	20 years

Asset	Expected design life
Bearings	100,000 hours
Other mechanical moving parts	75,000 hours
Pumps	20 years
Blowers, compressors and fans	7.5 years
Control panels and motor control centres	20 years
Programmable Logic Controllers and Supervisory Control and Data Acquisition	10 years
Switchgear	25 years
Variable speed drives	15 years
Detectors (gas, fire, intruder)	10 years
Closed circuit television	10 years
Batteries	3 years
Lightning protection	40 years
Internal lighting	15 years
External lighting	10 years
Valves	2,500 opening and closing cycles

3.6.31 During operation and maintenance of the IPSs and BPTs, attendance by an operative would be required approximately once per week for monitoring and any planned maintenance.

3.6.32 Information on the external lighting at the AGP is set out in paragraph 3.3.72.

3.6.33 An emergency generator would be provided as part of the IPSs and BPTs. The emergency generator would be a fuel powered generator used to create electrical power in an emergency situation, for example during lack of power. In these events, the emergency generator would run until power to the IPS is returned. The emergency generator would be tested for a short period during daytime hours on a weekday once a month to ensure the emergency generator is operating normally.

3.6.34 System controls would manage water levels within the BPTs. In the event of a failure in these systems or cessation or throttling of flows, utilisation of an overflow outlet would be required to discharge water from the BPT. Failure of these systems is considered as an emergency. It is not expected that the overflow outlet would be used during the operation of the Proposed Development.

3.6.35 Washout and air valves would also be required at the BPT sites and are described in paragraphs 3.3.62.

Release from the Eastney Long Sea Outfall

3.6.36 The existing Eastney LSO releases treated wastewater from Budds Farm WTW via the existing Eastney TT and Eastney PS. The Proposed Development would utilise the Eastney LSO for the release of reject water (via Budds Farm WTW)

produced by the WRP site. During maximum operation approximately 22Ml/d of reject water would be released from the Eastney LSO. During minimum flow operation approximately 4Ml/d of reject water would be released from the Eastney LSO.

3.6.37 During the operational phase of the Proposed Development, the volume of treated wastewater from Budds Farm WTW released from the Eastney LSO via the Eastney TT and Eastney PS would be reduced compared to the existing releases from the Eastney LSO, as treated wastewater from Budds Farm WTW is diverted to the WRP site.

3.6.38 The releases from the Eastney LSO during maximum operation are anticipated to result in very small changes in the salinity, nitrogen, solids, iron, Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) levels compared to the existing release from the Eastney LSO. ES Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6), sets out the assessment of the changes to the release from the Eastney LSO.

Materials management

3.6.39 Operation of the Proposed Development would result in the production of waste. The water recycling process at the WRP site would generate approximately 22Ml/d of reject water during maximum operation. Chemical filter washing at the WRP site would generate up to approximately 163m^3 of waste per day which would be discharged via the foul sewer network to Budds Farm WTW. This discharge will be undertaken in line with a trade effluent permit. Welfare facilities at the WRP site would generate up to approximately 5.6m^3 of waste per day which would be discharged via the foul sewer network.

3.6.40 Welfare facilities at the AGP sites would generate waste, however given these sites would only be visited weekly for testing and planned maintenance, the volumes of waste generated would be negligible. Waste generated at the AGP sites would be discharged to cesspits within the AGP sites, which would be emptied by tankers.

3.7 Decommissioning

3.7.1 The components of the Proposed Development are expected to have a design life of up to 100 years, however the operational life of the Proposed Development could be longer than this. Therefore, consent for decommissioning of the Proposed Development is not being sought by the Applicant. The condition of the components of the Proposed Development would be reviewed at the end of their expected design life to determine whether they remain in a viable condition to continue to operate after this time or whether further maintenance would be suitable. Table 3-26 sets out the expected design life of the Proposed Development components. Further detail on the design life of specific aspects of each component are set out in section 3.6 which explains the proposed maintenance regime.

Table 3-26 Proposed Development components expected design life

Component	Expected design life
WRP site	60 years
Pipeline (including tunnelled sections)	100 years
IPSs	60 years
BPTs	100 years

3.7.2 It is anticipated that the programme for decommissioning the components of the Proposed Development would be the similar to the construction programme set out at paragraph 3.5.1. It is not anticipated that additional land outside of the Order Limits would be required for decommissioning of the Proposed Development.

3.7.3 The specific method of decommissioning of the Proposed Development at the end of the operational phase is uncertain as the engineering approaches will evolve over this time. Any decommissioning works in connection with the Proposed Development would be undertaken using good industry practice and would comply with all relevant statutory requirements applicable at the time. Any decommissioning works would take place in the context of the regulatory framework in place at that time, which may include a requirement to seek additional consents, permits or licences.

3.7.4 Given the Applicant is not seeking consent for decommissioning of the Proposed Development, and the regulatory framework for future decommissioning is unknown, the Applicant is not submitting an Outline Decommissioning Environmental Management Plan as part of the DCO application.

3.7.5 During the decommissioning phase, it is anticipated that above-ground assets would be removed, including process, mechanical and electrical equipment, buildings, and associated below-ground structures.

3.7.6 It is anticipated that buried pipeline infrastructure would be left in situ following the end of the Proposed Development's operation phase, once drained and capped (and possibly filled in with grout under major assets such as road and railways) depending on industry best practice at the time.

3.7.7 The approach to the assessment of decommissioning is set out in ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6).

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