6 Detailed Assessment of Capital Scheme Preferred Options

6.1 Introduction

6.1.1 Ten of the capital scheme solutions proposed by Vinci Ringway were identified as requiring more detailed assessment within the SEA to fully explore the mechanisms of potentially significant environmental effects. This need is met through the application of Detailed Assessment Matrices (DAMs). The purpose of DAMs is to provide an in-depth assessment of the different aspects of a particular proposal which revealed potentially significant adverse effects at the HLA stage. The Detailed Assessment Matrices evaluate specific aspects of the Highways PFI proposals to meet the requirements of the SEA Directive, including:

- A description of the predicted effect;
- The duration of the effect: whether the effect is long, medium or short term;
- The frequency of the effect: will it be ongoing?
- Whether the effect is temporary or permanent;
- The geographic significance: whether the effect is of localised, regional, national or international significance;
- The magnitude of effect;
- The severity of significance; and
- Whether mitigation is required/possible to reduce the effect.

6.1.2 At a strategic level it is often difficult to assess significant effects in the absence of comprehensive site-specific data. Instead, orders of magnitude are used based on the geographic importance of potential receptors and impact magnitude. Table 6.1 illustrates this order of magnitude for positive and negative effects.

Table 6.1: Significance matrix

		Impact Magnitude								
		Negative					Positive			
		High	Medium	Low	Negligible		Negligible	Low	Medium	High
Geographic Importance	International	Severe	Severe	Major	Moderate	Neutral	Moderate	Major	Optimum	Optimum
	National	Severe	Major	Moderate	Minor		Minor	Moderate	Major	Optimum
	Regional	Major	Moderate	Minor	Negligible		Negligible	Minor	Moderate	Major
	Local	Moderate	Minor	Negligible	Negligible		Negligible	Negligible	Minor	Moderate

6.1.3 The following sections draw on the DAMs presented at **Appendix VIII** to provide a commentary on the findings of the detailed assessments. The nature of predicted effects, and recommended mitigation for each impact, is summarised from the DAM for each scheme, together with proposals for post-construction monitoring. Where a scheme has neutral or no impacts on one or more SEA Objectives, those objectives are omitted from the following sections. Environmental constraints facing each red risk site are illustrated by a series of maps, larger versions of which are included at **Appendix IX**.

6.2 Duver Road, St Helens

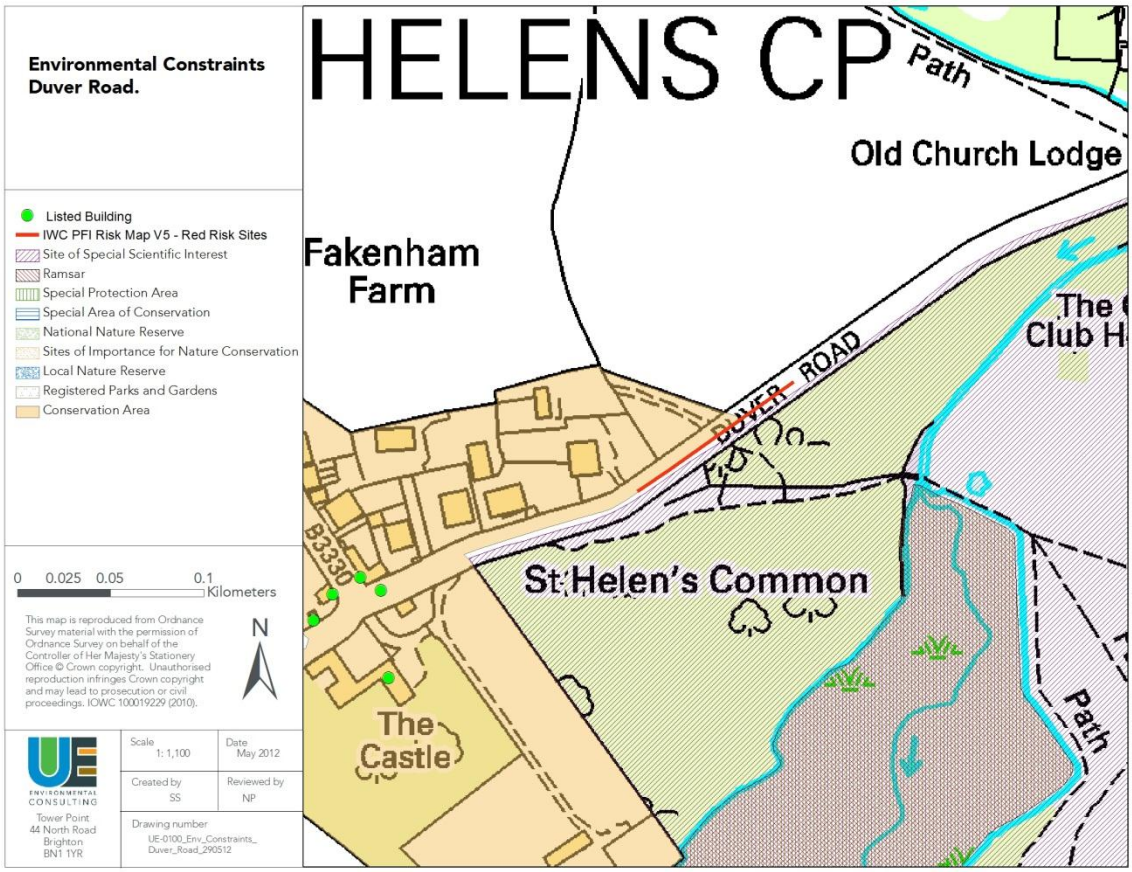

Figure 6.1: Environmental constraints (without AONB, Heritage Coast): Duver Road

Theme	Description of effect	Proposed mitigation	Monitoring
Historic envt	Piling works potentially affecting listed building, located c. 100m away from scheme.	Assessment of building(s) within range for sensitivity. Review piling method to minimise any expected vibrations and agreement to repair if affected following works	Post-completion structural inspections to check for and remediate damage
Landscape, historic envt	Timber clad facing may impact visual appearance if not in keeping with Conservation Area	Consultation with stakeholders to confirm finish and minimise visual impact by altering design accordingly. Minimise any vegetation removal. Consult to seek opinion on requirement for landscape and visual impact assessment	n/a
Biodiversity/	Adjacent to SPA/Ramsar/SSSI.	Noise from piling works are likely to	Monitoring of

Theme	Description of effect	Proposed mitigation	Monitoring
geodiversity	Proposed timings of works (including piling) clash with over wintering birds, which are a key feature on SSSI/SPA/Ramsar citations. Direct impact from works in SSSI resulting in some vegetation loss.	disturb over wintering bird assemblage possibly resulting in decreased survival rates and increased pressure on neighbouring winter grounds. Timing of work should be reviewed to avoid bird breeding and over wintering (suitable period = Aug - Oct). Consider use of vibro piling and/or other noise attenuation methods. SSSI area affected: defined in citation as relatively young woodland with oak/ash. The appropriate ecological survey(s) should be carried out (and site-specific mitigation based on findings of survey) to assess and minimise impact to any protected/priority species/ habitat. Additionally, works should avoid mature trees (and roots) where safe and possible to do so.	species populations and recovery of habitat and vegetative composition, and/or as recommended by project-level assessments and surveys
Accessibility & transport, population	Improves the satisfaction of people with their neighbourhoods as a place to live and maintains essential connectivity and access between local community and rest of the Island.	-	n/a
Health	Improves/maintains road safety	-	n/a

6.3 Lower Road, Adgestone

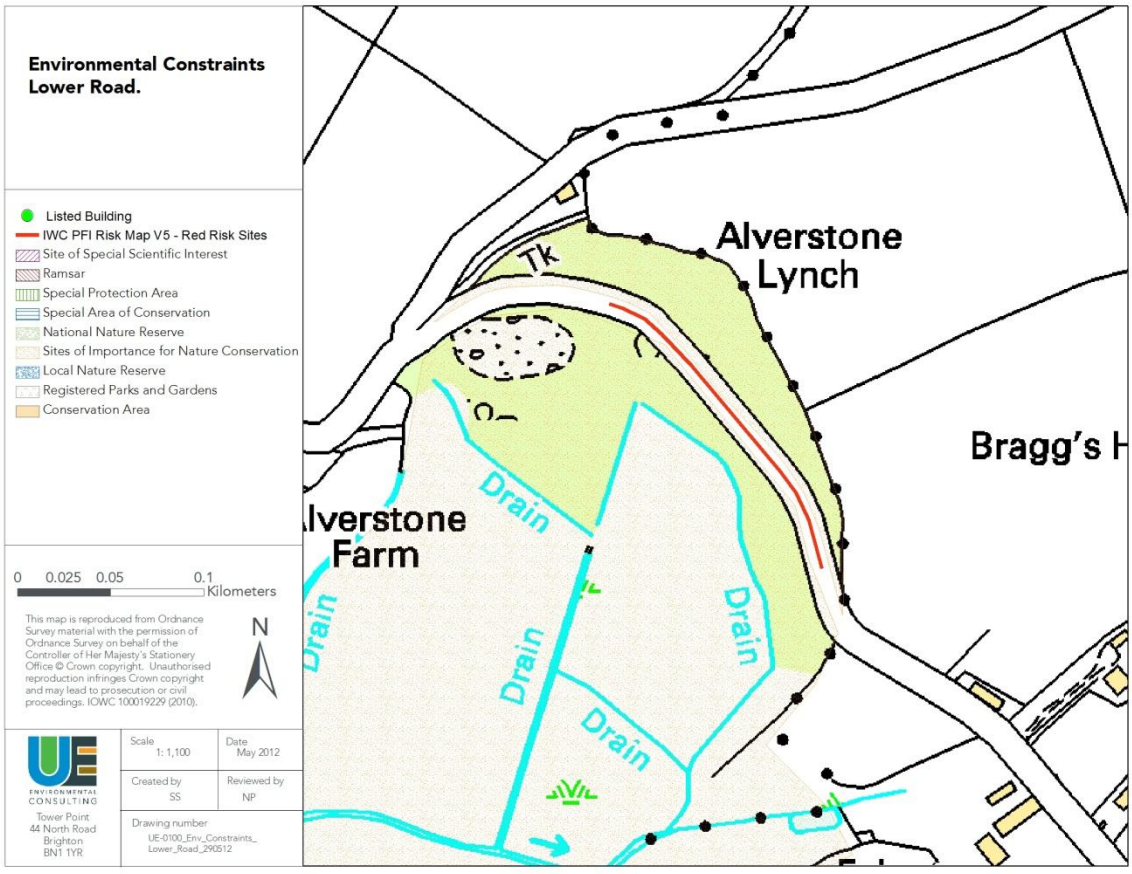

Figure 6.2: Environmental constraints (without AONB, Heritage Coast): Lower Road

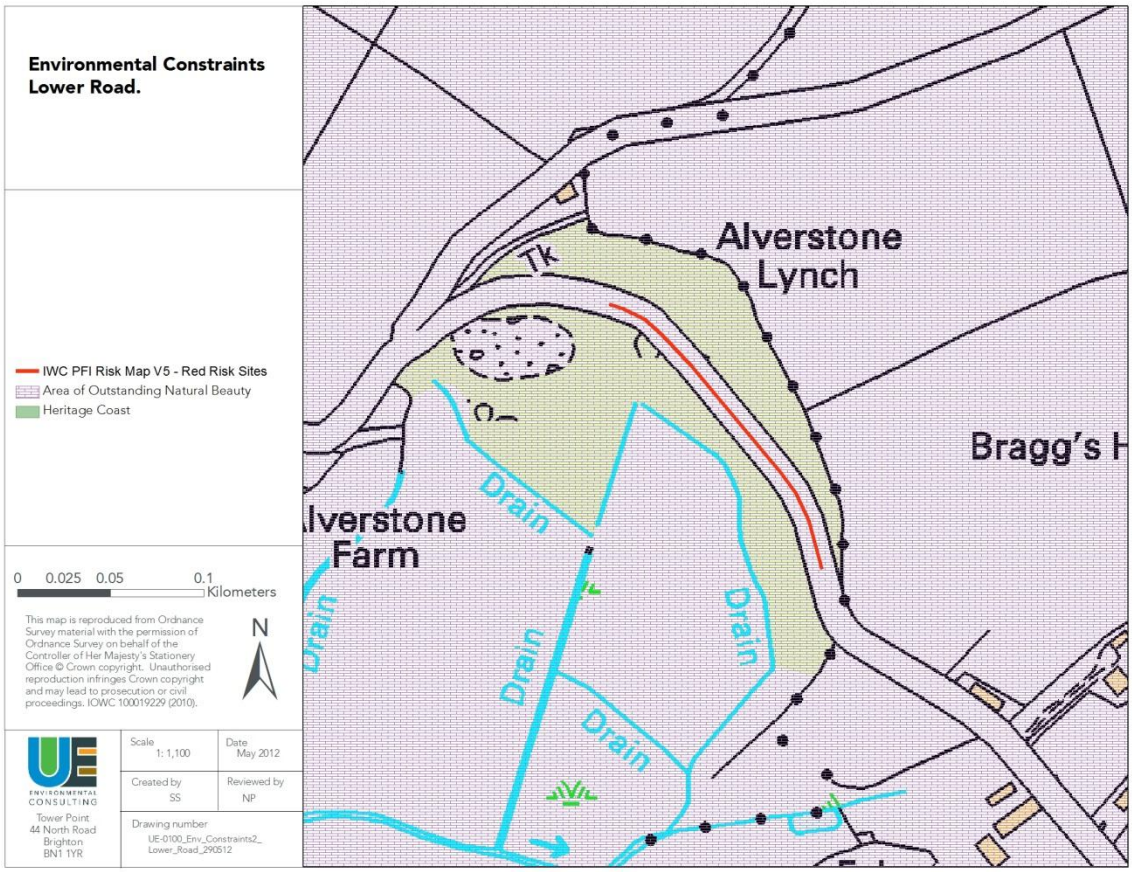

Figure 6.3: AONB and Tennyson Heritage Coastline: Lower Road

Theme	Description of effect	Proposed mitigation	Monitoring
Landscape, historic envt	Slope stabilisation using a soil nailed gabion wall may have a negative visual impact on the AONB, although it is likely to become overgrown with vegetation over time.	Consultation with stakeholders to minimise visual impact by altering appearance (soil and vegetation cover). Consult to seek opinion on requirement for landscape and visual impact assessment	n/a
Biodiversity/ geodiversity	Stabilisation using gabion baskets will destroy some of the habitat in the immediate area, which is within the Alverstone Marshes East (Alverstone Lynch) SINC. The SINC is listed as containing "a viable population of one or more species protected under the Habitats Regulations or listed in schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981 (as revised and amended) or in Red Data Books of Britain and Ireland." However, the impact is believed to be short term if mitigation is applied correctly.	Consultation with stakeholders to agree the necessary method for ecological survey(s), and to ensure required site-specific mitigation (based on findings of survey) is implemented, to minimise impact to any protected/priority species/habitat. Plant gabion wall to create new habitats to compensate for lost habitat	Monitoring of species populations and recovery of habitat and vegetative composition, and/or as recommended by project-level assessments and surveys
Accessibility & transport, population	Improves the satisfaction of people with their neighbourhoods as a place to live and maintains essential connectivity and access between local community and rest of the Island.	-	n/a
Health	Improves/maintains road safety.	-	n/a

6.4 Newport Road, Upper Ventnor 'Graben'

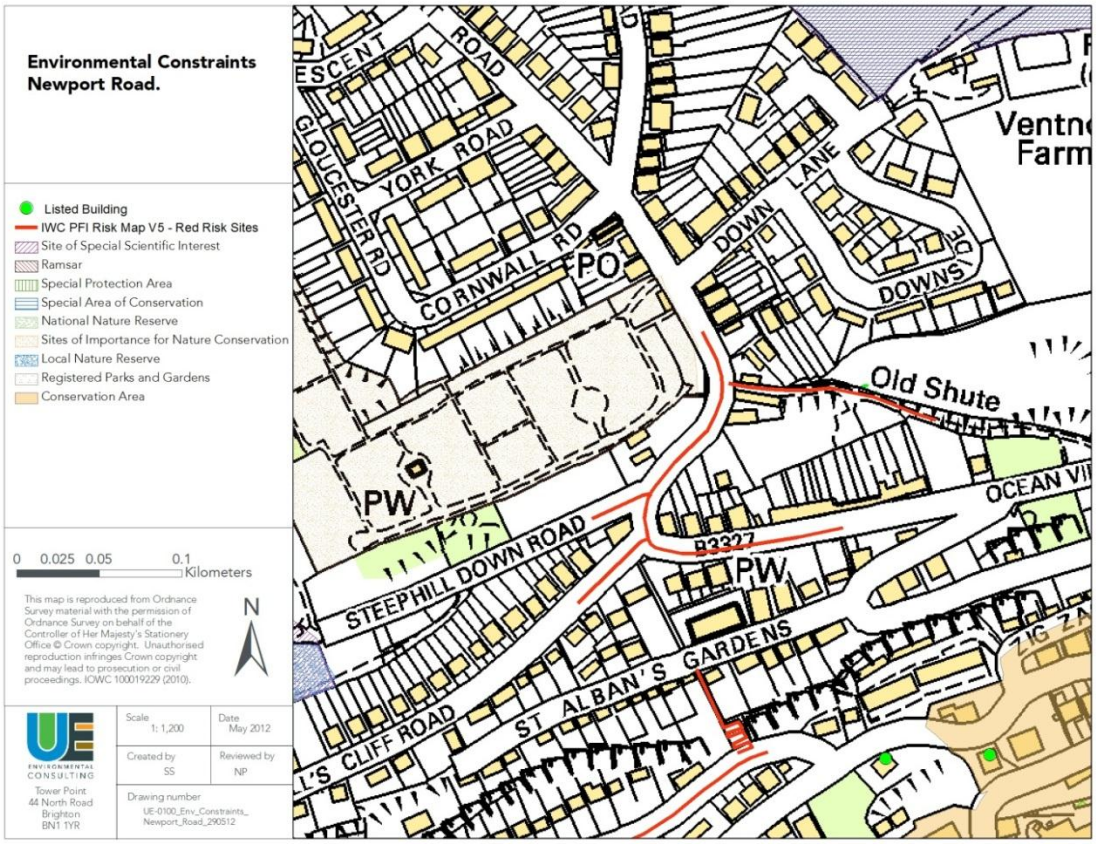

Figure 6.4: Environmental constraints (without AONB, Heritage Coast): Newport Road

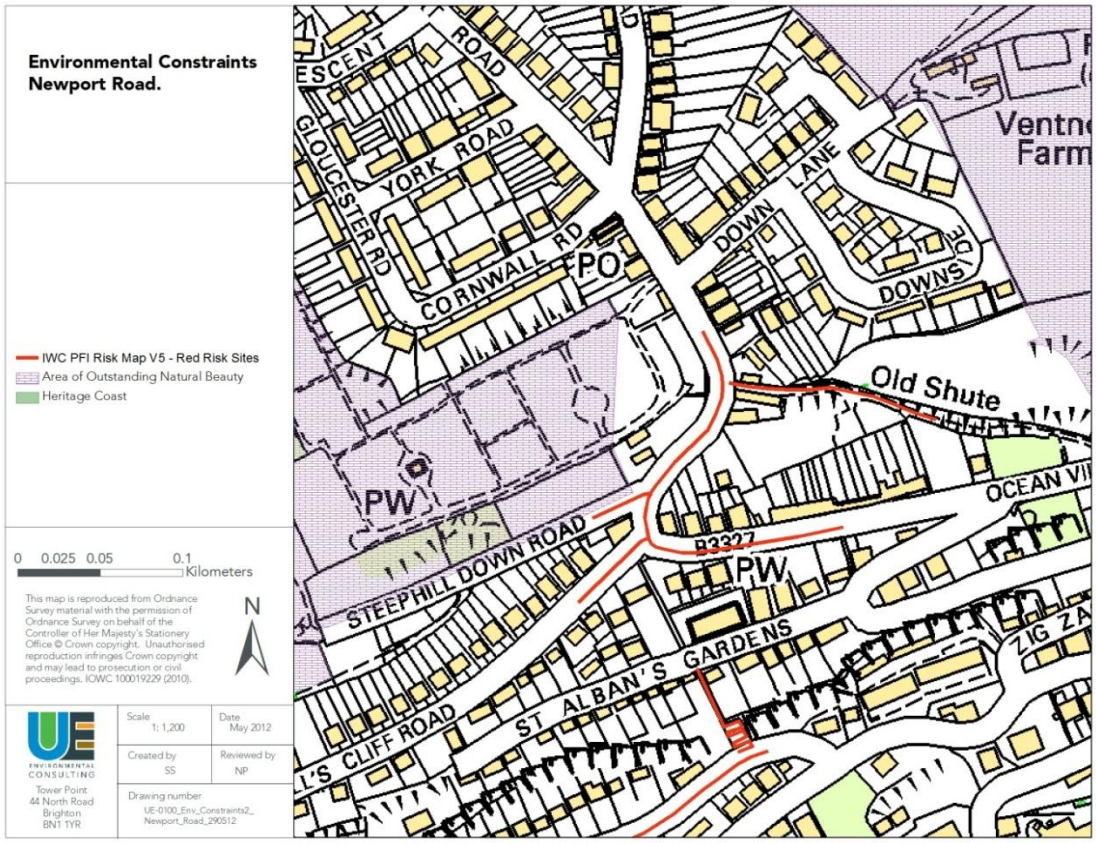

Figure 6.5: AONB and Tennyson Heritage Coastline: Newport Road

Theme	Description of effect	Proposed mitigation	Monitoring
Historic envt	Potential impact to Grade II Listed Buildings (c.130m away) from vibration/dust, although this is likely to be limited by the distance and intervening structures.	Assessment of impact to building(s), review piling method and protect building to minimise any expected vibrations /dust damage and agreement to repair if affected following works	Post-completion structural inspections to check for and remediate damage
Landscape, historic envt	Visual impact of new retaining walls and metal steps on the nearby AONB and Conservation Area	Proposal suggests wall design is yet to be determined but has suggested possibility of gabion wall using sympathetic material chosen to match the surrounding construction materials. Design should be in line with visual requirements, as agreed with stakeholders, but should avoid gabion walls where possible. Solution suggests the use of metal steps to the pedestrian pathway - depending on design finish, these may not be appropriate in keeping with the visual requirements. Requirement to agree design in consultation with IWC.	n/a
Biodiversity/ geodiversity	The site is adjacent to a SINC and nearby to SSSI, SAC, LNR. Impacts on SAC likely to be negligible given distance from works but degradation from dust is a possibility (SAC citation from Annex I habitat - species rich plant communities). Similarly, impact to LNR and SSSI is likely to be negligible. Citation for SSSI (part of the area is also designated as a LNR) is for the occurrence of both strongly acid soils and basic soils which gives rise to rich diversity of plant communities and considerable ecological interest, as well as the nationally rare Adonis blue butterfly. Works are not likely to affect these features. Direct impact on SINC is predicted, including a small amount of land take. However, it is designated due to its unimproved grasslands and social value (www.wildonwight.co.uk), not for specific species, therefore magnitude is expected to be very low.	The appropriate ecological survey(s) should be carried out (and site-specific mitigation based on findings of survey) to assess and minimise impact to any protected/priority species/habitat.	Monitoring of species populations and recovery of habitat and vegetative composition, and/or as recommended by project-level assessments and surveys

Theme	Description of effect	Proposed mitigation	Monitoring
Water	Ground water SPZ on site and therefore potential for contamination from pollution incident, or when relocating sewerage infrastructure.	During construction, storage of chemicals/fuels should be in sealed/bounded zones or outside of SPZ. Works to sewerage infrastructure to be agreed with and carried out to specification of Southern Water. Extra precautionary measures (e.g. pipe-in-pipe) to prevent leakage of sewerage from new installations as a result of future ground movements, and subsequent seepage into ground. Works to sewerage infrastructure to be agreed with and carried out to specification of Southern Water.	Regular checks for signs of damage to sewer pipes – annual, and after each sudden change in ground levels
Accessibility & transport, population	Improves the satisfaction of people with their neighbourhoods as a place to live and maintains essential connectivity and access between local community and rest of the Island.	-	
Health	Improves/maintains road safety	-	

6.5 Undercliff Drive

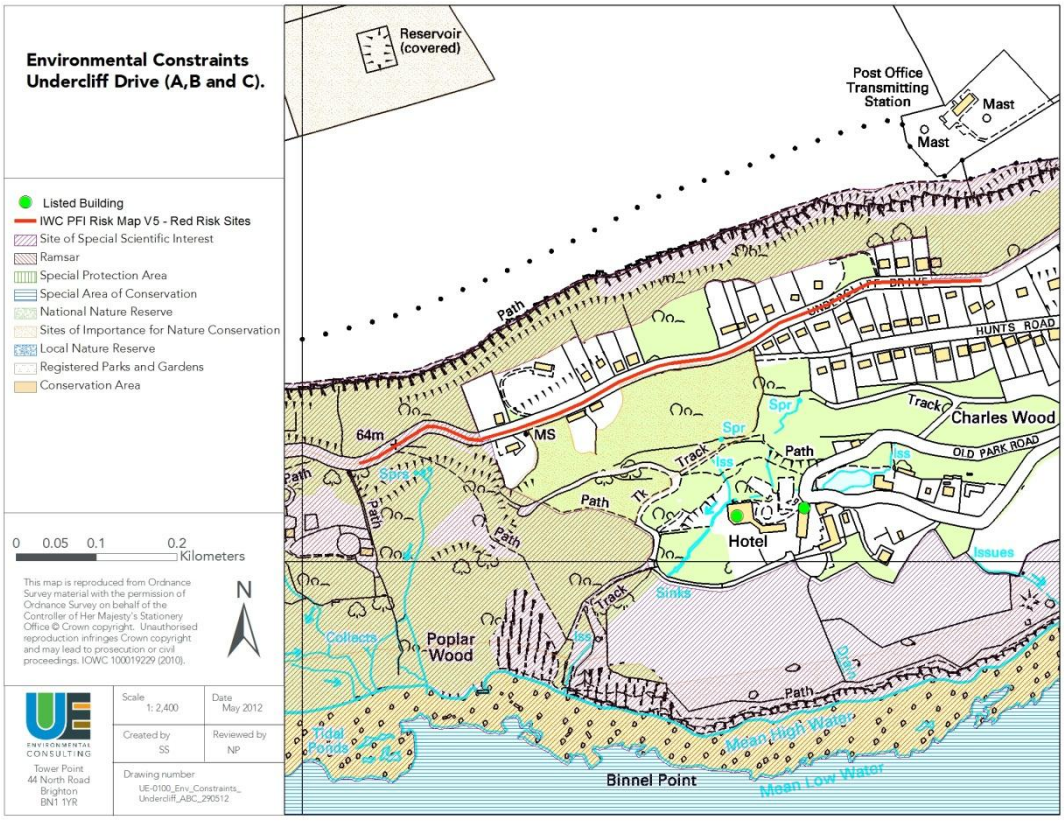

Figure 6.6: Environmental constraints (without AONB, Heritage Coast): Undercliff Drive A, B and C

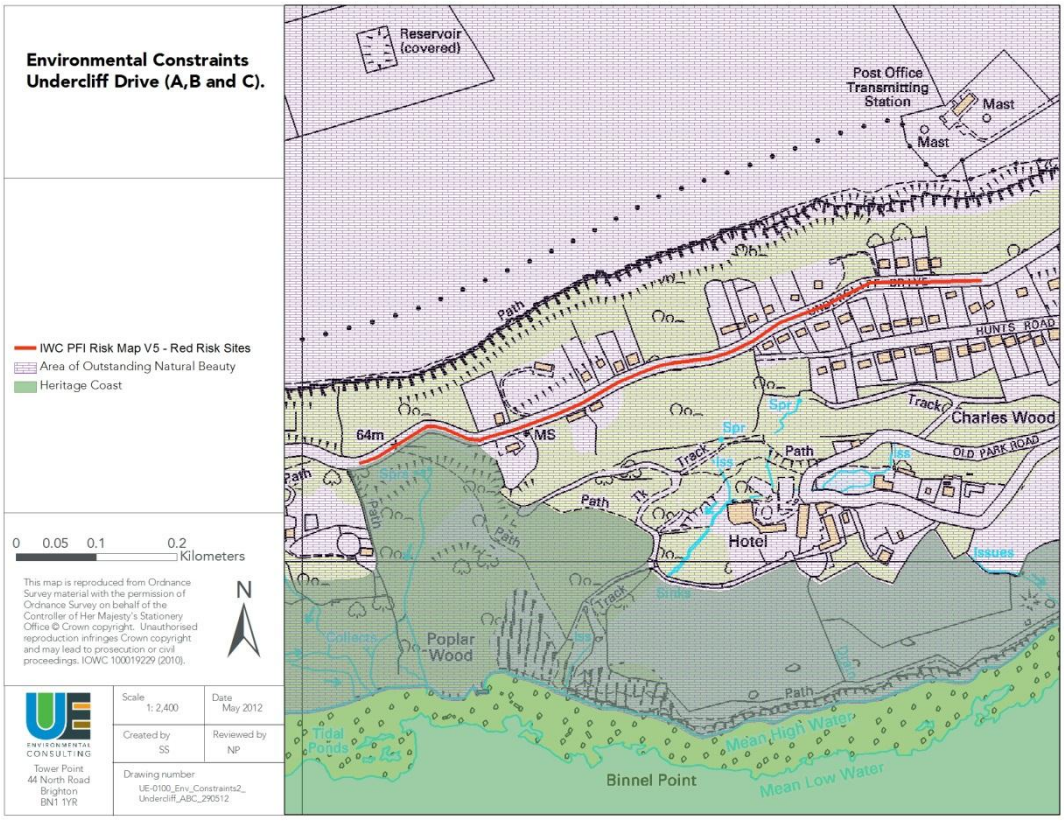

Figure 6.7: AONB and Tennyson Heritage Coastline: Undercliff Drive A, B and C

Area A, above Hunts Road

Theme	Description of effect	Proposed mitigation	Monitoring
Historic envt	There is an impact risk to a Grade II Listed Building (c.70m E) from the site, directly from construction work and potentially from construction traffic, through dust and vibration.	Assessment of impact to building(s) and protect building to minimise any expected vibrations /dust damage. Agreement to repair if affected following works. Consult with English Heritage regarding approach and consent to works.	Post-completion structural inspections to check for and remediate damage
Biodiversity/ geodiversity	The scheme is partly adjacent (eastern section) to the Compton Chine to Steephill Cove SSSI, Undercliff SINC (St Lawrence Undercliff) and St Lawrence Undercliff Wildlife Trust Reserve (overlapping geographic areas), which also contain TPOs. It is expected that there will be an impact through disturbance from construction noise, dust and some vegetation loss, and direct impact to vegetation along the edge of the highway from the use of bored piles. Works are scheduled to avoid bird breeding season. The scheme is partly adjacent to the Compton Chine to Steephill Cove SSSI, which is part of Wealden Group and has been	The appropriate ecological survey(s) should be carried out (and site-specific mitigation based on findings of survey) to assess and minimise impact to any protected/priority species/habitat. Additionally, works should avoid mature trees (and roots) by positioning piles accordingly, where safe and possible to do so. Given the proximity and number of environmental receptors, it is recommended that a construction environmental management plan (CEMP) is used to mitigate effects of construction along Undercliff Drive. Consult with Natural England and English Heritage regarding approach to and consent for works. Investigative excavations may be required to inform detailed design.	Monitoring of species populations and recovery of habitat and vegetative composition, and/or as recommended by project-level assessments and surveys

Theme	Description of effect	Proposed mitigation	Monitoring
	the source of numerous fossil remains. It is cited for being one of the richest sources of early cretaceous dinosaur fauna and flora in the world. Bored pile construction may adversely affect buried remains, with negative effects to geodiversity.		
Accessibility & transport, population	Improves the satisfaction of people with their neighbourhoods as a place to live and maintains essential connectivity and access between local community and rest of the Island.	-	n/a
Health	Improves/maintains road safety	-	n/a

Area B, Woodlands

Theme	Description of effect	Proposed mitigation	Monitoring
Historic envt	There is an impact risk directly from construction work to historic and archaeological remains, which are a local feature of the Undercliff landscape. Additionally the Old Park area (Old Park Farm and The cottage adjoining stables are listed buildings) may be impacted from construction dust (construction lasts circa six months).	Assessment of impact to building(s) and protect building to minimise any expected vibrations /dust damage and agreement to repair if affected following works. Consult with English Heritage regarding approach and consent to works. Consider Archaeological Watching Brief during construction programme.	Post-completion structural inspections to check for and remediate damage
Landscape, historic envt	Part of the solution involves ground anchors to stabilise the upslope area. Depending on visibility, vegetation removal will have a short term visual impact on the onsite AONB and potentially the Heritage Coastline. The Service Provider has suggested the post construction planting and avoidance of noteworthy trees.	Minimise vegetation loss / loss of mature trees where possible. Utilise local plant seed mix for reseeding scarp face. Consult to seek opinion on requirement for landscape and visual impact assessment	n/a
Biodiversity/ geodiversity	The scheme is partly adjacent to the Undercliff SINC (Old Park and Mirables and Old Park) and a TPO area. It is expected that there will be an impact from construction dust and some vegetation loss (although vegetation loss will be outside of the SINC on the upper slope). Works are outside of bird breeding season.	The appropriate ecological survey(s) should be carried out (and site-specific mitigation based on findings of survey) to assess and minimise impact to any protected/priority species/habitat. Minimise damage to vegetation, avoiding mature trees (and root systems). Given the proximity and number of environmental receptors, it is recommended that a construction environmental management plan (CEMP) is used to mitigate effects of construction along Undercliff Drive.	Monitoring of species populations and recovery of habitat and vegetative composition, and/or as recommended by project-level assessments and surveys
Accessibility & transport,	Improves the satisfaction of people with their neighbourhoods as a place to	-	n/a

Theme	Description of effect	Proposed mitigation	Monitoring
population	live and maintains essential connectivity and access between local community and rest of the Island.		
Health	Improves/maintains road safety	-	n/a

Area C, Caravan park

Theme	Description of effect	Proposed mitigation	Monitoring
Historic envt	There is a slight impact risk directly from construction work to rich historic and archaeological remains, which are a local feature of the Undercliff landscape. Additionally there is a locally listed archaeological feature, south of the scheme, which could be impacted from construction dust (construction lasts circa six months). The 'Mirables' listed building is situated to the west between site C and D so could be impacted by construction vehicles /dust or accidental damage.	Assessment of impact to building(s) and features of interest during detailed design. Protect buildings to minimise any possible damage and agreement to repair, if affected, following works. Consult with English Heritage regarding approach and consent to works. Consider Archaeological Watching Brief during construction programme.	Post-completion structural inspections to check for and remediate damage
Landscape, historic envt	Part of the solution involves soil nailing. Depending on visibility, vegetation removal will have a short term visual impact on the onsite AONB and potentially the Heritage coast line. The Service Provider has suggested the incorporation of biodegradable seeded matting to the slope facing.	Minimise vegetation loss/mature trees where possible. Utilise local plant seed mix for reseeding soil nailed slope. Consult to seek opinion on requirement for landscape and visual impact assessment	n/a
Biodiversity/ geodiversity	The scheme is partly within (western section) the Compton Chine to Steephill Cove SSSI, Undercliff SINC (St Lawrence Undercliff, Old Park and Mirables and Old Park) which also contains TPOs. It is expected that there will be an impact from construction dust, vegetation loss and land take. Additionally the SINC on the south side of the scheme supports nationally scarce and BAP species, which may be impacted by noise and vibration. The scheme is partly adjacent to the Compton Chine to Steephill Cove SSSI, which is part of Wealden Group and has been the source of numerous fossil remains. It is cited for being one of the richest sources of early cretaceous dinosaur fauna	Given the known presence of at least one protected species (SINC citation), the appropriate ecological survey(s) should be carried out (and site-specific mitigation based on findings of survey) to assess and minimise impact to any protected/priority species/habitat. Minimise damage to vegetation, avoiding mature trees (and root systems). Given the proximity and number of environmental receptors, it is recommended that a construction environmental management plan (CEMP) is used to mitigate effects of construction along Undercliff Drive. Consult with Natural England and English Heritage regarding approach to and consent for works. Investigative excavations may be required to inform detailed design.	Monitoring of species populations and recovery of habitat and vegetative composition, and/or as recommended by project-level assessments and surveys

Theme	Description of effect	Proposed mitigation	Monitoring
	and flora in the world. Soil nailing may adversely affect buried remains, with negative effects to geodiversity.		
Accessibility & transport, population	Improves the satisfaction of people with their neighbourhoods as a place to live and maintains essential connectivity and access between local community and rest of the Island.	-	n/a
Health	Improves/maintains road safety	-	n/a

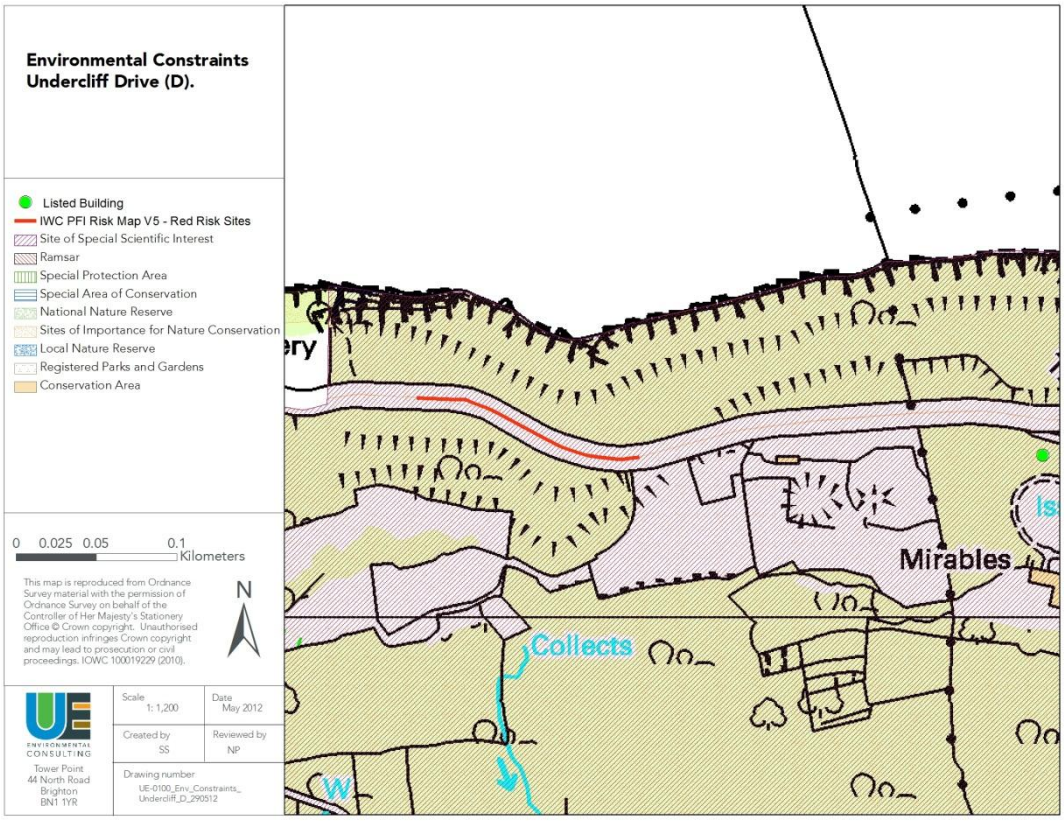

Figure 6.8: Environmental constraints (without AONB, Heritage Coast): Undercliff Drive D

Area D, Mirables

Theme	Description of effect	Proposed mitigation	Monitoring
Historic envt	There is an impact risk directly from construction work to rich historic and archaeological remains, which are a local feature of the Undercliff landscape. The 'Mirables' listed building is situated to the east between site C and D so could be impacted by construction vehicles /dust or accidental damage.	Assessment of impact to building(s) and features of interest. Protect buildings to minimise any possible damage and agreement to repair, if affected, following works. Consult with English Heritage regarding approach and consent to works. Consider Archaeological Watching Brief during construction programme.	Post-completion structural inspections to check for and remediate damage

Theme	Description of effect	Proposed mitigation	Monitoring
Landscape, historic envt	Part of the solution requires an existing dry stone wall to be strengthened or replaced. The wall is important to the landscape character of the AONB in this location. The Service Provider has suggested possible replacement with stone-filled gabion baskets.	Consult to seek opinion on requirement for landscape and visual impact assessment. Detailed designs should considered reconstruction of wall with similar materials, or facing detail to gabion baskets in line with existing material.	n/a
Biodiversity/ geodiversity	The scheme is within the Compton Chine to Steephill Cove SSSI and Undercliff SINC (St Lawrence Undercliff and Old Park and Mirables) which also contains TPOs. It is expected that there will be an impact through disturbance from construction dust, loss of habitat (dry stone wall) and vegetation loss, from wall strengthening activities. Additionally the SINC on the south side of the scheme supports nationally scarce and BAP species, which may be impacted by noise and vibration.	The appropriate ecological survey(s) should be carried out (and site-specific mitigation based on findings of survey) to assess and minimise impact to any protected/priority species/habitat. Minimise damage to vegetation, avoiding mature trees (and root systems). Dry stone wall replacement should offer comparable habitat opportunities by adding soil / native seed mix to the gabion baskets. Given the proximity and number of environmental receptors, it is recommended that a construction environmental management plan (CEMP) is used to mitigate effects of construction along Undercliff Drive.	Monitoring of species populations and recovery of habitat and vegetative composition, and/or as recommended by project-level assessments and surveys
	The scheme is partly adjacent to the Compton Chine to Steephill Cove SSSI, which is part of Wealden Group and has been the source of numerous fossil remains. It is cited for being one of the richest sources of early cretaceous dinosaur fauna and flora in the world. Excavation of the road could impact these features, if present at this location of the road, with negative effects to geodiversity.	Consult with Natural England and English Heritage regarding approach to and consent for works. Investigative excavations may be required to inform detailed design.	n/a
Accessibility & transport, population	Improves the satisfaction of people with their neighbourhoods as a place to live and maintains essential connectivity and access between local community and rest of the Island.	-	n/a
Health	Improves/maintains road safety	-	n/a

6.6 Military Road, Brook Chine

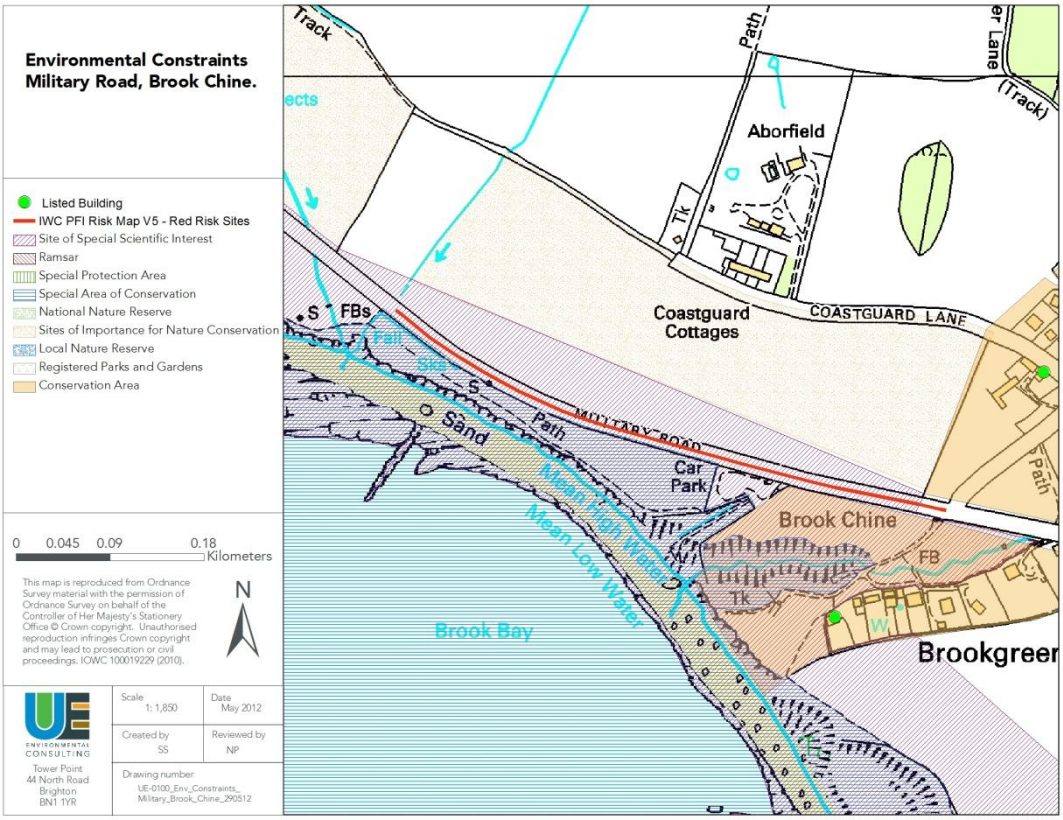

Figure 6.9: Environmental constraints (without AONB, Heritage Coast): Brook Chine

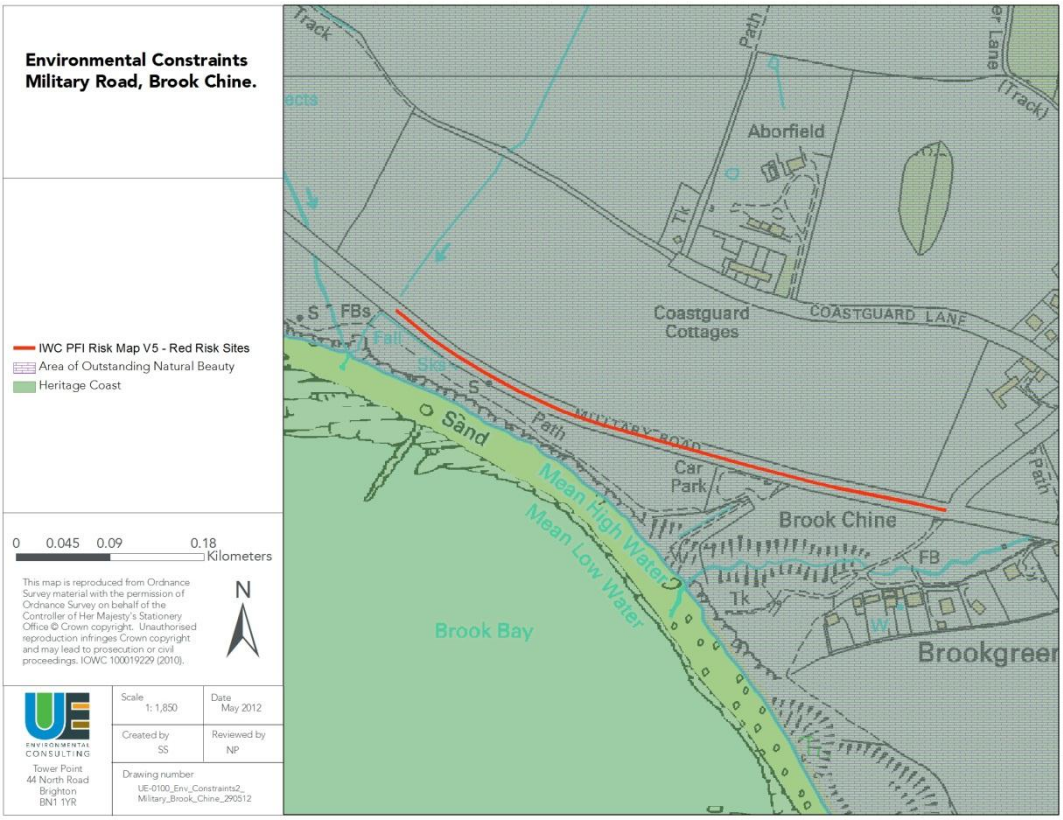

Figure 6.10: AONB and Tennyson Heritage Coastline: Brook Chine

Theme	Description of effect	Proposed mitigation	Monitoring
Historic envt	The scheme is within the Compton Chine to Steephill Cove SSSI, which is part of Wealden Group and has been the source of numerous fossil remains. It is cited for being one of the richest sources of early cretaceous dinosaur fauna and flora in the world. Construction method uses piles to support a temporary modular bridge which may encounter and damage features, if present at this location of the road, with negative effects to geodiversity. Investigative excavations may be required to inform detailed design.	Consult with Natural England and English Heritage regarding approach to and consent for works. Investigative excavations / Archaeological Watching Brief may be required to inform detailed design / monitor construction.	n/a
Landscape, historic envt	The scheme is within a Conservation Area and AONB, and adjacent to the Heritage Coastline. A modular bridge solution with tall aerial supporting structure would adversely affect the coastline landscape character. However, it will be relatively straightforward to dismantle and remove the surface structure at the end of its useful lifetime, meaning that restoration is fully feasible.	Consult to seek opinion on requirement for landscape and visual impact assessment, to ensure visual impacts are minimised. Provision may need to be made for eventual removal of piled structures, which may be difficult, costly and complicated by the ecological sensitivity of the area (see below).	n/a
Biodiversity/ geodiversity	The scheme is designed to allow chine formation to continue beneath the road unimpeded by supporting structures, which acknowledges and responds to the conservation objectives of the SAC. Conservation objectives include the requirement to allow natural coastal and geomorphological process to evolve unhindered. The scheme will be a short-term solution, the road inevitably becoming impassable at some stage, and can be removed albeit with potential for additional short-term impacts. However, there are potential impacts to terrestrial habitats and protected plant species of the SAC/SSSI during construction and there may be some habitat alteration through shading, as the bridge will be positioned over the exiting road where the chine is forming.	The scheme is consistent with the SAC conservation objectives and SMP policy of 'no active intervention'. But it may be necessary to adapt designs for a longer span, and/or slightly adjust the location of the span to respond to chine formation. Construction and decommissioning could negatively affect SAC/SSSI features and will require suitable detailed assessments and mitigation strategies at the project stage via HRA and EcIA, informed by appropriate ecological surveys (of maritime cliff vegetation in particular). Given the proximity and number of environmental receptors, it is recommended that a construction environmental management plan (CEMP) is used to mitigate effects of construction.	Monitor rate and location of chine development, adjusting life or formation of engineering structures to accommodate areas of most rapid change Monitoring of species populations and recovery of habitat and vegetative composition, and/or as recommended by project-level assessments and surveys
Accessibility & transport, population	Improves the satisfaction of people with their neighbourhoods as a place to live and maintains essential connectivity and access between local community and rest of the Island.	-	n/a
Health	Improves/maintains road safety	-	n/a

6.7 Military Road, Shippards Chine

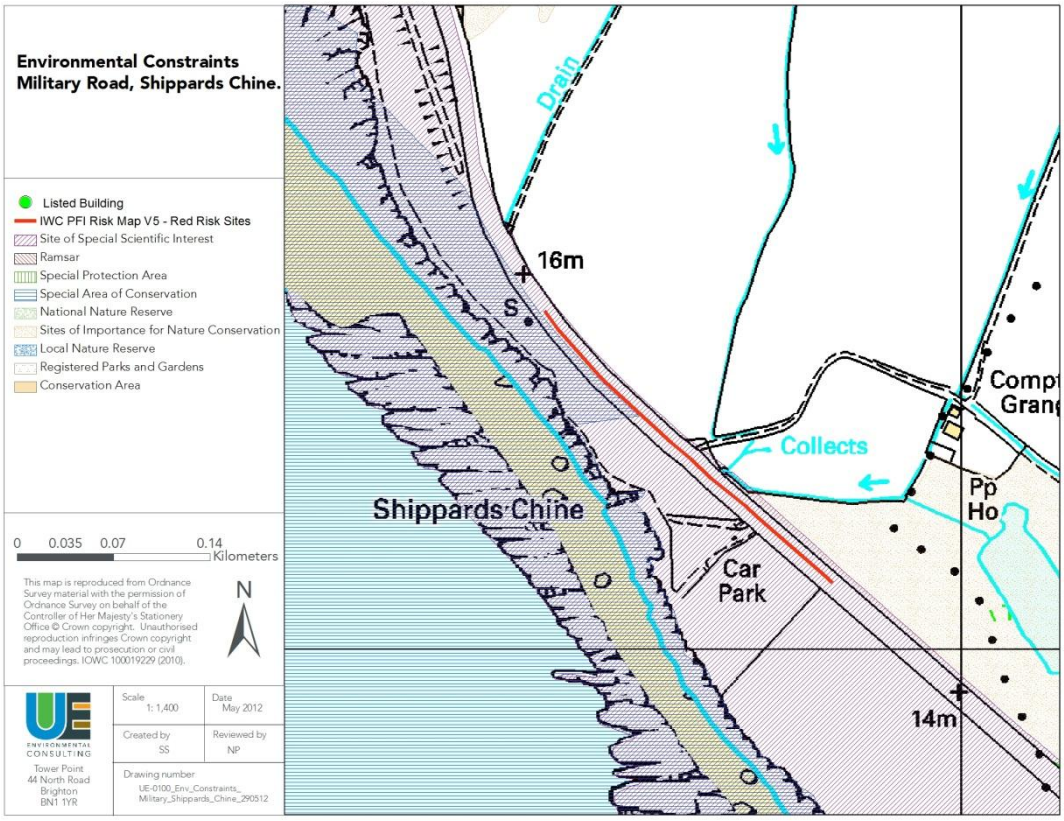

Figure 6.11: Environmental constraints (without AONB, Heritage Coast): Shippards Chine

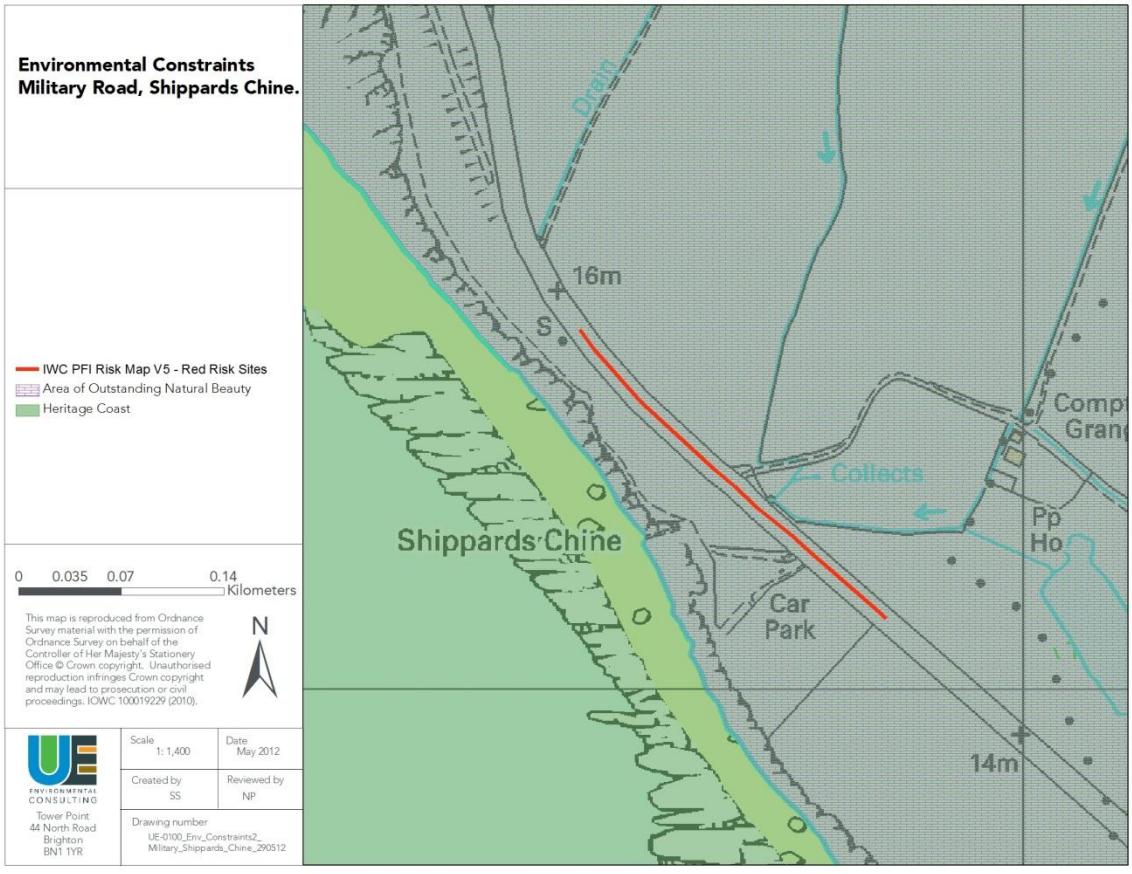

Figure 6.12: AONB and Tennyson Heritage Coastline: Shippards Chine

Theme	Description of effect	Proposed mitigation	Monitoring
Historic envt	The scheme is within the Compton Chine to Steephill Cove SSSI, which is part of Wealden Group and has been the source of numerous fossil remains. It is cited for being one of the richest sources of early cretaceous dinosaur fauna and flora in the world. Construction method uses piles to support a temporary modular bridge which may encounter and damage features, if present at this location of the road, with negative effects to geodiversity. Investigative excavations may be required to inform detailed design. However, construction is not thought to be required until 2020.	Consult with Natural England and English Heritage regarding approach to and consent for works. Investigative excavations / Archaeological Watching Brief may be required to inform detailed design / monitor construction.	n/a
Landscape, historic envt	The scheme is within a Conservation Area and AONB, and adjacent to the Heritage Coastline. A modular bridge solution with tall aerial supporting structure will adversely affect the coastline landscape character. However, it will be relatively straightforward to dismantle and remove the surface structure at the end of its useful lifetime, meaning that restoration is fully feasible.	Consult to seek opinion on requirement for landscape and visual impact assessment, to ensure visual impacts are minimised. Provision may need to be made for eventual removal of piled structures, which may be difficult, costly and complicated by the ecological sensitivity of the area (see below).	n/a
Biodiversity/ geodiversity	The scheme is designed to allow chine formation to continue beneath the road unimpeded by supporting structures, which acknowledges and responds to the conservation objectives of the SAC. Conservation objectives include the requirement to allow natural coastal and geomorphological process to evolve unhindered. The scheme will be a short-term solution, the road inevitably becoming impassable at some stage, and can be removed albeit with potential for additional short-term impacts. However, there are potential impacts to terrestrial habitats and protected plant species of the SAC/SSSI during construction and there may be some habitat alteration through shading, as the bridge will be positioned over the exiting road where the chine is forming.	The scheme is consistent with the SAC conservation objectives and SMP policy of 'no active intervention'. But it may be necessary to adapt designs for a longer span, and/or slightly adjust the location of the span to respond to chine formation. Construction and decommissioning could negatively affect SAC/SSSI features and will require suitable detailed assessments and mitigation strategies at the project stage via HRA and EcIA, informed by appropriate ecological surveys (of maritime cliff vegetation in particular). Given the proximity and number of environmental receptors, it is recommended that a construction environmental management plan (CEMP) is used to mitigate effects of construction.	n/a
Accessibility & transport, population	Improves the satisfaction of people with their neighbourhoods as a place to live and maintains essential connectivity and access between local community and rest of the Island.		n/a
Health	Improves/maintains road safety		n/a

6.8 Bouldnor Road, Yarmouth

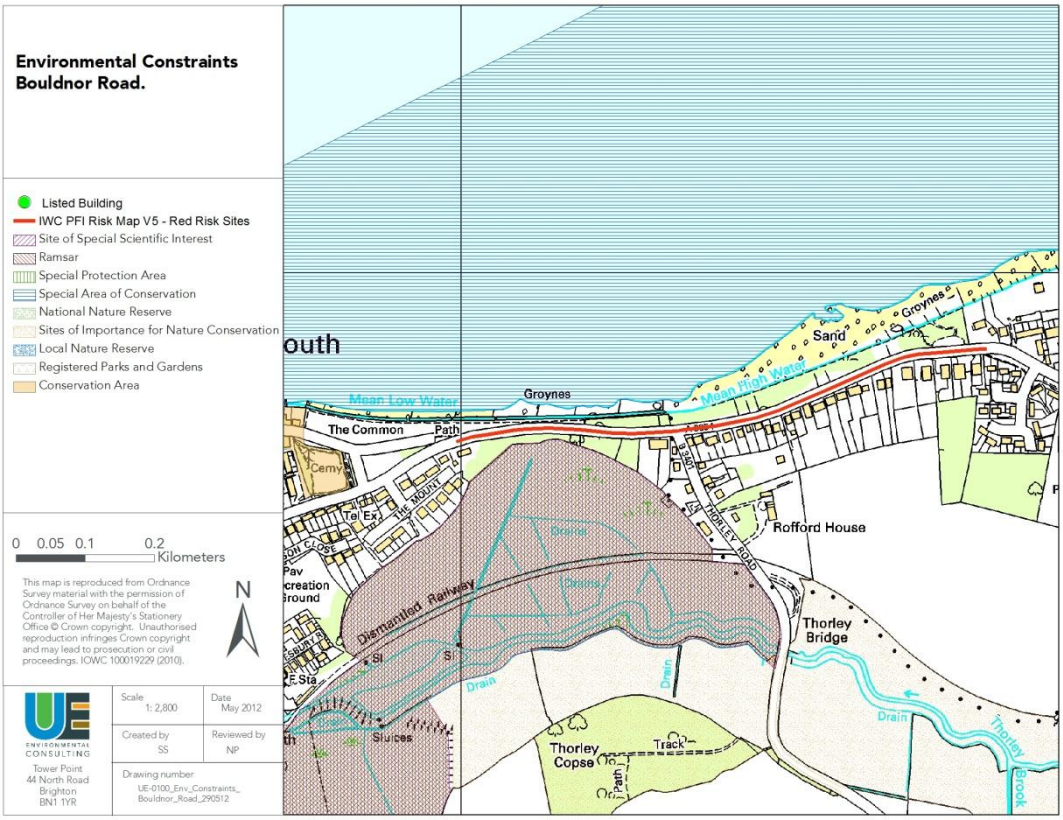

Figure 6.13: Environmental constraints (without AONB, Heritage Coast): Bouldnor Road

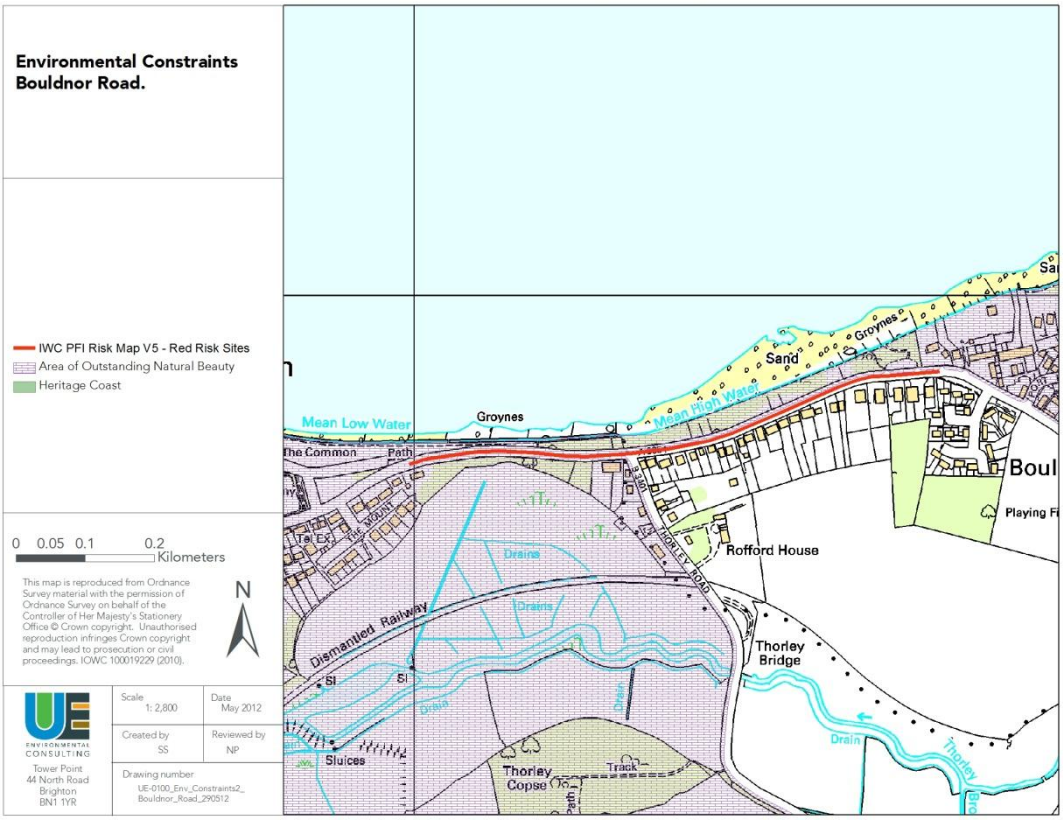

Figure 6.14: AONB and Tennyson Heritage Coastline: Bouldnor Road

Theme	Description of effect	Proposed mitigation	Monitoring
Historic envt	It is possible that artefacts could be encountered and/or damaged, but the likelihood is uncertain.	Consult with English Heritage and Council archaeologist to refine detailed designs. Consider use of Archaeological Watching Brief during construction.	n/a
Landscape, historic envt	Soil nailing could have short-term negative effects on the visual appearance of the area through removal of vegetation, with impacts to the AONB and possibly the (further away) conservation area.	The majority of engineering interventions will not be visible post-construction, and removed vegetation will recover over time. No mitigation required.	n/a
Biodiversity/ geodiversity	The proposal includes removal of vegetation for access for piling works (c.2m) as well as installation of soil nails. Methods include use of vibro-piling to reduce disturbance impacts to birds. But works are scheduled to coincide with on passage migrant and overwintering seasons in both of two years, meaning that impacts to SPA/Ramsar/SSSI features are still possible through visual disturbance, and also noise depending on feasibility of vibro-piling in relation to ground conditions. Construction also extends into bird breeding season in year one. SAC to north is unlikely to be affected during construction and operation, although there is a risk of contamination from a pollution incident. Japanese Knotweed is present onsite and will require a suitable remediation strategy, and measures to prevent accidental translocation during construction.	Vibro-piling should be used wherever feasible, including for soil nailing, with percussive piling limited to reduce potential impacts to birds. If ground conditions suggest that vibro-piling is insufficient, works should be supervised by Ecological Clerk of Works to avoid work when birds are present at Thorley Brook. Visual screening may be required to prevent additional visual disturbance. Best practice construction methods should be followed, including a pollution response plan, to reduce the risk of pollution; given the proximity and number of environmental receptors, it is recommended that a construction environmental management plan (CEMP) is used to mitigate effects of construction. The appropriate ecological survey(s), e.g. breeding birds, should be carried out (and site-specific mitigation based on findings of survey) to assess and minimise impact to any protected/priority species/habitat. Minimise damage to vegetation, avoiding mature trees (and root systems). Vegetation clearance to be undertaken outside of bird breeding season. A suitable remediation strategy, and measures to prevent accidental translocation during construction, will be required.	Monitoring of species populations and recovery of habitat and vegetative composition, and/or as recommended by project-level assessments and surveys Monitoring of extent of Japanese knotweed infestation
Water	Existing drainage outfalls seaward. There may be an opportunity to divert drainage south into Thorley Brook, with potential (minor) ecological benefits.	-	n/a
Accessibility & transport, population	Improves the satisfaction of people with their neighbourhoods as a place to live and maintains essential connectivity and access between local community and rest of the Island.	-	n/a
Health	Improves/maintains road safety	-	n/a

6.9 Interactions among Capital Schemes

6.9.1 For the most part, the environmental effects described above operate independently of one another. Most red risk sites are sufficiently far from each other that the impacts of one scheme would not be expected combine with those of another. Similarly, for most individual schemes, significant effects on a given receptor are not expected to be compounded by separate effects on another receptor. But there are some notable exceptions.

6.9.2 At Newport Road, Upper Ventnor, there is a dual risk of leakage from the sewerage infrastructure and pollution or spillage of chemicals during construction. Although the likelihood of both events is considered low, if they were to occur at the same time the cumulative effects on groundwater quality within the SPZ could be significantly worsened.

6.9.3 Along the Undercliff Drive, significant adverse effects (before mitigation) are expected from all four schemes on receptors as diverse as the historic environment, landscape character, biodiversity, flora and fauna. Because the schemes are so close to one another, and construction is scheduled to occur sequentially (albeit with suspensions during the summer months), it is considered that the impacts of one scheme are likely to combine with those of neighbouring schemes to worsen the overall effect. However, for the most part impacts are expected to be relatively short-term and recoverable, particularly once proposed mitigation is taken into account.

6.9.4 The two schemes along Military Road are related in their relative proximity, similarity of predicted effects and the operation of the road being dependant on the success of both schemes. However, the solutions, utilising temporary modular bridges, are likely to be implemented at different times, depending on when coastal retreat at Shippards Chine dictates (estimated to be 2020). Once the coast has retreated to such an extent that the road becomes impassable even with the modular bridge(s), the piled structures will be removed. Given passage of the road is dependent on both capital schemes, removal operations are likely to coincide, potentially creating adverse effects on ecology. Removal would resolve impacts on landscape character, but may include short-term ecological impacts of its own.

6.9.5 Turning to socio-economic consequences of the Highways PFI, almost all Vinci Ringway schemes are expected to contribute to community health, safety and well-being, and help to maintain connectivity between the Island's communities.

6.9.6 The cumulative and synergistic effects of the capital schemes that were subject to detailed assessment are illustrated in Table 6.2.

Table 6.2: Cumulative and synergistic effects of the Highways PFI capital schemes

	Receptor										
	SEA 1	SEA 2	SEA 3	SEA 4	SEA 5	SEA 6	SEA 7	SEA 8	SEA 9	SEA 10	SEA 11
Duver Road											
Lower Road											
Newport Road											
Undercliff A											
Undercliff B											
Undercliff C											
Undercliff D											
Brook Chine											
Shippards Chine											
Bouldnor Road											
Accumulative?	Y	Y	Y	N	N	N/A	N/A	N/A	N/A	Y	Y

Key

Severe	Major	Moderate	Minor	Negligible	Neutral	Negligible	Minor	Moderate	Major