Appendix E1:
Appropriate Assessment: Low Impact Options

1. Overview

1.1.1 The 'People Over Wind'[1] case law requires that mitigation not be considered at screening. Historically, HRAs of plans typically assumed that established best-practice avoidance and mitigation measures (see **Appendix C**) would be employed at the project level to safeguard environmental receptors, including European site interest features, and accounted for this at the screening stage. However, it is arguable that an assumption such as this, albeit in relation to a lower-tier project that would itself be subject to HRA, might constitute an 'avoidance measure' that the WRMP HRA is effectively relying on to ensure that significant effects do not occur.

1.1.2 In this instance, therefore, mitigation measures (including the established best-practice avoidance and mitigation measures noted in **Appendix C**) have not been taken into account at screening, but are instead introduced and considered through 'appropriate assessment'.

1.1.3 The screening has identified a number of options where significant effects (i.e. an effect that could undermine the conservation objectives) cannot be definitively excluded with the data available at the plan-level, but where the potential effects are typically low-probability, short-term and secondary to the scheme's intent (e.g. risk of site-derived pollutants from construction), and can self-evidently be avoided with established measures that might historically have been accounted for at screening.

1.1.4 These options are typically those with potential construction effects only – i.e. network improvements or transfer schemes (typically involving pipeline construction or installation of new equipment at existing operational sites) that improve network efficiency and resilience, and which utilise water that is already available to Southern Water or delivered under one or more of the other WRMP options.

1.1.5 In these instances, the relevant European sites and features are necessarily 'screened in', with available mitigation (see **Appendix C**) then tested through appropriate assessment. However, it is recognised that an 'appropriate' assessment simply needs to be proportional to the scale, risk and complexity of ecological effects; exhaustive and often speculative examination of hypothetical effect pathways can be of limited value if it is clear that the potential effect is of a scale and type that can be clearly avoided or mitigated with the addition of established measures that are known to be available, achievable and effective.

1.1.6 Therefore, for clarity, those options where the screening has only identified minor potential effects are address together in this appendix.

[1] Case *C 323/17 Court of Justice of the European Union: People Over Wind*

1.1.7 In addition, options with potentially more complex construction-only effects (e.g. crossings of SAC rivers) are also considered in this section; this is because it is reasonable (at the strategic plan level) to assume that these schemes can be constructed without adverse effects (as, for example, pipeline crossings of SAC rivers have been completed many times in the past).

2. Screening Summary

1.1.8 In summary, for all of the options in **Table 2.1 – 2.3**:

- there will be no operational effects (all essentially modifications to the network or existing assets that do not require the development of new water resources or alterations to abstraction licences);
- all potential construction effects are of a scale and type that can be reliably prevented with established measures (see **Appendix C**), such that residual effects 'alone' would be nil or negligible and so 'in combination' effects would not be expected.

1.1.9 These options and the European sites that they may affect are considered in **Section 3**.

Table 2.1 Western area options that only have potential effects that can be reliably avoided with established project-level measures

Option	European sites
Bulk import (HSE): Havant Thicket Reservoir to Lower Itchen WSW (90Ml/d)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Meon) • Solent Maritime SAC • Portsmouth Harbour SPA • Solent and Southampton Water SPA • Solent and Dorset Coast SPA • Chichester and Langstone Harbours Ramsar • Chichester and Langstone Harbours SPA • Portsmouth Harbour Ramsar • Solent and Southampton Water Ramsar
Bulk import (HSE): PWC Source A to Lower Itchen WSW (21Ml/d)	• River Itchen SAC* • Solent and Dorset Coast SPA • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC
Bulk export (HSE): Lower Itchen WSW to PWC Source A (45Ml/d)	• River Itchen SAC* • Solent and Dorset Coast SPA • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC
Bulk import (HAZ): T2ST to Andover (20Mld)	• River Itchen SAC • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent and Dorset Coast SPA

Option	European sites
Bulk import (HWZ): T2ST to Yew Hill (95Ml/d)	• River Itchen SAC • River Lambourn SAC* • Kennet Valley Alderwoods SAC • Solent and Dorset Coast SPA • Kennet and Lambourn Floodplain SAC • Solent Maritime SAC • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar
Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d)	• Mottisfont Bats SAC
Groundwater (HSW): Test MAR (5.5Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC • Solent and Dorset Coast SPA
Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA
Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)	• Mottisfont Bats SAC • River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA
Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA
Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (5Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA
Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d)	• River Itchen SAC • Solent Maritime SAC • Emer Bog SAC • Mottisfont Bats SAC • Solent and Southampton Water SPA • Solent and Dorset Coast SPA • Solent and Southampton Water Ramsar

Option	European sites
Interzonal transfer (HSE-HWZ): Lower Itchen WSW to Yew Hill bi-directional (74Ml/d)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Test) • Solent Maritime SAC • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent and Dorset Coast SPA
Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent and Dorset Coast SPA

* These sites may be directly affected by pipeline construction, although potential adverse effects are avoidable at the project-level using established measures; however, potential impacts are considered in more detail in Appendix E1.

Table 2.2 Central area options that only have potential effects that can be reliably avoided with established project-level measures

Option	European sites
Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	• Duncton to Bignor Escarpment SAC • Kingley Vale SAC • Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC • Solent Maritime SAC • Chichester and Langstone Harbours Ramsar • Chichester and Langstone Harbours SPA • The Mens SAC • Singleton and Cocking Tunnels SAC • Solent and Dorset Coast SPA
Bulk import (SNZ): SEW RZ5 to Pulborough	• Arun Valley Ramsar • Arun Valley SAC • Arun Valley SPA • The Mens SAC • Ebernoe Common SAC • Singleton and Cocking Tunnels SAC
Interzonal transfer (SNZ-SWZ): Pulborough to Worthing	• Arun Valley SPA • Arun Valley SAC • Arun Valley Ramsar • The Mens SAC
Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d)	• Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC • The Mens SAC • Ebernoe Common SAC

Table 2.3 Eastern area options that only have potential effects that can be reliably avoided with established project-level measures

Option	European sites
Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d)	• Stodmarsh Ramsar • Stodmarsh SAC • Stodmarsh SPA • Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA
Bulk import (SHZ): SEW RZ8 to Rye	• Dungeness SAC • Dungeness, Romney Marsh and Rye Bay SPA • Dungeness, Romney Marsh and Rye Bay Ramsar
Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d)	• Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA
Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d)	• Dungeness, Romney Marsh and Rye Bay SPA • Dungeness, Romney Marsh and Rye Bay Ramsar
Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d)	• Stodmarsh Ramsar • Stodmarsh SAC • Stodmarsh SPA • Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA
Recycling (SHZ): Hastings to Darwell (15.3Ml/d)	• Dungeness, Romney Marsh and Rye Bay SPA • Pevensey Levels SAC • Pevensey Levels Ramsar • Dungeness, Romney Marsh and Rye Bay Ramsar

3. Appropriate Assessment

3.1 Context

3.1.1 The appropriate assessment stages take account of the baseline condition of the European sites and their interest features[2], including (where reported) data on

- the site boundaries and the boundaries of the component SSSIs;
- the conservation objectives;
- information on the attributes of the European sites that contribute to and define their integrity;

[2] The interest features are taken to be the qualifying features; and other within-site features that may be relevant to site integrity, particularly 'typical species' (for SACs) and within-site supporting habitats for SPAs. 'Functional land' would not usually be considered an interest feature of the site (although it may be important to the integrity of some interest features).

- the condition, vulnerabilities and sensitivities of the sites and their interest features, including known pressures and threats;
- the approximate locations of the interest features within each site (if reported); and
- designated or non-designated 'functional habitats' (if identified).

3.1.2 These data were derived from:

- the most recent JNCC-hosted GIS datasets;
- the Standard Data forms for SACs and SPAs and Information Sheets for Ramsar sites;
- Article 12 and 17 reporting;
- the published site Conservation Objectives;
- Supplementary Advice to the conservation objectives (SACO) where available[3];
- Site Improvement Plans (SIPs);
- Core Management Plans (Wales); and
- the supporting Site of Special Scientific Interest's favourable condition tables where relevant and where no SACOs applicable to the features are available.

3.1.3 Note:

- For SPAs, the qualifying features are taken as those identified on the most recent JNCC datasets and citations where these post-date the 2nd SPA Review (i.e. it will be assumed that any amendments suggested by the SPA review have been made) unless otherwise identified to us by NE or NRW; any site-specific issues relating to the SPA Review can be addressed in the screening and appropriate assessment of the preferred options (see below).
- The conservation objectives for Ramsar sites are taken to be the same as for the corresponding SACs / SPAs (where sites overlap); SSSI Definition of Favourable Condition (FCTs) will be used for those features not covered by SAC/SPA designations.

3.1.4 Where possible the site data is used to identify other features that may be relevant to site integrity, particularly '**typical species**' (for SACs), within-site **supporting habitats**, and designated or non-designated '**functional habitats**'.

3.1.5 A '**typical species**' is broadly described by EC guidance as being any species (or community of species) which is particularly characteristic of, confined to, and/or dependent upon the qualifying Annex I habitat feature at a particular site. This may include those species which:

- are critical to the composition or structure of an Annex I habitat (e.g. constant species identified by the National Vegetation Classification (NVC) community classification);

[3] NE has published '*Supplementary advice on conserving and restoring site features*' for most European sites in England which describe in more detail the range of ecological attributes which are most likely to contribute to a site's overall integrity, and the targets each qualifying feature needs to achieve in order for the site's conservation objectives to be met.

- exert a critical positive influence on the Annex I habitat's structure or function (e.g. a bioturbator (mixer of soil/sediment), grazer, surface borer or predator);
- are consistently associated with, and dependent upon, the Annex I habitat feature for specific ecological needs (e.g. feeding, sheltering), completion of life-cycle stages (e.g. egg-laying) and/or during certain seasons/times; or
- are particularly distinctive or representative of the Annex I habitat feature at a particular site.

3.1.6 Within-site **supporting habitats** are those which support the population(s) of the qualifying species and which are therefore critical to the integrity of the feature.

3.1.7 '**Functional habitats**' are generally taken to be habitats or features outside a European site boundary that are important or critical to the functional integrity of the site habitats and / or its interest features. These might include, for example:

- 'buffer' areas around a site (e.g. dense scrub areas preventing public access; areas of land that reduce the effects of agricultural run-off; etc.);
- specific features or habitats relied on by mobile species during their lifecycle (e.g. high-tide roosts for waders; significant maternity colonies for bats known to hibernate within an SAC; areas that are critical for foraging or migration; etc).

3.1.8 **Conservation Objectives** benchmark Favourable Conservation Status (FCS) for each feature. Guidance[4] from the UK Statutory Nature Conservation Bodies (SNCBs) provides a broad characterisation of FCS, stating that it "*relates to the long-term distribution and abundance of the populations of species in their natural range, and for habitats to the long-term natural distribution, structure and functions as well as the long-term survival of its typical species in their natural range. It describes a situation in which individual habitats and species are maintaining themselves at all relevant geographical scales and with good prospects to continue to do so in the future*".

3.1.9 The conservation objectives for European sites in England have been revised by Natural England in recent years to improve the consistency of assessment and reporting. As a result, the high-level conservation objectives for all sites are effectively the same (depending on the site features):

3.1.10 For SACs:

- *With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features'...), and subject to natural change; ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring* [as applicable to each site];
  - *The extent and distribution of the qualifying natural habitats;*
  - *The extent and distribution of the habitats of qualifying species;*
  - *The structure and function (including typical species) of the qualifying natural habitats;*
  - *The structure and function of the habitats of qualifying species;*

[4] JNCC (2018). *Favourable Conservation Status: UK Statutory Nature Conservation Bodies Common Statement* [online]. Available at: https://data.jncc.gov.uk/data/b9c7f55f-ed9d-4d3c-b484-c21758cec4fe/FCS18-InterAgency-Statement.pdf. [Accessed March 2022].

- *The supporting processes on which the qualifying natural habitats rely;*
- *The supporting processes on which the habitats of qualifying species rely;*
- *The populations of qualifying species; and,*
- *The distribution of qualifying species within the site*.

3.1.11 For SPAs:

- *With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features'...), and subject to natural change; ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:*
  - *The extent and distribution of the habitats of the qualifying features;*
  - *The structure and function of the habitats of the qualifying features;*
  - *The supporting processes on which the habitats of the qualifying features rely;*
  - *The population of each of the qualifying features; and*
  - *The distribution of the qualifying features within the site*.

3.1.12 The conservation objectives for Ramsar sites are taken to be the same as for the corresponding SACs / SPAs (where sites overlap); where Ramsar sites do not coincide with an SAC or SPA, or where the Ramsar features are not ecologically coincident with SAC or SPA features, the conservation objectives and definitions of favourable condition for the underlying SSSIs are used.

3.1.13 The conservation objectives are considered when assessing the potential effects of plans and policies on the sites; information on the sensitivities of the interest features also informs the assessment.

3.1.14 NE has published '*Supplementary advice on conserving and restoring site features*' for most sites, which describe in more detail the range of ecological attributes which are most likely to contribute to a site's overall integrity, and the minimum targets each qualifying feature needs to achieve in order to meet the site's conservation objectives. These are considered at the screening and appropriate assessment stages, as necessary.

3.1.15 Site qualifying features are identified in Appendix A. The above data (conservation objectives, SACO, etc.) are freely-available online (see **Appendix A**) and so are not exhaustively reproduced within the following tables given the low-risk of adverse effects and the high confidence in the effectiveness of the available avoidance and mitigation measures.

3.2 Mitigation and Avoidance Measures

3.2.1 **Appendix C** identifies standard and established measures that are known to be available, achievable and likely to be effective in avoiding or mitigating potentially adverse effects on European sites and interest features. These are based on best- and case-practice from similar schemes, and so there can be high confidence in their deliverability and effectiveness. These measures would be applied unless project-level HRAs or project-specific environmental studies demonstrate that they are not required (i.e. the anticipated effect will not occur), not appropriate, or that alternative or additional measures are necessary or more appropriate. In addition numerous established engineering solutions are available to avoid effects through design – for example, crossing watercourses with directional-drill techniques, or re-routing pipelines entirely.

3.3 Assessment

3.3.1 **Table 3.1** summarises the assessment of those options that only have low-probability / low magnitude effects of a type that can be reliably avoided with measures that are known to be achievable and effective; those options that have additional risks for particular European sites are considered in Section 4 below or **Appendices E2 – E12** (i.e. for some European sites considered in **Appendices E2 – E12** there will be European sites that are only potentially exposed to low-probability / low magnitude effects, to which the measures in Appendix C are applied).

3.3.2 Note, options are grouped in **Table 3.1** where they are spatially coincident (e.g. at the same operational site) and the effects are expected to be of similar magnitude, or where they are effectively part of one 'scheme' (e.g. some transfer schemes are divided into pipeline sections). This for clarity, to reduce repetition in the table; the distances noted in the 'Dist (km)' column are therefore the minimum distances for the closest components of a scheme.

3.3.3 Note, the assessments in **Table 3.1** are essentially for the options 'alone'. It is considered that, for construction-only effects, potential in combination effects can be reliably avoided at the project level using established measures.

Table 3.1 Western area options that only have potential effects that can be reliably avoided with established project-level measures

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Chichester and Langstone Harbours SPA / Ramsar	• Bulk import (HSE): Havant Thicket Reservoir to Lower Itchen WSW (90Ml/d)	• Indicative pipeline routes within the catchment of these sites and construction is likely to be required near minor tributaries. • Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features**). • Breeding / wintering bird features within the site unlikely to be exposed to disturbance, although some may utilise non-designated functional land closer to the construction areas.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)
Emer Bog SAC	• Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d)	• Construction for this option would cross tributaries of this site. • Site-derived pollutants from run-off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features within site itself**).	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Kennet and Lambourn Floodplain SAC	• Bulk import (HSE): T2ST to HSE (120Ml/d)	• Construction of pipeline would cross tributaries of these sites. • Site-derived pollutants from run-off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features within site itself**). • Mobile species associated with SAC (Desmoulin`s whorl snail *Vertigo moulinsiana*) will not be dependent on habitats of pipeline routes	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)
Kennet Valley Alderwoods SAC	• Bulk import (HSE): T2ST to HSE (120Ml/d)	• Construction of pipeline would cross tributaries of these sites. • Site-derived pollutants from run-off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features within site itself**).	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Mottisfont Bats SAC	• Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d) • Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d) • Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)	• Some pipeline construction for this option would be required in the 'Core Sustenance Zone' for the bat species associated with this site. • No permanent land-take within the CSZ required; effects on bat species possible through disruption of foraging/commuting routes (e.g. hedge removal, site lighting). • Exposure of features likely to be low based on habitat preferences of bat (principally woodland) and habitats potentially affected by pipeline.	• Standard measures to avoid / minimise disturbance of bat species (e.g. pre-survey, habitat retention, lighting design, timing of works, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)
Portsmouth Harbour SPA / Ramsar	• Bulk import (HSE): Havant Thicket Reservoir to Lower Itchen WSW (90Ml/d)	• Indicative pipeline routes within the catchment of these sites and construction is likely to be required near minor tributaries. • Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features**). • Breeding / wintering bird features within the site unlikely to be exposed to disturbance, although some may utilise non-designated functional land closer to the construction areas.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
River Itchen SAC	• Bulk import (HSE): Havant Thicket Reservoir to Lower Itchen WSW (90Ml/d) Bulk • import (HSE): PWC Source A to Lower Itchen WSW (21Ml/d) • Bulk import (HSE): T2ST to HSE (120Ml/d) • Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d)Interzonal transfer (HSE-HWZ): Lower Itchen WSW to Yew Hill bi-directional (74Ml/d) • Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d) •	• Indicative pipeline routes within the catchment of this site and construction is likely to be required near minor tributaries. • Construction required at Lower Itchen WSW (within 300m of site). • Crossing of River Itchen required for Bulk import (HSE): Havant Thicket Reservoir to Lower Itchen WSW (90Ml/d) • Bulk import (HSE): PWC Source A to Lower Itchen WSW (21Ml/d) • Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated aquatic habitat (**all site features**). • Construction activities posing risk to **otter** when using terrestrial habitats. • Risk of noise / vibration effects on fish species (principally salmon, other fish species have relatively low sensitivity to this pathway) principally for river crossing schemes.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard best-practice measures to safeguard protected / conservation-notable species. • Directional drill or pipe bridges for river crossings • See Appendix C.	• Expected to be fully effective, such that ‘no effects’ on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
River Lambourn SAC	• Bulk import (HSE): T2ST to HSE (120Ml/d)	• Indicative pipeline routes within the catchment of this site and construction is likely to be required near minor tributaries. • Crossing of River Lambourn required • Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated aquatic habitat (**all site features**). • Risk of noise / vibration effects on fish species (principally salmon, other fish species have relatively low sensitivity to this pathway) principally for river crossing schemes.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard best-practice measures to safeguard protected / conservation-notable species. • Directional drill or pipe bridges for river crossings • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)
River Test SAC Compensatory Habitat (River Meon)	• Bulk import (HSE): Havant Thicket Reservoir to Lower Itchen WSW (90Ml/d) •	• Pipeline crossings of Meon or tributaries likely to be required. • Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (supporting habitats for qualifying features). • Atlantic salmon may be exposed to noise/vibration disturbance.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Timing works to avoid key migration periods. • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone. • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects).

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
River Test SAC Compensatory Habitat (River Test)	• Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d) • Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d) • Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d) • Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d) • Groundwater (HSW): Test MAR (5.5Ml/d)	• Construction at SWS assets is likely to be required near minor tributaries of these sites. • Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (supporting habitats for qualifying features).	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone. • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects).

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Solent and Dorset Coast SPA **Solent Maritime SAC** **Solent and Southampton Water SPA / Ramsar**	• Bulk import (HSE): Havant Thicket Reservoir to Lower Itchen WSW (90Ml/d) Bulk • import (HSE): PWC Source A to Lower Itchen WSW (21Ml/d) • Bulk import (HSE): T2ST to HSE (120Ml/d) • Groundwater (HSW): Test MAR (5.5Ml/d) • Interzonal transfer (HRZ-HSW): Romsey Town and Test valve bi-directional • Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d) • Interzonal transfer (HSE-HWZ): Lower Itchen WSW to Yew Hill bi-directional (74Ml/d) • Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d) • Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d) • Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)	• Indicative pipeline routes within the catchment of these sites and construction is likely to be required near minor tributaries. • Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features**). • Breeding / wintering bird features within the site unlikely to be exposed to disturbance, although some may utilise non-designated functional land closer to the construction areas.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.) • See Appendix C.	• Expected to be fully effective, such that ‘no effects’ on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

Table 3.2 Central area options that only have potential effects that can be reliably avoided with established project-level measures

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Arun Valley Ramsar **Arun Valley SAC** **Arun Valley SPA**	• Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d) • Bulk import (SNZ): SEW RZ5 to Pulborough • Interzonal transfer (SNZ-SWZ): Pulborough to Worthing • Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d)	• Construction required within catchment of this site including on upstream Rother. • Site-derived pollutants from run-off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features within site itself**). • Qualifying feature (**Ramshorn snail**) primarily associated with ditches located some distance from the river with limited fluvial influence, so exposure likely to be low. • Wintering bird features may utilise habitats close to construction areas, and proximity to site may present risk of disturbing birds using the site or non-designated functional land (**bird qualifying features of sites**).	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Chichester and Langstone Harbours SPA / Ramsar	• Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	• Indicative pipeline routes within the catchment of these sites and construction is likely to be required near minor tributaries. • Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features**). • Breeding / wintering bird features within the site unlikely to be exposed to disturbance, although some may utilise non-designated functional land closer to the construction areas.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)
Duncton to Bignor Escarpment SAC	• Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	• Indicative pipeline route is close to this site (~50m). • Site-derived pollutants from run-off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features within site itself**). • Air quality effects from construction unlikely but may require consideration at scheme level due to proximity.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise air quality changes (e.g. choice / operation of plant). • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Ebernoe Common SAC	• Bulk import (SNZ): SEW RZ5 to Pulborough • Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d)	• Pipeline construction may be required in the 'Core Sustenance Zone' for the bat species associated with this site, but wider use of the countryside is possible. • No permanent land-take within the CSZ required; effects on bat species possible through disruption of foraging/commuting routes (e.g. hedge removal, site lighting). • Exposure of features (**Barbastelle *Barbastella barbastellus***; **Bechstein`s bat *Myotis bechsteini***) likely to be low based on habitat preferences of bats and habitats potentially affected by pipeline.	• Standard measures to avoid / minimise disturbance of bat species (e.g. pre-survey, habitat retention, lighting design, timing of works, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)
Kingley Vale SAC	• Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	• Indicative pipeline route is close to this site. • Site-derived pollutants from run-off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features within site itself**). • Air quality effects from construction unlikely but may require consideration at scheme level due to proximity.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise air quality changes (e.g. choice / operation of plant). • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Singleton and Cocking Tunnels SAC	• Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d) • Bulk import (SNZ): SEW RZ5 to Pulborough	• Pipeline construction would be required in the 'Core Sustenance Zone' for the bat species associated with this site. • No permanent land-take within the CSZ required; effects on bat species possible through disruption of foraging/commuting routes (e.g. hedge removal, site lighting). • Exposure of features (**Barbastelle *Barbastella barbastellus***; **Bechstein`s bat *Myotis bechsteini s***) likely to be low based on habitat preferences and habitats potentially affected by pipeline.	• Standard measures to avoid / minimise disturbance of bat species (e.g. pre-survey, habitat retention, lighting design, timing of works, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Solent and Dorset Coast SPA **Solent Maritime SAC** **Solent and Southampton Water SPA / Ramsar**	• Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	• Indicative pipeline routes within the catchment of these sites and construction is likely to be required near minor tributaries. • Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features**). • Breeding / wintering bird features within the site unlikely to be exposed to disturbance, although some may utilise non-designated functional land closer to the construction areas.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
The Mens SAC	• Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d) • Bulk import (SNZ): SEW RZ5 to Pulborough • Interzonal transfer (SNZ-SWZ): Pulborough to Worthing • Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d)	• Pipeline construction would be required in the 'Core Sustenance Zone' for the bat species associated with this site. • No permanent land-take within the CSZ required; effects on bat species possible through disruption of foraging/commuting routes (e.g. hedge removal, site lighting). • Exposure of features (**Barbastelle *Barbastella barbastellus***) likely to be low based on habitat preferences and habitats potentially affected by pipeline.	• Standard measures to avoid / minimise disturbance of bat species (e.g. pre-survey, habitat retention, lighting design, timing of works, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

Table 3.3 Eastern area options that only have potential effects that can be reliably avoided with established project-level measures

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Thanet Coast and Sandwich Bay Ramsar **Thanet Coast and Sandwich Bay SPA**	• Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d) • Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d) • Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d)	• Indicative pipeline route crosses tributaries of this site. • Site-derived pollutants from run-off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features within site itself**). • Breeding / wintering bird features within the site unlikely to be exposed to disturbance, although **golden plover** may utilise non-designated functional land closer to the construction areas.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Stodmarsh Ramsar **Stodmarsh SAC** **Stodmarsh SPA**	• Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d) • Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d)	• Construction for this option would cross tributaries of this site. • Site-derived pollutants from run-off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features within site itself**). • Breeding / wintering bird features unlikely to utilise construction area, although proximity to site may present risk of disturbing birds using the site or non-designated functional land (**bird qualifying** features of site). • Mobile species associated with SAC (Desmoulin`s whorl snail *Vertigo moulinsiana*) will not be dependent on habitats of pipeline routes	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

European Site(s)	Options	Pathways / Vulnerable features	Mitigation	Effectiveness	Conclusion with mitigation
Dungeness SAC **Dungeness, Romney Marsh and Rye Bay SPA** **Dungeness, Romney Marsh and Rye Bay Ramsar**	• Bulk import (SHZ): SEW RZ8 to Rye • Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d) • Recycling (SHZ): Hastings to Darwell (15.3Ml/d)	• Works required at Brede WSW upstream of this site. • Construction of pipeline would cross tributaries of these sites. • Site-derived pollutants from run-off entering local watercourses hence designated site or functionally associated habitat (**supporting habitats for qualifying features within site itself**). • Breeding / wintering bird features within the site unlikely to be exposed to disturbance, although some may utilise non-designated functional land closer to the construction areas.	• Standard best-practice measures to prevent site-derived pollutants entering local watercourses. • Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.) • See Appendix C.	• Expected to be fully effective, such that 'no effects' on the site would occur through these pathways.	• No adverse effects alone • In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects)

3.4 In combination effects

3.4.1 The potential ‘alone’ effects identified and assessed in **Tables 3.1 – 3.3** are essentially of a scale and type that can be reliably avoided at the project-level using established design and mitigation measures, such that the magnitude of any residual environmental changes would make ‘in combination’ effects (either between options (assuming they were delivered on a similar timescale) or with other plans and projects unlikely (i.e. if effects from the options are entirely avoidable then ‘in combination’ effects cannot in theory occur).

3.4.2 It is possible that there will be ‘in combination’ project-specific construction effects associated with projects or plans that cannot be reasonably identified and assessed at the WRMP level, and which can only be assessed at the time of any application or delivery. This is consistent with the ACWG guidance on cumulative/in combination assessments.