A358 Taunton to Southfields Dualling Scheme

Preliminary Environmental Information Report - Chapter 2 The Project

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2 The Project

2.1 Introduction

2.1.1 This chapter provides an overview of the site location and context together with a detailed description of the proposed scheme and outline details of the incorporated environmental mitigation measures (section 2.6), the construction, operation and long-term management (section 2.7), and the demolition of the proposed scheme (section 2.8).

2.1.2 The proposed scheme is presented in Figure 2.1 General Arrangement.

2.2 Project objectives

2.2.1 The overall project objective is to create a dual carriageway link from the M5 at Taunton to the A303 at Southfields roundabout. The new dual carriageway will comprise new and upgraded stretches of the existing A358 road and will be integrated into the strategic road network (SRN). The design will aim to address the existing traffic issues and long delays currently experienced along the route.

2.2.2 The UK government's *Road Investment Strategy* [1] outlines an overall ambition to improve connectivity between the South-West and London and the South-East of the UK. Further information on the need for the proposed scheme is provided in section 1.2 of Chapter 1 Introduction.

2.2.3 The scheme vision, design principles and scheme-specific objectives are identified in Table 2-1.

Table 2-1 Scheme vision, design principles and objectives

Scheme vision	
The A358 Taunton to Southfields Dualling Scheme (the 'proposed scheme') announced within the UK government's RIS will provide a high quality dual carriageway between the M5 motorway and the A303 at Southfields roundabout, Ilminster. The proposed scheme is part of a programme of improvements planned along the A303/A358 corridor aimed at improving connectivity between London, the South-East and the South-West. The A303, alongside the A30, forms part of the SRN and together with the A358, provides the link between London, the South-East and the South-West. The environmental strategy is to invest for the long-term and capture the vision for the environment which is *"…a strategic road network working more harmoniously with its surroundings to deliver an improved environment"*. This includes conserving energy, water and other resources, reduce waste and phase out the use of ozone depleting substances and minimise the release of greenhouse gases, volatile organic compounds and other substances damaging to health and the environment.	
Scheme design principles	
"Designing an inclusive, resilient and sustainable road network" in accordance with "The road to good design". [2]	
A358 scheme objectives	
Employment: facilitate growth in employment at key locations and centres along the A303/A358/A30 corridor and to the South-West region	**Housing**: facilitate growth in housing at key development hotspots along the corridor
Capacity: reduce delays and queues that occur during peak hours and at seasonal times of the year	**Resilience**: improve the resilience of the A303/A358/A30 route corridor
Safety: improve safety along the A303/A358/A30 route corridor	**Safety**: improve safety at along the A358 Taunton to Southfields route for non-motorised users (NMU)

Connectivity: improve the connectivity of the South-West to the rest of the UK, to reduce peripherality and improve business and growth prospects	**Environment**: avoid unacceptable impacts on the surrounding natural environment and landscape and optimise the environmental opportunities and mitigation that the intervention could bring
Severance: reduce severance on local communities	**Quality of life**: promote opportunities to improve the quality of life for locals

2.2.4 The development of the proposed scheme has considered the feedback received during the stakeholder workshops (as listed in Table 1-1 in PEI Report Chapter 1 Introduction), the 2018 non-statutory consultation and 2021 community forums, as well as the results of ongoing surveys and assessments. The preliminary design, and the assessment of its likely significant environmental effects, are presented in this Preliminary Environmental Assessment (PEI) Report.

2.3 Project location

2.3.1 The preferred route for the proposed scheme was announced by the Secretary of State (SoS) on 19 June 2019. The proposed scheme is part of a programme of improvements planned along the A303/A358 corridor aimed at improving connectivity between the south-west and London and the south-east of the UK. The A303, alongside the A30, forms part of the SRN and together with the A358, provides this link. The existing A358 is situated entirely within the county of Somerset, spanning across the Somerset West and Taunton District and the South Somerset District. The two Districts meet at approximately chainage (Ch) 9+430 of the proposed scheme (located approximately 0.27km north-west of Folly Drove).

The location of the proposed scheme is presented on Figure 1.1 Proposed scheme location.

Existing route corridor

2.3.2 The existing section of the A358 between Taunton and Ilminster is approximately 8.5 miles (13.6km) long, running from junction 25 on the M5 (National Grid Reference (NGR): ST255247) to Southfields roundabout on the A303 (NGR: ST342153). The existing A358 forms part of the local highway network and is maintained by Somerset County Council (SCC).

2.3.3 The route predominantly comprises single carriageway, with a short section of dual carriageway (approximately 0.8 miles/1.3km) between Henlade and Mattock's Tree Green. This is preceded for 500m to the east by a section of single carriageway with an overtaking lane as the road ascends to the crest at Mattock's Tree Green. There is also a short section of dual carriageway on the approach to the M5 junction 25.

2.3.4 At the north-western limit of the proposed scheme, the A358 forms one of six arms of the M5 junction 25 roundabout, which is a partially signalised four-lane roundabout under the M5 motorway. This junction allows access from the A358 to the M5 and into Taunton. At the eastern end of the proposed scheme, the A358 forms one of five arms of the Southfields roundabout which is situated on the A303 at the western end of the Ilminster Bypass. This junction provides access into Ilminster, Horton Cross and to the A303.

2.3.5 Along the A358 between Taunton and Southfields roundabout, there are numerous at-grade local road junctions, the most notable of which is the traffic-signal controlled junction with the A378 at Mattock's Tree Green. Other local

roads provide access to local villages such as Ilton, Ashill, Hatch Beauchamp, Bickenhall, Thornfalcon, Ruishton and Henlade.

2.3.6 There is currently one grade-separated crossing over the A358. This carries the A358 Hatch Beauchamp Link road over Griffin Lane on a substantial structure which has recently been strengthened following the identification of potential weaknesses.

2.3.7 Along the A358 motorists currently experience high volumes of traffic, primarily because, for many sections of the route the current traffic demand is above that for which they were designed. This is exacerbated in the summer when there is typically 30% growth in traffic along the A303 corridor due to holiday traffic.

2.3.8 As well as experiencing high levels of congestion, there are several locations along the A358 where clusters of accidents have been reported. The accident types were predominantly rear end collisions, vehicles turning in or out of local minor roads or head-on collisions. In addition, a number of public rights of ways (PRoW) (i.e. footpaths, bridleways, byways open to all traffic, and restricted byways), undesignated paths and cycle routes cross the existing road.

2.3.9 The existing A358 has been the subject of a number of upgrades. The short dualled section at Mattock's Tree Green appears to have been upgraded in the 1960s or 1970s, possibly in response to the poor vertical alignment and associated visibility through this section which is likely to have made overtaking and turning manoeuvres at the A378 junction particularly dangerous on the single carriageway. The single carriageway section around Hatch Beauchamp was constructed as a bypass in the 1980s, the original route of the A358 having passed through the centre of the village. Similarly, the section of single carriageway around the village of Ashill was constructed as a bypass in the 1990s.

The surrounding environment

2.3.10 The existing A358 passes through a largely rural area between Taunton and Ilminster, with various agricultural land uses and villages, hamlets and scattered farms and individual dwellings.

2.3.11 The A358 provides direct access to local communities (such as Ruishton, Haydon, Henlade, Thornfalcon, West Hatch, Hatch Beauchamp, Ashill, Broadway and Horton Cross), businesses and local facilities including churches, indoor sports facilities, schools, care homes, doctor's surgeries and shops. Taunton Gateway Park and Ride is located within 500m of the M5 at Taunton. 23 PRoW as well as other routes cross or meet the A358 and have been identified as potentially impacted by the proposed scheme.

2.3.12 The land adjacent to the A358 is predominantly grade 3 agricultural land, with pockets of grade 4 at the southern end of the proposed scheme and land associated with Venner's Water further north; elements of grade 1 and 2 lie in close proximity to the A358. It is currently estimated that 25-30 individual farm holdings are present along the route.

2.3.13 A number of potentially contaminative land uses have been identified along the route, including historical landfills, sewage works, commercial activities and fuel storage sites as well as evidence of made ground of unknown quality. Six records of historic landfills have been identified within 500m of the A358, two of which intersect the route.

2.3.14 There are two Air Quality Management Areas (AQMA) near to the A358; East Reach AQMA (2km west) and Henlade AQMA (300m north) which were declared by Somerset West and Taunton Council (SWTC) for exceedances of the national annual mean objective for nitrogen dioxide (NO_2). There are currently no AQMAs associated with the A358.

2.3.15 Existing noise and vibration in the area is likely to be dominated by road traffic noise from the A358, A303, A378 and M5. Noise sensitive areas along the A358 are associated with individual or small groups of dwellings.

2.3.16 Several ecological designated sites are located near to the A358. These comprise, but are not limited to: Somerset Levels and Moors Special Protection Area (SPA) and Ramsar (3.5km north-east); Severn Estuary Special Area of Conservation (SAC) and Ramsar site (7km north); Thurlbear Woods and Quarrylands Site of Special Scientific Interest (SSSI) (1.5km south-west); and Barrington Hill Meadows SSSI and National Nature Reserve (NNR) (1.7km south); Bickenhall Orchard Local Nature Reserve (LNR) (550m south-west); South Taunton Streams LNR (690m west of the link road to M5 junction 25); and Children's Wood / Riverside Park LNR (900m north). A further 15 SSSIs are located within 200m of the A358.

2.3.17 Along the A358 corridor are existing hedgerows, veteran trees and watercourses that have the potential to support flora and fauna of ecological importance. Ecological records identify a number of protected species present in the surrounding environment, including Bewick's swan (*Cygnus columbianus bewickii*), bats and dormouse (*Muscardinus avellanarius*).

2.3.18 There are 12 known watercourse crossings along the A358 route. The channels that are officially designated under the *EU Water Framework Directive* (WFD) [3], as enacted by the *Water Environment (Water Framework Directive) (England and Wales) Regulations 2003* [4], as WFD waterbodies are:

- Broughton Brook
- Meare Stream
- Fivehead rivers (2 main channels)
- River Ding
- River Isle

2.3.19 However, all watercourses that cross the A358 route are located within catchments that are associated with these designated waterbodies.

2.3.20 A number of these watercourses are considered minor and therefore would be accommodated by piped culverts. However Back Stream, Cad Brook, Venner's Water, Fivehead River and Broughton Brook are accommodated by larger structures, such as underpasses. The A358 crosses areas of Flood Zones 2 and 3 and is in an area at risk of flooding from the Clatworthy and Luxhay Reservoirs located to the west of Taunton and from Chard Reservoir located to the north-east of Chard.

2.3.21 Blackdown Hills Area of Outstanding Natural Beauty (AONB) is located approximately 2.2km west at its nearest point to the proposed scheme.

2.3.22 The proposed scheme would pass through three National Character Areas (NCA): NCA 140, Yeovil Scarplands; NCA 143, Mid Somerset Hills; and NCA 146, Vale of Taunton and Quantock Fringes. An additional NCA (NCA 147, Blackdowns) is located approximately 1.5km to the south-west at its nearest point to the route. It also passes through the local landscape character areas (LLCA)

from the Taunton Deane Landscape Character Assessment: 1a, Vale of Taunton Deane; 4a, Fivehead Farmed and Wooded Vale; and 5a, North Curry; and will also pass through the following Lower Lias Foothills and Lowland LLCA within Region 2 (Blackdown Hills Plateau Footslopes and Valleys) of the Landscape of South Somerset character assessment.

2.3.23 There are 141 listed buildings located within 1km of the A358, including:

- Four Grade I Listed Buildings: Church of St John the Baptist (970m east at Hatch Beauchamp); Church of St George (850m east at Ruishton); Church of the Holy Cross (750m east at Thornfalcon); and Church of St Aldhelm and Eadburga (350m west of the village of Broadway).
- 10 Grade II* Listed Buildings, with the closest assets being: Musgrave Farmhouse (45m west at Henlade); The Old Rectory (320m west at Ashill) and The Grotto at Jordans (300m east, north-east of Horton Cross). Additionally, the Grade II* Cross in St Aldhelm and St Eadburga churchyard is also a Scheduled Monument, located approximately 370m south-west in Broadway at the south-eastern end of the proposed scheme.
- 127 Grade II Listed Buildings, ten of which are located within 100m of the proposed scheme.

2.3.24 Other heritage assets near to the A358 include the Grade II Registered Park and Garden at Hatch (Beauchamp) Court (located 490m east of the A358 near Hatch Beauchamp) and three Conservation Areas located within 1km at Hatch Beauchamp, Thornfalcon and Ilminster. There are also a number of areas of woodland, some of which are categorised by Natural England as semi-natural ancient woodland, which contributes to the historic landscape character.

2.3.25 Further information on the existing baseline is presented within the technical assessment Chapters 5-14 of this PEI Report.

2.4 Baseline and future scenario

2.4.1 This section provides a description of the baseline scenario and the future baseline scenario.

2.4.2 For each environmental factor the existing baseline scenario and future baseline scenario for the relevant environmental receptors and resources must be defined. These descriptions are outlined in Chapters 5-14 of this PEI Report.

Baseline scenario

2.4.3 The baseline scenario is the current state of the environment without implementation of the proposed scheme.

2.4.4 As described in section 2.3, the proposed scheme is situated in a predominantly rural area in Somerset, with small settlements scattered along the route. There are approximately 25-30 farm holdings adjacent to the existing A358. There are also a number of ecological and heritage assets which are of individual value, but also contribute to the character of the local landscape (including the nearby Blackdown Hills AONB). These aforementioned designations reflect the conservation value of the region, and its rich heritage of human settlement.

Future baseline scenario

2.4.5 The future baseline is an outline of the likely evolution of the current state of the environment again without implementation of the project, taking account natural

changes and readily available information such as local development frameworks and climate change scenario data.

2.4.6 Potential changes to landscape in the future scenarios would not be noticeable, i.e. tree and vegetation growth would not be extensive, landscape pattern or topography is unlikely to change. It is not anticipated that large areas of woodland or hedgerow would be lost.

2.4.7 Given the relatively short period of time between the baseline scenario and mid-2028 (opening year) and 2043 (15 years after opening) the features and characteristics of the landscape would remain similar. There would likely be no perceivable change to the landform, land cover, field pattern, land use, or vegetation presence during this time. Management of ecological or heritage assets would remain the same.

2.4.8 Hence the future baseline for ecological and heritage assets which contribute to the character of the landscape would remain the same as set out in the existing baseline.

2.4.9 Based on the current land use, the future baseline in the absence of the proposed scheme is unlikely to change significantly by 2043. Subtle changes are expected due to climate change, such as some movements of certain species and local population changes; however, the overall habitats and species composition in the study area are expected to be broadly similar to that of the existing baseline.

2.4.10 Therefore, the future baseline would remain the same as set out in the existing baseline.

2.5 Project description

Detailed description of the preliminary design

2.5.1 The proposed scheme would provide 8.5 miles (13.6km) of new, rural dual carriageway for the A358. The new dual carriageway would connect Junction 25 of the M5 at Taunton with the existing A303 at Southfields roundabout near Ilminster and would be completed in line with current trunk road design standards. The section west of the proposed Mattock's Tree Green junction would be offline to the existing road corridor, while the section east of the junction would use the existing corridor.

2.5.2 The term 'chainage' (Ch) is used to refer to the distance measured in metres along the centre line (middle) of the proposed scheme. For example, Ch 2+300 refers to a location 2,300 metres along the centre line of the proposed scheme. The chainages referred to in the text are indicated on Figure 2.1 General Arrangement.

2.5.3 All distances, directions, areas and lengths referred to in this chapter are approximate.

M5 junction 25

2.5.4 Starting from the north-western end of the proposed scheme, the route would commence at junction 25 of the M5. The existing grade-separated junction would require capacity improvements to accommodate additional traffic generated by the proposed scheme. Improvements include the addition of a segregated left turn lane (SLTL) from Toneway onto the M5 northbound carriageway as well as widening of the southbound off-slip from three lanes to four for 120m along the

offside lane. A retaining wall approximately 2.5m high would be required to accommodate the widened carriageway.

Park and ride facility

2.5.5 Access to the existing facility would continue to use the current arrangement off the existing A358 with egress via the Nexus 25 roundabout to M5 junction 25.

Nexus 25 roundabout and link to M5 junction 25

2.5.6 A new dual carriageway road link and roundabout junction was constructed providing access to the Nexus 25 Strategic Employment site, located immediately south of the existing Taunton Gateway Park and Ride facility. This road link is approximately 300m long and provides two eastbound and three westbound lanes to the new roundabout at Ch 0+900.

2.5.7 The new mainline would connect to a new spur off the Nexus 25 roundabout. The roundabout would require extensive capacity improvements including widening of the existing roundabout as well as the provision of additional lanes on its approaches. Further modifications would be required to the traffic signage, road markings and pedestrian facilities.

A358 offline

2.5.8 From the Nexus 25 roundabout, the proposed new dual carriageway would then be offline from the existing A358 and be on low embankment to remain above the local flood levels, before continuing east in a cutting cut through a gap between residential properties along Stoke Road in Henlade.

Stoke Road overbridge

2.5.9 At Ch 2+440, a new single carriageway overbridge would carry Stoke Road over the A358 which would be in a 7m deep cutting at this point. Stoke Road would be realigned slightly to the west on an embankment and set higher than the current road level.

Mattock's Tree Green junction

2.5.10 East of Henlade, the proposed route would run parallel to the existing A358, initially at ground level but then entering a deep cutting through Mattock's Tree Hill where a new grade-separated junction with slip roads allowing for all traffic movements would be provided at Ch 4+260.

2.5.11 The junction would have a dumbbell roundabout arrangement (i.e. a roundabout each side of the main road with an overbridge connecting the two), linking the existing A358 and A378 to the north and Ash Road to the south via a new bridge over the A358. The junction would provide connections to Ash, Henlade, Hatch Beauchamp and the A378.

2.5.12 The route would then emerge from the cutting before it reaches the Thornwater Stream. It would continue at ground level through a gap between Bath Cottage and Somerset Progressive School until it reaches West Hatch Lane at Ch 5+600 where the proposed road would gradually adopt the horizontal and vertical alignment of the existing A358 carriageway.

Scout camp link

2.5.13 A new single carriageway approximately 650m long would be provided to connect from Mattock's Tree Green junction south terminal to Huish Woods Lane to facilitate access to the Scout camp, Somerset Progressive School and local businesses.

Village Road link (north)

2.5.14 A new single carriageway approximately 600m long would be provided to connect Mattock's Tree Hill Road (the existing A358 carriageway) to Village Road, providing improved access to Hatch Beauchamp.

Griffin Lane

2.5.15 At Ch 6+550, the existing bridge carrying the single carriageway A358 over Griffin Lane, would be retained in its current form as the westbound carriageway of the proposed dual carriageway. A new bridge would be constructed to the north to carry the proposed eastbound carriageway.

A358 online

2.5.16 From Griffin Lane, the proposed scheme would follow the alignment of the existing A358 through to Southfields roundabout. All at-grade existing junctions and direct accesses would be stopped up along the length of the proposed scheme. The proposed dual carriageway would follow the alignment of the existing A358 Hatch Beauchamp Link Road except for an 800m section at Kenny.

Bickenhall Lane

2.5.17 A new 900m length of single carriageway and a bridge over the A358 would be provided at Ch 7+550 to connect Bickenhall Lane across the route.

Village Road link (south)

2.5.18 A new single carriageway approximately 1,350m long, and bridge over the A358 would be provided at Ch 8+500 to connect Village Road (south) across the route to a portion of the retained A358 carriageway. A new junction would be provided with Staple Fitzpaine Road.

2.5.19 Between Ch 9+200 and Ch 10+000, the proposed route would be constructed off-line to the east of the existing carriageway. This would enable the existing road to be retained as a local route between Ashill and Hatch Beauchamp and provide access to existing properties along this section of the route.

Stewley Link

2.5.20 A new 800m long single carriageway link would be provided from Stewley Lane to Ashill Road north of the proposed Ashill junction.

2.5.21 This new link would provide access to property along the northern side of the route from the Capland area including the sewage treatment works and Park Lane, as well as providing emergency access to Merryfield Military Airfield.

Ashill junction

2.5.22 At Ch 12+100, a new grade-separated junction with slip roads for all movements would be provided at Ashill. The junction utilises a 'diamond' arrangement due to the relatively low traffic volumes and would provide a link between Ashill village to the west and Rapps/Ilton to the east by means of a new bridge over the A358.

Broadway Street link

2.5.23 A new single carriageway approximately 1500m long, running adjacent to the route, would be provided to connect Broadway Street to Ashill Road providing access to properties along the western side of the route.

Southfields roundabout

2.5.24 The Southfields Roundabout would be upgraded to provide a dedicated and segregated left-turn lane (SLTL) between the A358 and A303 eastbound carriageway, creating a free flow of traffic for this particular movement.

2.5.25 Minor improvements to the existing A303 westbound entry and A358 eastbound entry would also be provided to increase capacity at the roundabout.

Access-ways

2.5.26 Several new or relocated vehicle access-ways would be provided across the proposed scheme to accommodate vehicle access to private property or to infrastructure elements (including structures or drainage ponds) for the purpose of maintenance.

Capland Lane link

2.5.27 The existing Capland Lane junction on the A358 would be closed by the proposed scheme and road access to the adjacent community would be via local roads, some of which are affected by localised surface flooding.

2.5.28 The provision of a new single carriageway link between Capland Lane and Village Road or the improvement of local roads to improve flood resilience, are two alternative options under consideration. Currently the design is not developed sufficiently to allow assessment of the environmental impact of either of these options, but an options appraisal approach will be followed, and should one of the options be taken forward, it will be described in Chapter 3 Alternatives, of the Environmental Statement (ES).

2.5.29 Additional areas within the proposed scheme boundary have been included to allow for the inclusion of any resultant design changes.

Earthworks

Geology and ground conditions

2.5.30 The most prevalent bedrock deposits are the Branscombe Mudstone from the start of the proposed scheme to approximately Ch 6+200, the Blue Lias Formation from Ch 6+200 to Ch 9+500, and finally the Charmouth Mudstone Formation for the rest of the proposed scheme. Other deposits appear less frequently and/or are at depth and unlikely to be encountered by the proposed scheme. Refer to Chapter 9 Geology and soils of this PEI Report for further information on the existing baseline.

2.5.31 Potentially contaminated sites are present in the vicinity of the proposed scheme as summarised below:

- Former Thornfalcon refuse tip / Thornfalcon tip
- Ashill Bypass Site A landfill, a former inert landfill site
- Off-line former Ashill petrol filling station (PFS) and Shell PFS and service station at Horton Cross
- Former, now disused, Great Western Railway (GWR) alignment near West Hatch Land
- Foresters Garden Buildings north west of West Hatch Lane
- Former, now disused, GWR alignment north of Greenway Lane
- Former Near Dairy Farm landfill
- Texaco PFS and Motorhome dealership

- Former Butler's fuel depot
- Hatch Green Garage (former PFS) and coach depot
- Former Land east of Bow Bridge landfill and gravel pit
- Former Saw Mills landfill

Earthworks design

2.5.32 In general earthworks slopes have been assumed to be at 1:3 (vertical-horizontal) for all cuttings and embankments along the proposed scheme. This is appropriate for the mainly cohesive soils that would be collected from on-site excavations and reused as fill along the route.

2.5.33 The principal cuttings are at Stoke Road and Mattock's Tree Green junction, with a maximum depth of 8m.

2.5.34 The principal embankments would be constructed at Bickenhall Lane, Village Road link (south) and Ashill junctions. The embankment heights would typically be a maximum of 8m to achieve adequate bridge clearance over the route.

2.5.35 Low embankments are also proposed at the east and west ends of the proposed scheme where the alignment crosses low lying ground, to ensure the road remains above design flood level. Minor cut and fill earthworks are also required along the remainder of the proposed route to provide space for the additional carriageway.

Material re-use and acceptability

2.5.36 A preliminary assessment of earthworks materials volumes has been undertaken. Approximate bulk quantities are indicated in Table 2-2.

Table 2-2 Bulk earthworks quantities

Description	From Cut (m^3)	Fill (m^3)	Net (m^3)
Modelled cut and fill	731,300	680,300	51,000
Total	**731,300**	**680,300**	**51,000**

2.5.37 It is anticipated that the majority of the site-won materials would be acceptable for re-use.

2.5.38 As the general cut/fill quantities are approximately in balance, there is likely to be a limited volume available for landscaping fill.

Earthworks for landscaping

2.5.39 The design would incorporate earthworks with the landscape to mitigate the visual impact of the proposed scheme and integrate it into the surrounding landscape. The offline section would make use of cuttings through the higher ground around Henlade and Mattock's Tree Green. Much of the online section of the route would be close to the general ground level, matching the existing A358 alignment. The new grade-separated junctions would require embankments for the slip roads, connecting local roads and bridges. The amount of landscaping fill available is expected to be limited and, therefore, mitigation measures such as earthworks screening bunds would be restricted to selected locations.

Structures

2.5.40 Thirteen new structures would be provided, and seven existing structures would be extended for the proposed scheme, with two existing structures re-used. Preliminary details of each are listed in Table 2-3.

Table 2-3 Proposed and re-used structures

Chainage (Ch)	Structure name	Purpose	Width (m) [1]	Clearance (m) [2]	Height above existing ground level (m) [3]	Length (m) [4]
1+310	Black Brook Tributary culvert 1	New underbridge carrying the A358 over a tributary to Black Brook	6	2.5	N/A	30
1+700	Black Brook Tributary culvert 2	New underbridge carrying the A358 over a tributary to Black Brook	6	1.5	N/A	45
2+430	Stoke Road overbridge	New overbridge carrying Stoke Road over the A358 and providing connectivity between the villages of Henlade and Lower Henlade	12.3	6.5-7.5	0 (cutting)	30
3+050	Thornwater Stream South culvert	New underbridge carrying the A358 over Thornwater Stream	4	2.5	N/A	40
4+300	Mattock's Tree Green junction overbridge	New overbridge carrying the proposed junction link road over the A358 at Mattock's Tree Green junction	15.9	9-10	0 (cutting)	30
5+700	Meare Stream culvert (Culvert 1928)	Extension to the existing culvert to allow Meare Stream to cross under the A358	N/A	1.5m diameter	N/A	65
6+550	Griffin Lane underbridge westbound	Existing underbridge carrying the A358 westbound carriageway over Griffin Lane, two farm tracks and a minor watercourse	11.65	7	0 (cutting)	75
6+550	Griffin Lane underbridge eastbound	New underbridge carrying the A358 eastbound carriageway over Griffin Lane, two farm tracks and a minor watercourse	16.5	7	0 (cutting)	70
7+150	Hatch Park cattle creep	Extension to the existing underpass to allow landowner access under the A358	3	2.9 (maximum)	N/A	55
7+480	Bickenhall Lane overbridge	New overbridge carrying Bickenhall Lane over the A358	11	6-7	4-8	50
8+200	Fivehead River underbridge	Extension to an existing underbridge carrying the A358 over Fivehead River and an access path	11.55	2.7m (access path), 3.9m (channel invert)	N/A	30

Chainage (Ch)	Structure name	Purpose	Width (m) [1]	Clearance (m) [2]	Height above existing ground level (m) [3]	Length (m) [4]
8+500	Village Road overbridge	New overbridge carrying the proposed Village Road over the A358	12.3	7-7.5	8	40
9+400	High Bridge underbridge north	New underbridge carrying the A358 over a tributary to Venner's Water and a farm track. The new underbridge is next to, but separate from, an existing structure under the A358 which would become part of the local road network.	6	3.5	N/A	30
10+550	Venner's bridge	Extension to an existing underbridge carrying the A358 over Venner's Water	8.2	2.5	N/A	30
10+550	Venner's bridge (Stewley Link)	New underbridge carrying Stewley Link over Venner's Water	8.2	2.5	N/A	15
10+900	Sunnyside underpass	Extension to an existing underbridge carrying the A358 over a farm track	3.4	3.1	N/A	30
12+100	Ashill junction overbridge	New overbridge carrying the proposed junction link road over the A358 at Ashill junction	12.3	6.5-7.5	10-11	50
12+950	Cad Brook bridge	Extension to an existing underbridge carrying the A358 over Cad Brook	6.5	2.4	N/A	30
12+950	Cad Brook bridge (Broadway Street link)	New underbridge carrying Broadway Street link over Cad Brook	6.5	2.4	N/A	15
13+800	Ding Mill culvert	Extension to the existing culvert allowing the River Ding to cross under the A358	1.8	2.8	N/A	60
14+000	Ding bridge westbound	Existing underbridge carrying the A358 westbound carriageway over Back Stream and a farm track	8.2	3.2	N/A	15
14+000	Ding bridge eastbound	New underbridge carrying the A358 eastbound carriageway over Back Stream and a farm track	8.2	3.2	N/A	15

[1] Dimension given is either the clear opening of underbridge/underpass/culvert, or the width between parapets on overbridges.

[2] Dimension is either the clearance to the A358 under the bridge for overbridges, the clearance to the road under the bridge for underbridges, or the opening size underneath the A358 for underpasses/culverts.

[3] Dimension is the height of the junction/bridge above existing ground level.

[4] Dimension is the distance between abutments either side of the A358 for overbridges, or the distance through the culvert/underpass (total including proposed extensions to existing structures).

Flood risk and drainage design

Flood risk

2.5.41 All sources of flood risk to and from the proposed scheme, including the impact of a changing climate on flood risk, are being assessed as part of the Flood Risk Assessment (FRA) that will accompany the ES and Chapter 13 Road drainage and the water environment of this PEI Report.

2.5.42 The proposed scheme design would manage all rainfall event up to the 1 in 100-year return period event plus an allowance of 40% for climate change as required by the Environment Agency (EA) [5] and *Design Manual for Roads and Bridges* (DMRB) CG 501 *Design of Highway Drainage Systems (formerly HD 33/16, TA 80/99)* [6].

Drainage strategy and design

2.5.43 The highway drainage design is designed in accordance with DMRB CG 501 *Design of highway drainage systems* and DMRB LA 113 *Road drainage and the water environment* [7].

2.5.44 The A358 mainline and grade separated junctions slip road drainage systems would be adopted and maintained by Highways England. The local road drainage systems would be adopted and maintained by SCC. The road drainage for the proposed scheme would be managed using a series of attenuation basins, which are assumed to remain dry most of the time.

2.5.45 The Highways England and SCC drainage systems would be kept separate wherever practicable.

2.5.46 Wherever practicable, drainage collection and conveyance methods would be designed sustainably and accordance with the *Sustainable Drainage Systems Manual* (Ciria Report C753) [8].

2.5.47 Drainage systems would be designed to ensure that the critical storm for the 1 year return period event is conveyed without surcharge and there is no surface water flooding on the highway for the critical rainfall duration for the 1 in 5-year return period event. An allowance of 20% for climate change has also been included.

Highway drainage – A358

2.5.48 Edge of pavement drainage details for the A358 would be selected in accordance with the recommended solutions in CG 501 *Design of highway drainage systems*. Where practicable vegetative systems are preferred over conventional. Likely solutions are outlined below.

2.5.49 In cuttings and embankments, the preferred verge solution would be surface water channels, either grassed or concrete, and filter drains.

2.5.50 The preferred central reserve detail, for super elevated carriageways or when existing drainage assets are to be retained, is a concrete surface water channel.

2.5.51 Where kerbs are required, the surface water runoff would be drained via gully outlets or combined kerb and drainage units.

2.5.52 Cut-off ditches at the top of cuttings and the bottom of embankments would be incorporated to intercept natural run-off from adjacent land. Where necessary for reasons of slope stability the ditches at the top of cuttings may be lined. If the natural topography falls away from the road alignment, cut off ditches would not generally be provided other than to mitigate local flooding risk, or for slope stability reasons.

2.5.53 When the highway is in deeper cutting, verge filter drains would also drain the subsurface of the pavement along with the surface water runoff from the slopes. They may also serve a function lowering groundwater to ensure slope stability.

2.5.54 Narrow filter drains or fin drains would be used to drain the road pavement where this is not already provided for by a filter drain.

2.5.55 Wherever practicable, systems draining trafficked paved road surfaces would be kept separate from those intercepting groundwater and run-off from earthworks slopes.

Highway drainage – local roads

2.5.56 For local roads adoptable by SCC, road drainage in cuttings would typically comprise combined filter drains and grassed surface water channels. On shallow embankments with no kerbs the default would be over-the-edge drainage with swales or ditches, or otherwise gully outlets where kerbs are provided.

Cross drainage and watercourses

2.5.57 Several watercourses and streams would cross the route of the proposed scheme. The flows in these watercourses would be maintained within their catchment through culverts wherever possible.

2.5.58 No EA designated main river crossings are required for the proposed scheme.

2.5.59 The proposed new cross drainage culverts would be designed to convey the 100-year event plus a 40% allowance for climate change.

2.5.60 Hydraulic performance of any proposed extensions to existing culverts would be checked to ensure capacity is adequate as culvert extensions may increase head loss and upstream water levels. When extending an existing culvert, discharge capacity would be provided as like-for-like as a minimum.

2.5.61 Details of existing and proposed culverts and underbridges are presented in Table 2-4. Culvert sizes and form would be refined at detailed design.

Table 2-4 Existing and proposed culvert/underbridge details

Name	Mainline Chainage (Ch)	Structure Type	Total Length (m) [1]	Width (m) [2]
Black Brook Tributary culvert 1	1+310	Proposed culvert	30	6
Black Brook Tributary culvert 2	1+700	Proposed culvert	50	6
Thornwater Stream south culvert	3+050	Proposed culvert	40	4

Name	Mainline Chainage (Ch)	Structure Type	Total Length (m) [1]	Width (m) [2]
Culvert 1611 (existing structure ref: 2280301)	5+400	Existing drainage culvert extension	TBC	0.9
Culvert 1783 (existing structure ref: 2290601)	5+550	Existing drainage culvert extension	TBC	0.9
Meare Stream culvert (Culvert 1928) - existing structure ref: 2290501)	5+700	Existing drainage culvert extension	65	1.5 (dia-meter)
Griffin Lane underbridge westbound (existing structure ref: 2290201)	6+550	Existing underbridge	15	75
Griffin Lane underbridge eastbound	6+550	Proposed underbridge	15	70
Fivehead River underbridge (Existing structure ref: 2190301)	8+200	Existing underbridge extension	30	11.55
High Bridge underbridge north	9+400	Proposed underbridge	30	6
Folly Main culvert (existing structure ref: 3100801)	9+700	Existing drainage culvert extension	TBC	0.8
Venner's bridge (existing structure ref: 3111301)	10+550	Existing underbridge extension	30	8.2
Venner's bridge (Stewley Link)	10+550	Proposed underbridge	15	8.2
Cad Brook bridge (existing structure ref: 3131401)	12+950	Underbridge extension	30	6.5
Cad Brook bridge (Broadway Link)	12+950	Proposed underbridge	15	2.4
Jordan's Pipe culvert (existing structure ref: 3122101)	13+350	Existing drainage culvert extension	TBC	0.9
Ding Mill culvert (existing structure ref: 3131501	13+800	Existing drainage culvert extension	60	1.8
Ding bridge westbound (existing structure ref: 3131601)	14+000	Existing underbridge	15	8.2
Ding bridge eastbound	14+000	Proposed underbridge	15	8.2

[1] Dimension is the approximate distance through the culvert/underbridge (total including proposed extensions to existing structures).

[2] Dimension is the clear horizontal opening of the culvert/underbridge.

2.5.62 In addition to the culverts in Table 2-4, there would be a number of culverts managing land drainage or minor watercourses under local roads adjacent to the proposed scheme, and numerous smaller culverts conveying flows from the cut-off ditches under tracks, walking, cycling and horse riding (WCH) and private accesses.

Watercourse realignment/diversion

2.5.63 The widening of the A358 at Southfields roundabout impacts the River Ding directly. This would require the existing bridge to be extended and the realignment of the stream.

2.5.64 At Henlade, the Black Brook watercourse and associated land drainage would be realigned as part of the proposed new highway alignment.

2.5.65 The proposed scheme would seek to de-culvert existing sections of culverted watercourse and minimise the introduction of new culverted sections of the watercourse where possible.

Walking, cycling and horse riding

2.5.66 Walking, cycling and horse riding (WCH) routes include PRoW, the national cycle network (NCN) and local roads that are popular with walkers, cyclists and equestrians. A network of PRoW crosses the A358 corridor. The network comprises primarily of footpaths in addition to a small number of bridleways and restricted byways. However, safe crossing points are limited where these routes interface with the existing A358. Promoted routes include the Neroche Herepath, NCN route 33 and the Taunton Cycle Trail.

2.5.67 The proposed scheme aims to ensure that existing routes remain accessible where possible for the local community and visitors to the area. Necessary mitigation of the WCH network has been explored with stakeholders.

2.5.68 The proposed scheme would provide a number of new and safe PRoW crossings of the proposed route through the construction of overbridges and underpasses. The details will be presented in a Public Rights of Way Management Plan that will be produced as part of the ES.

Lighting

Existing lighting

2.5.69 Lighting is currently only provided at the M5 junction 25, Nexus 25 roundabout (including the short length of roadway between the two) and at Southfields roundabout.

Proposed lighting

2.5.70 The basis of the lighting proposals used for optioneering phase has subsequently been replaced with TA 501 *Road lighting appraisal* [9], and the need for provision of lighting at the proposed junctions has been re-assessed based on TA 501.

- The mainline would not be lit, apart from the immediate approaches to the Nexus and Southfields roundabouts. The extent of lighting would be limited (approximately 160m from junction conflict points) to ensure the requirements in British Standard (BS) 5489-1:2020 *Design of road lighting. Lighting of roads and public amenity areas. Code of practice* [9] are achieved.
- Based on the assessment undertaken to TA501, the provision of lighting at the proposed Mattock's Tree Green and Ashill junctions would not be justified based on the economic assessment. A sensitivity analysis was also taken to understand if justification could be provided based on an adjustment in terms of night-time accident rate, uplift in perceived night-time accident savings and no allowance for any extra over costs associated with energy and carbon. The

findings from the sensitivity analysis confirmed that lighting would not be justified.
- The provision of lighting on other local roads is not expected to be required except for some limited locations at the tie-in of the new road alignment with existing local roads, where limited lighting may be required. An assessment for any underpasses to determine the provision of daytime lighting will be undertaken to determine if illumination is required.
- Temporary construction lighting would be intermittently used throughout the construction phase for select operations in isolated locations only and as required by the contractor.

Fencing, walling and other boundary treatments

2.5.71 Boundary fencing would be proposed along the proposed highway boundary and at other locations such as offline cycle or equestrian routes and attenuation basins. The fencing would comprise timber post and four rail fencing, stockproof fencing, mammal proof fencing or other landscape-led proposals such as hedgerows.

Technology

2.5.72 The preliminary scheme design includes limited technology to support the maintenance and operation of the new road and has been developed in agreement with the Highway England's Maintenance, Operations and Technology teams.

2.5.73 The following intelligent transport systems (ITS) equipment is being proposed on the proposed scheme:

- Subject to a review of the current CCTV provision and coverage at M5 junction 25 and the proposed A358 tie-in, additional CCTV installation(s) may be implemented. This is being established with Highways England's South-West Regional Operations Centre.
- Emergency Roadside telephones would be provided within laybys.
- Traffic detection / vehicle counting loops have been designed in accordance with TD131 *Roadside technology and communications* [10], with an average spacing of 500m across the length of the proposed scheme.
- Necessary electrical interfaces to feed the technology equipment is being proposed at regular intervals based on location of technology assets.
- Ducting and cabling routes along with civil assets (chambers) within the proposed verge to accommodate these installations. Alternatively, wireless communication proposals are being discussed with Highways England's National Road Telecommunications Service (NRTS).

2.5.74 Any power cabinets agreed with the Distribution Network Operator (DNO) would be located close to the fence line within the verge.

Temporary works

2.5.75 Full details of the temporary works including the temporary compounds and topsoil storage areas are considered and described in the environmental topic chapters (PEI Report Chapter 5-14), where relevant. The time period covering temporary works elements will be provided in the ES when this information becomes available.

Construction compounds and storage areas

2.5.76 It is currently proposed to include one main compound and a crusher/material stockpile compound. The main compound is proposed to be located at Ch 0+100, situated in the adjacent fields south of the westbound carriageway.

2.5.77 The main compound would remain in place for the duration of construction (2024-2028).

2.5.78 Operations at the main compound would include office and welfare accommodation, training and induction facilities, emergency recovery and safe refuge facilities, material storage, waste segregation areas, plant lay down area, fuel storage and car/minibus parking for staff and operatives. The main compound would also act as holding points for oversized deliveries until they are able to access the required area on site.

2.5.79 A crusher and material stockpile compound would be located in fields on the south side of the new alignment of the A358 between Ch 2+300 and Ch 2+600.

2.5.80 To facilitate movement of material to and from this compound, and to reduce the amount of construction traffic using the existing road network, haul routes would be created. Where practicable, these are likely to be routed along or immediately adjacent to the proposed mainline route; however, where this is not practicable, additional temporary land use may be required adjacent to the works to enable access to the local roads network.

2.5.81 Construction traffic that is required to use the existing road network would be restricted to using the SRN, as far as is reasonably practicable.

2.5.82 In addition to the crusher, bulk stone and topsoil storage, a small office and welfare facility would be maintained at this location for staff and workforce engaged with material handling.

2.5.83 Satellite compounds for construction of the junctions, local road overbridge and underbridges are located at the following locations:

- Stoke Road overbridge
- Mattock's Tree Green junction overbridge
- Griffin Lane underbridge
- Bickenhall Lane overbridge
- Village Road link (south) overbridge
- Ashill junction overbridge
- Southfields roundabout

2.5.84 These small satellite compounds would include a small office and welfare facility together with limited storage facilities for materials. They would remain in place only for the duration of the specific works (typically 2-3 years).

Borrow pits

2.5.85 Construction of the proposed scheme would require excavation in places to form cuttings for the highway and this material would then be used to form embankments. The design aims to balance these 'cut and fill' requirements as far as practicable; therefore, no borrow pits are required.

Temporary drainage

2.5.86 Where possible, the permanent earthworks drainage would be installed before the start of the main construction programme, with cut-off ditches and filter drains; and these would manage the surface water run-off towards and within the site

and discharge it into the existing watercourses via the temporary/permanent basins as required.

2.5.87 The contractor will obtain temporary discharge consents and abstraction licences from SCC and EA. Temporary settlement basins/tanks would be used to ensure any site surface water discharge to the adjacent watercourses is of the required quality, with any suspended solids given the opportunity to settle out prior to discharge into receiving waters.

2.5.88 At watercourse crossings, during the construction of the permanent culverts, it is assumed that multiple temporary smaller pipes (same cross-sectional area as the existing) would be used adjacent to the new crossing with the watercourses locally temporarily realigned to suit.

Access arrangements

2.5.89 It is a project requirement to maintain two-way traffic along the existing A358 during the construction of the proposed scheme. However, where construction activities such as existing online bridge demolition, modification or construction (e.g. bridge deck beam installation) prohibits safe road operation, limited temporary road closures may be required at night and weekends.

2.5.90 Although a significant section of the works would be constructed offline at sections where local roads and the offline elements of the works tie into the existing A358 a higher degree of temporary traffic management measures during construction would be required, such as narrow lanes, lane closures, contraflow and two-way and three-way lights.

2.5.91 The existing A358 is not identified as an abnormal load route.

Scale of development

2.5.92 The draft Development Consent Order (DCO) would allow for the proposed scheme to be constructed anywhere within the maximum extent of the defined limits within which the draft DCO will authorise. These are known as the limits of deviation (LOD). Further details on limits of deviation are provided in Chapter 4 Environmental assessment methodology of this PEI Report. These would be further detailed in the ES and in the draft DCO.

Off-site works

2.5.93 Confirmation of any off-site works required to facilitate the development (delivered by Highways England or other parties); would be detailed in the ES.

2.6 Environmental mitigation design measures

2.6.1 The proposed scheme design has emerged as part of an iterative process between the engineering and environmental design and assessment teams, and through active engagement with statutory consultees, key stakeholders and the wider public. Throughout the iterative design process, interventions have been made and integrated into the proposed scheme with the primary purpose of avoiding or reducing adverse effects at source and to make the proposed scheme fit better into its landscape setting. These measures are considered integral to the proposed scheme and are termed as ‘embedded mitigation’.

2.6.2 DMRB LA 104 *Environmental assessment and monitoring* [11] defines embedded mitigation as *“…project design principles adopted to avoid or prevent adverse*

environmental effects". Embedded mitigation is reported as part of the proposed scheme description and not repeated in each environmental factor assessment.

2.6.3 The environmental design incorporates landscape, biodiversity and cultural heritage mitigation and enhancements, to create a coordinated coherent scheme. Essential mitigation and any enhancement measures are reported in each environmental factor chapter (Chapters 5-14). Further details on the approach to mitigation of impacts can be found in Chapter 4 Environmental assessment methodology.

2.6.4 These are identified on PEI Report Figure 7.8 Environmental Masterplans and described in outline below.

Embedded mitigation

2.6.5 The following section identifies design and construction measures which are integrated into the proposed scheme to avoid, prevent or reduce adverse environmental effects both during construction and operation of the proposed scheme.

Air quality

2.6.6 During construction, there is the potential for changes in air quality due to dust emissions from construction activity. Best practice mitigation measures to reduce effects from construction dust will be included in the Environmental Management Plan (EMP) that will be produced as part of the ES and to support the DCO application. The mitigation measures would reduce the impact of construction dust effects to negligible. No other specific mitigation has been incorporated for air quality.

Cultural heritage

2.6.7 The environmental mitigation plan, described in Chapter 7 Biodiversity, includes a range of embedded landscape features which are intended to soften the visual impact of the proposed scheme and includes areas of new woodland and native hedgerow creation which would screen views of the road from a number of heritage resources. This would prevent or reduce adverse effects on heritage resources which would have been created by the construction of the proposed scheme. The detail of this is reported in Appendix 6.4 Preliminary impact assessment tables of this PEI Report.

2.6.8 Noise mitigation is reported on in Chapter 11 Noise and vibration of this PEI Report. This would reduce or prevent adverse effects on heritage resources arising from changing noise levels.

2.6.9 The archaeological mitigation works would be undertaken during the preliminary works (the majority of the archaeological fieldwork and recording) and construction works stages. The Detailed Archaeological Mitigation Strategy and Overarching Written Scheme of Investigation will set out appropriate measures to be undertaken during the preliminary works and construction stages to ensure that the mitigation measures embedded in the proposed scheme design are appropriately implemented. This would likely include a combination of essential and embedded mitigation, although the detail of this requires the results of the ongoing geophysical survey, trial trenching and building assessment. The results of these surveys will be used to further develop the strategy for mitigation,

including embedded mitigation such as relocating proposed tree planting or ponds to avoid identified buried remains. This will be reported within the ES.

Landscape

2.6.10 Embedded mitigation measures for landscape and visual has been combined with ecological mitigation. The landscape design incorporates a range of embedded landscape features such as woodland, grassland and water features. These are described in Chapter 8 Biodiversity of this PEI Report.

2.6.11 The landscape objectives for the proposed scheme are to:

- link with local green infrastructure strategies, initiatives, and strategic green infrastructure opportunities
- consider distant views from the Blackdown Hills AONB (day and night)
- inform engineering design to avoid or reduce impacts
- respond to the rural characteristics of the wider landscape
- reinforce landscape structure perpendicular to, as well as along, the road corridor
- reinstate vegetation and screening function lost alongside existing road corridor during construction
- deliver environmental elements/mitigation with multiple functionality
- design planting and structures to respond to local typologies and characteristics

2.6.12 Specific embedded essential mitigation as it relates to landscape and visual impacts is described below:

- Revision of proposed access arrangements to Merryfield Airfield and Rapps to avoid potential impacts on Ashill Wood/Every's Copse ancient woodland and nearby mature trees.
- Positioning Bickenhall Lane overbridge at a location where it has minimised height compared to the surrounding landscape due to the A358 being in cutting.
- Positioning Village Road overbridge further north to avoid visual impacts on residential properties in close proximity, and landscape impacts on mature hedgerow trees to the south.
- All bridge structure wing-walls to:
  - avoid prominent wing-walls in views from the wider landscape
  - allow hedgerow planting on approaches to get as close as possible to the A358
  - result in visual narrowing of cuttings at Stoke Road and Mattock's Tree Green junction.
- Re-design of property access at Jordans to avoid impacts on mature trees near the existing entrance.
- Addition of a new PRoW link to the west of the proposed scheme between Nexus 25 roundabout and Stoke Road to retain views towards Stoke Hill and Blackdown Hills AONB without the proposed scheme and passing traffic restricting or interrupting the view.
- Widening online sections to one side only, where possible, to increase the retention of existing vegetation and its associated screening and landscape functions.

Biodiversity

2.6.13 Embedded mitigation during the construction phase would be identified in the Register of Environmental Actions and Commitments (REAC), contained within the EMP. This would be developed to avoid or reduce the potential construction impacts on habitats and species and would seek to employ best-practice methods for dealing with habitat loss, habitat severance, disturbance and species mortality.

2.6.14 The EMP would include specific construction phase method statements that would address potential impacts on habitats and species and would detail the timing of works, roles and responsibilities of the contractors, control measures, training and briefing procedures, risk assessments and monitoring systems to be employed during planning and construction for all relevant environmental factor areas. Prior to construction the EMP would be updated to include additional items identified during the DCO examination and decision stages, and with additional input from the contractor.

2.6.15 The EMP would include site-specific methods, e.g. temporary use of silt busters or bales which would be used to prevent silt or contaminants from being released into watercourses during construction. Such precautions would be undertaken in accordance with relevant legislation and undertaken in compliance with the relevant Guidance for Pollution Prevention (GPPs) and industry best practice [12].

2.6.16 Additional mitigation to protect ancient woodland habitat would include a buffer zone of at least 15m between the works and the woodland edge in accordance with Natural England guidelines. There are two locations where this buffer cannot be achieved due to the proximity of the ancient woodland to the existing A358; these are at Bickenhall Wood and Saltfield Copse. In these instances, further assessment of root protection areas and refinement of the proposed scheme design will be undertaken to reduce potential impacts to root protection areas.

2.6.17 The root protection areas and canopies of hedgerows, scattered trees, and woodland to be retained within the proposed scheme, would be protected during construction in accordance with British Standard (BS) 5837:2012 *Trees in relation to design, demolition and construction*. *Recommendations* [13]. Measures for protection would be included in the EMP and would refer to root protection areas as defined within the Arboricultural Impact Assessment (AIA). Consideration should be given to the retention and management of edge habitats, within the protected root protection areas, for the benefit of wildlife during construction. It is acknowledged that some overhanging branches from trees adjacent to construction areas may need to be subject to pruning in order to protect trees from accidental damage by construction machinery. Such works would be avoided through careful design of construction logistics where possible, and where required would be carried out by suitably experienced arboriculturalists to maintain the health of the trees.

Protected and notable species

2.6.18 It is anticipated that the effects of disturbance or risk of mortality to species during construction would be mitigated through specific construction phase method statements detailing best practice that would address potential impacts on species and prevent committing offences in relation to the *Wildlife and Countryside Act 1981 (as amended)* [14]. General best practice measures that address multiple ecological receptors are detailed below. Where protected species are present, further measures are likely to be required. The details of which would be agreed with Natural England through the licencing process. Draft

Protected Species Licences will be submitted separately from the DCO application, and will be detailed in the Consents and Agreements Position Statement.

2.6.19 Construction activities could result in individual birds and/or their active nests being injured/killed and/or destroyed, respectively. For this reason, vegetation clearance would be planned to be undertaken between September and February outside of the core breeding bird season, which is considered as March-August, inclusive. If this is not possible and works are required within this period, vegetation clearance works would adopt a precautionary working method including nesting bird surveys to identify nesting birds within 24 hours of the commencement of clearance, and a watching brief by a suitably experienced ecologist during all vegetation clearance where visibility (for nest detection) is limited on the pre-works surveys. If nesting birds are encountered, a suitable working buffer distance from the nest would be devised, by a suitably experienced ecologist, and the nest left until all young have fledged.

2.6.20 Sensitive programming of construction works would be implemented to avoid or reduce potential impacts such as mortality or disturbance to species. Details will be incorporated in the EMP and could include:

- Sensitive timing of works involving watercourse realignment to reduce impacts upon riparian mammals, aquatic macroinvertebrates and fish translocation.
- Sensitive timing and methodologies of vegetation clearance and manipulation regard to nesting birds, hazel dormouse and other species such as reptiles and amphibians to be overseen by a suitably experienced ecologist.
- Avoidance of ground works in key reptile and dormouse habitat between October and April to prevent harm to hibernating animals.

2.6.21 Restrictions on working hours to avoid night working (taken as the period 30 minutes before sunset to 30 minutes after sunrise) would be implemented in key locations so that there is no light spill in the vicinity of watercourses and key bat flight lines or roosts and adjacent habitats. Any temporary task requiring lighting would use directional lighting and would be designed to ensure that there is no light spill over 0.5 Lux on any identified bat commuting and foraging areas, roosting habitat or water courses with regard to bats and otters. Detailed lighting restrictions would be provided in the EMP. Lighting designed to be sensitive to bats and otters, would also benefit other nocturnal wildlife such as owls and badgers.

2.6.22 All excavations would be closed overnight, or ramps provided to reduce risk of trapping or injuring wildlife in them.

2.6.23 A pre-construction check for invasive plant species, both terrestrial and aquatic, would be undertaken at the appropriate time of year to inform any requirement to avoid or remove invasive species.

2.6.24 The implementation of biosecurity best practice described as ‘check, clean, dry’ would help to mitigate any potential mobilisation of invasive aquatic plant species and also chytrid fungus which effects amphibians. Measures for dealing with invasive species and implementing biosecurity measures would be incorporated in the EMP.

Geology and soils

2.6.25 The proposed scheme footprint has been reduced and designed to limit impacts on agricultural land and soil resources.

2.6.26 Adoption of appropriate mitigation for soil handling and restoration to mitigate the effects on soil resources is by two primary means:

- Development of a Soil Resource and Management Plan (SRMP) during the pre-construction phase, which would identify the existing soil resources that would be affected by the proposed scheme, based on detailed soil surveys information. The SRMP would be and implemented by the contractor.
- Adherence to good practice guidance on soil handling and storage, in accordance with Department for Environment, Food and Rural Affairs' (Defra) *Code of Construction Practice for the Sustainable Use of Soils on Construction Sites (2009)* [15].

2.6.27 To inform the assessment on geology and soils receptors the proposed scheme design is being developed in accordance with CD 622 *Managing Geotechnical Risk* [16], which describes best practice in relation to managing the risk associated with the ground. This includes best practice on characterising a site, including geology, geomorphology, hydrogeology and land contamination.

2.6.28 Technical consultation is undertaken with various statutory and non-statutory bodies and external sources to obtain the latest information on baseline conditions.

2.6.29 Site investigation would be undertaken prior to construction, to investigate areas of potential land contamination which have been identified as part of baseline assessment, potentially presenting a moderate to high risk to identified receptors (human health, surface water, groundwater). The additional information obtained from the site investigation would enable further definition of potential risk to human health and Controlled Waters. This would identify the requirement for additional site investigation, further risk assessment and/or mitigation works to be incorporated into the design, where risks are assessed as significant.

2.6.30 Based on available baseline information a potential significant effect has been identified to off-site human health receptors (residential) from potential ground gas/vapours associated with historic landfills intersected by the proposed scheme. Mitigation (if required, subject to completion of the site investigation) to remove potential secondary/preferential pathways to off-site receptors may include construction of an engineered cap for placement of new service ducts/drainage, installation of passive gas venting layer and/or treatment of old service ducts/drainage.

2.6.31 Waste hierarchy principles are to be used at every stage of the project, as appropriate to identify opportunities for reuse of soils within the proposed scheme. This can be achieved through:

- Promotion of sustainable reuse of excavated made ground and natural soils either within the proposed scheme or at a receiver or hub site. A Materials Management Plan (MMP) will be prepared by the contractor in advance of construction works in accordance with *CL:AIRE Definition of Waste Code of Practice (DoWCoP) (2011) (v.2)* [17].
- A Site Waste Management Plan (SWMP) is to be prepared to detail the amount of waste to be produced, how it would be used, recycled or disposed of.

2.6.32 An EMP will be prepared and developed by the contractor prior to the start of construction works. Where significant residual effects have been identified, the EMP shall include remediation and remediation monitoring requirements, to be

agreed with the relevant authorities, in accordance with DMRB LA 109 *Geology and soils* [18].

2.6.33 The proposed scheme design would also include assessment of ground aggressivity and selection of appropriate concrete class and pile design, for the site-specific ground conditions and structural loading.

Material assets and waste

2.6.34 Design measures include, but are not limited to, applying the five key principles for Designing out Waste as outlined by the Waste and Resources Action Programme (WRAP) *A Design Team Guide for Civil Engineering* which has been summarised below:

- Design for Reuse and Recovery – this includes the reuse of materials and components recovered from on site or from other sites, use of recycled materials and use of "new" materials that contain a high percentage of recycled material.
- Design for Off Site Construction – this includes identifying if any part of the design can be prefabricated / manufactured off site and assembled on site rather than constructed in-situ.
- Design for Material Optimisation – consideration should be focussed on using less material and producing less waste; for example, through "lean design" and reducing variables and bespoke elements in materials and design.
- Design for Waste Efficient Procurement – this includes utilising the procurement process of materials and services to inform design development, reducing waste in the supply chain, consideration where waste arises and where waste can be reduced in construction methods.
- Design for Deconstruction and Flexibility – consider maintenance and adaptability for future uses, how constructions can be deconstructed effectively at end of life and avoiding the use of materials that prevent future recycling.

Noise and vibration

2.6.35 A low noise thin surface course system (TSCS) would be incorporated throughout the proposed scheme. At present this is assumed to achieve a similar noise reduction as the existing A358 low noise road surface but opportunities to improve on this will be further investigated and reported in the ES.

2.6.36 Mitigation measures designed into the proposed scheme to reduce impacts, including noise during operation, are achieved through careful design of the horizontal and vertical alignment of the road. Roadside landscaping and screening have been incorporated into the design[1]. This will result in the number of people adversely affected by noise across the proposed scheme being reduced. The approach is in line with the aim of government noise policy to minimise, as far as is sustainable, adverse impact on health and quality of life. The horizontal alignment of the proposed scheme, as part of the engineering design, has resulted in larger distances between dwellings and the new A358 where practicable.

[1] Note that the noise assessment presented in PEI Report Chapter 11 Noise and vibration does not currently take into account the latest DF2 landscape bunding. This will be included in the assessment for the ES.

Population and health

2.6.37 The design of the proposed scheme has, where possible, avoided direct impacts on development land, businesses and agricultural land holdings, with appropriate embedded mitigation developed in order to mitigate potential effects where possible (e.g. early reprovision of access to ensure accessibility during construction).

2.6.38 During construction we will engage with all identified commercial property and businesses to minimise disruption and maintain access arrangements where possible. Through the design of the proposed scheme, appropriate access would continue to be provided. Where concerns have been raised by landowners and tenants about the proposed scheme and its potential effects on business and agricultural land holding viability, landowner engagement has helped inform design with appropriate mitigation measures agreed and incorporated as part of the proposed scheme.

Road drainage and the water environment

2.6.39 All construction activities associated with road drainage and the water environment are to be completed in compliance with the EMP which would include items such as:

- Management of chemicals and fuels
- Sediment/surface water run-off control
- Monitoring requirements for water quality
- Storage of materials
- Dewatering protocol
- Piling risk assessments
- Working near watercourses protocol
- Localised flood risk management measures

2.6.40 During the operational phase, the design will implement the following measures to manage impacts on affected surface watercourses:

- New crossings of watercourses will be minimised and only implemented where essential.
- The length of crossings along the watercourse will be kept to a minimum.
- The width and height will be based on existing crossings to maintain baseline conditions, although an iterative assessment process will be applied so that impacts in terms of flood risk, water quality and hydro-geomorphology can be reduced as far as it technically feasible.
- Any new crossings (including clear span bridges or culverts) will be designed to minimise effects on the existing flow regime and hydro-geomorphological conditions of the channel.

2.6.41 Channel diversions and realignments required as part of the proposed scheme have been designed to match existing conditions (as far as possible) to maintain existing flood risk, water quality and hydro-geomorphological conditions.

2.6.42 Further embedded mitigation measures associated with specific watercourses are provided in Table 13-11 within Chapter 13 Road drainage and water environment of this PEI Report.

Climate change

Greenhouse gas (GHG) emissions

2.6.43 The proposed scheme considered a variety of alternative options to solve the identified capacity problem on the existing A358 before defining and refining the preferred option. An assessment of carbon was undertaken during option selection, which identified the Pink option as having a small benefit (lower construction emissions) compared to the Orange and Blue options (these options are described in Chapter 3 Assessment of alternatives, to this PEI report).

2.6.44 As the proposed scheme design has been refined during the preliminary design stage, consideration has been given to options that reduce or avoid carbon emissions. This included:

- removal of retaining walls at Stoke Road/Henlade
- simplification of overbridge and connecting road junction at Mattock's Tree Green junction which reduces overall material demand compared to the baseline option

2.6.45 Existing pavements will be retained wherever possible within the proposed scheme to reduce the requirement for additional materials and construction.

2.6.46 The proposed scheme has been designed to minimise the requirement for energy consuming operational equipment such as street lighting or intelligent transport systems wherever possible. Where lighting may be required, for example at Southfields junction, LED/demand sensitive lighting is proposed to reduce GHG emissions.

2.6.47 Materials and assets would be specified for longer lifespans to avoid future need for replacement.

2.6.48 Further refinements to the design will be reported in the ES.

Vulnerability to climate change

2.6.49 The proposed scheme has been designed to improve its resilience to climate change through a range of design and construction standards, good engineering practice and material specification measures and in compliance with the EMP include but are not limited to:

- The use of construction materials with appropriate durability requirements (such as increased resilience to thermal loading from fluctuating temperatures).
- Risk of heat stress to site personnel from exposure to extreme temperatures to be managed through the provision of necessary personal protective equipment and facilities.
- Sufficient time to be included within the construction programme or considering changing the timing of construction activities to reduce risks relating to site personnel, plant and machinery associated with high temperatures and prolonged periods of heavy precipitation.
- Material stockpiles, drainage infrastructure and structures to be inspected before and after extreme weather events to ensure stability and incorporating such measures into materials management plans.
- Provision of flood compensation storage areas.
- Soft landscape features to be maintained following establishment through watering in periods of dry weather and carrying out periodic inspections to monitor the establishment of new planting.

2.7 Construction, operation and long-term management

Construction programme

2.7.1 The start date for the construction phase would depend upon several factors including the outcome of the DCO process and the date the DCO comes in to force, should it be made by the SoS, and the date the requirements contained within Schedule 2 of the Order are discharged.

2.7.2 All previously made Orders have contained a definition of 'commence' which allows limited operations to be undertaken once the Order comes into force. These generally include operations such as archaeological investigations, ground investigations, advanced ecological mitigation and the establishment of construction compounds. All other construction operations require the requirements contained within the made Order to be discharged prior to construction commencing. The requirement discharge is subject to stakeholder consultation and approval by the SoS.

2.7.3 Taking into account the above statutory restrictions, it is currently anticipated that the construction activities would commence in 2024 and the proposed scheme open to traffic in mid-2028.

2.7.4 The construction programme would be finalised by the contractor in advance of the commencing the works. An outline construction programme, including the duration, anticipated phasing, working hours and any requirement for night-time working would be included within the ES.

2.7.5 The current proposal is for the works to be completed as one single project, reducing any long-term impact on the local area, access and communities. This construction would be separated into two main phases:

- Phase 1 would be works adjacent to the existing A358 between junction 25 of the M5 to Southfields roundabout. During phase 1 we would maintain one lane open in each direction while we construct the new road alongside. To safely install the beams for the new overbridges at Ashill junction, Village Road link (south) and Bickenhall Lane overnight road closures would be required.
- Phase 2 would be the upgrade and construction of the new westbound carriageway that would be built online over the existing A358 road.

Construction activities

2.7.6 The construction activities for the proposed scheme would be typical of a major highway scheme and would include the following:

- Advanced works comprising ecology and landscape mitigation (e.g. habitat creation, moving of badger setts, establishing receptor sites for reptiles and amphibians, installation of bat and bird boxes and ecological ponds, vegetation clearance) and archaeological investigations (excavations)
- Establishment of site compounds, laydown areas and facilities
- Vegetation clearance
- Statutory utility diversions
- Bulk earthworks, including excavation of cuttings and creation of embankments
- Drainage works
- Construction of bridge structures, including piling
- Road pavement works

- Signage, lighting and street furniture
- Auxiliary works including local roads, WCH routes and ecology structures
- Landscape and planting works

Construction access and vehicle movements

2.7.7 The construction of the proposed scheme would use typical construction techniques associated with major infrastructure projects.

2.7.8 Construction of the proposed scheme would require a large quantity of plant and equipment. The high volume of material to be moved would require large excavators, articulated dump trucks, dozers, compactors plus graders, bowsers and stabilising plant. To construct the structures, large piling rigs and heavy-duty cranes would also be required. Exact plant numbers and type would be determined by the construction methodology and the volume of material to be handled on-site.

2.7.9 It is currently assumed that a haul road strip 15m wide would be required parallel to the embankments/structures with access gained from existing local roads, where reasonably practicable, and created from laybys on the A358.

Excavated materials

2.7.10 It is estimated that (after allowance for topsoil stripping and existing pavement), there would be approximately 731,300m^3 (cubic metres) of bulk cut available from necessary excavations on-site. This preliminary volume total does not include for excavation for drainage pipes, drainage ditches and ponds and backfill/excavation for structures. These volumes would be refined during the current preliminary design.

2.7.11 Total fill requirements would be 680,300m^3 which excludes a further 190,000m^3 of imported selected fill required for capping and pavement sub-base.

Re-use of excavated materials

2.7.12 Using available data, it is assumed that approximately 85-90% of excavated materials would be suitable for re-use as general engineering fill on the proposed scheme (dependent on the material classifications confirmed through ground investigations). Taking this into account, the adjusted volume of excavated material suitable for fill would reduce to 621,600m^3. Remaining non-suitable material (approximately 109,700m^3) and excavated topsoil would be stockpiled for use in landscaping

2.7.13 Demolition arisings and marginal materials would also be processed for re-use where possible.

2.7.14 The earthworks strategy, including management of any surplus or deficit of material, would be developed further as part of the EIA to achieve an earthworks cut/fill balance.

Statutory utilities

2.7.15 Construction of the proposed scheme would require the diversion, relocation or protection of several existing utility assets including water, wastewater, electricity and telecommunications. The required diversions would be planned in detail by the contractor as part of the construction works.

2.7.16 Twelve statutory undertakers (SU) with apparatus would be impacted by the proposed scheme, comprising:

- BT Openreach
- CenturyLink Level 3 Communications managed by Instalcom
- GTC
- National Grid
- Mobile Broadband Network Ltd
- Sky UK Limited
- SSE Telecoms
- Virgin Media
- Vodaphone
- Wales & West Utilities
- Wessex Water
- Western Power Distribution

2.7.17 While most of the utilities affected by the proposed scheme are simply cables or pipes, there are several major elements such as communication masts, pumping or sewage works and sub-stations which would be protected or diverted.

2.7.18 There are two assets of national importance, the Level 3 Communications and the National Grid high pressure gas main.

2.7.19 The Level 3 Communications assets requires 16 weeks advanced notice period for each outage and only permits one outage every 18 months; this includes outages for other schemes that require diversionary works and any outage required to facilitate emergency works.

2.7.20 The National Grid high pressure gas main also has a long lead in time of up to 18 months with works only permitted over the summer period between March and October.

2.7.21 Utilities diversions will be assessed in the ES once further information becomes available.

Permanent and temporary land-take

2.7.22 The extent of land use requirements during construction and operation are defined by permanent and temporary land-take requirements. These are shown within the proposed scheme boundary line on Figure 2.1 General Arrangement. These would be set out and justified in the Statement of Reasons to accompany the DCO application.

2.7.23 Permanent land-take is required to construct, operate and maintain the proposed scheme and includes the footprint of all the proposed highway infrastructure, earthworks and drainage works, also includes the areas for environmental mitigation, such as landscape planting and areas of habitat replacement. Further details on the essential landscaping areas are shown on the Environmental Masterplans (refer to Figure 7.8 Environmental Mitigation Plan).

2.7.24 Temporary land-take is required to assist the contractor in the construction of the proposed scheme, including working areas, haul roads, main and satellite site compounds and material/topsoil storage areas, and can also be required for the construction of part of the works with a permanent easement right acquired for operation and maintenance.

Environmental Management Plan

2.7.25 An EMP is being developed and will summarise proposed scheme specific actions identified through the EIA process for all environmental factors and would

be presented in the form of a Register of Environmental Actions and Commitments (REAC) within the ES.

2.7.26 Prior to the commencement of the construction works, the EMP would be refined by the contractor, in line with DMRB LA 120 *Environmental Management Plans* [19].

2.8 Demolition

2.8.1 The proposed scheme would require the partial demolition of four existing highway structural culvert wing walls and foundation aprons to allow for the construction of the proposed culvert extension, including:

- Hatch Park cattle creep
- Venner's culvert
- Sunnyside culvert
- Cad brook culvert

2.8.2 The proposed scheme would require the demolition of three existing residential properties, comprising:

- Henlade Farmhouse, Stoke Road
- Meadow View, Stoke Road
- Bath Cottage, Village Road

2.8.3 One existing parking lay-by would be upgraded to meet the current standards for an emergency lay-by. The remaining parking lay-bys along the existing A358 are not deemed suitable for reuse and would require demolition.

2.9 Maintenance

2.9.1 A Maintenance and Repair Strategy Statement (MRSS) would be prepared for the proposed scheme, which would identify maintenance proposals for assets and how these assets would be maintained during operation.

2.9.2 The maintenance proposals would be developed with engagement with Highways England's Maintenance and Operation team.

2.9.3 Maintenance activities would be as authorised under the DCO. As required by the EMP, industry standard control measures would be applied and encapsulated in the third iteration of the EMP for the end of construction. With the implementation of these measures no significant effects are considered likely.

2.10 Decommissioning

2.10.1 The traffic and economic assessment demonstrate the proposed improvements would operate adequately for the first 15 years of opening to the Design Year of 2043. Typically, highway schemes are designed to have a material life-span of between 20 and 40 years before major maintenance and upgrading is required dependant on material properties, maintenance and usage. Elements including structural concrete and steelwork have extended design lives of up to 120 years.

2.10.2 It is considered highly unlikely that the proposed scheme would be decommissioned as the road is likely to have become an integral part of the infrastructure in the area. Decommissioning would not be either feasible or desirable and is therefore not considered further within this PEI Report.

Abbreviations List

Please refer to PEI Report Chapter 17 Abbreviations.

Glossary

Please refer to PEI Report Chapter 18 Glossary.

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