

# A1 in Northumberland: Morpeth to Ellingham

## GEN.1 Principles for Good Road Design WQ GEN.1.1

APFP Regulation Rule 8(1)(b)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed  
Forms and Procedure) Regulations 2009

Infrastructure Planning

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(Applications: Prescribed Forms  
and Procedure) Regulations 2009**

**The A1 in Northumberland: Morpeth to  
Ellingham**

Development Consent Order 20[xx]

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**Principles for Good Road Design WQ GEN.1.1**

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# 1 PRINCIPLES FOR GOOD ROAD DESIGN WQ GEN.1.1

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## 1.1 MAKES ROADS SAFE AND USEFUL

1.1.1. *Safety has been fundamental to providing good road design for the Scheme; it is integral to both the usefulness of its function and the confidence of road users and their well-being. The design creates safe roads which will support and link to other wider imperatives, both nationally and locally, and that are fundamentally useful, meeting users' need for mobility effectively.*

1.1.2. The existing A1 between Morpeth and Ellingham consists of a mix of highways standards, with sections of both single carriageway and dual carriageway standard. The proposed improvements will result in dual carriageway standard throughout.

1.1.3. Part A would consist of the following key changes to improve safety:

- Two carriageways operating at national speed limit;
- Hardstrips;
- No direct accesses onto the dualled A1;
- No minor junctions at grade;
- No gaps in the central reserve and full grade separation;
- Removal of at grade pedestrian crossings;
- A parking lay-by and abnormal load bay is proposed on both northbound and southbound carriageway at Priest's Bridge;
- Parking lay-bys are also proposed on the northbound carriageway just south of Causey Park Overbridge, on the southbound carriageway just south of Burgham Park Underbridge and on the southbound carriageway at chainage 16500;
- Removal of existing bus stops near Warreners House, Strafford House and Low Espley and formalisation of bus stops on the northbound and southbound carriageways on the A697 at Low Espley; and
  - All of the new A1 mainline carriageway will be a clearway (i.e. no stopping).Part B would consist of the following key features to improve safety:
- Two carriageways operating at national speed limit;
- Hardstrips;
- No direct accesses onto the dualled A1;
- No junctions at grade;
- No gaps in the central reserve and full grade separation;
- No at grade pedestrian crossings;
- Parking lay-bys are proposed along the route of the improved A1, with three on the northbound carriageway and three on the southbound carriageway; and,
- Removal of three existing bus stops at Charlton Mires and along the B5341. To replace these bus stops, two new bus stops are proposed along the B6341 to the west of the A1.

- As with both Part A and Part B using the same design standards and strategy to make the road safe, the following benefits are expected to be realised:
  - Risk associated with vehicles overtaking on the opposite carriageway and crossing the adjacent carriageway unsafely (i.e. right turn movements) will be eliminated due to continuous central reserve barrier and full grade separation.
  - The removal of direct accessed onto the dualled A1 and junctions design in accordance to DMRB standards TD 9 Highway Link Design and TD40 Layout of Compact Grade Separated Junctions will allow reasonable speed for access and egress. This significantly reduce the risk of vehicles entering the main carriageway unsafely.
  - It is expected that a significant number of walkers, cyclists and horse-riders (WCH) will use the off-network routes due to removal of at grade pedestrian crossings and bus stops, which will deter WCH from crossing the carriageway or walking adjacent to it.
  - The risk and exposure of road workers has been recognised and the provision of off-network access for maintenance for particular roadside assets (e.g. detention basins) has been provided to ensure road workers are protected as much as possible.

1.1.4. In terms of making roads 'useful', the Department for Transport Road Investment Strategy for the 2015/16-2019/20 Road Period confirms that the A1 north of Newcastle provides "a nationally important" connection between Newcastle and Edinburgh and that it comprises an "essential" link for the North East and Northumberland. The RIS confirms the route needs "substantial improvement" to meet the needs of the local economy and to better fulfil its role in the national transport network. The second version of this Strategy (Road Investment Strategy 2: 2020–2025) underscores the commitments in the first as it notes some projects are still to come forward. It states that for Road Period (RP2), covering the financial years 2020/21 to 2024/25, the A1 is a Committed Scheme recognised still as a Government priority to see disparate sections of dual carriageway linked together into joined-up, high-quality roads.

1.1.5. Therefore, the improved standards in accordance to the listed features above to be delivered as part of the Scheme would enhance the road environment to improve safety and improve journeys by providing an essential link to the North East and Northumberland including a consistent operational environment from Newcastle to Ellingham and reducing or eliminating unsafe vehicle manoeuvres which currently are the main causation of accidents across this section of the network. The wider economic impacts of the Scheme have also been calculated after accounting for impacts associated with delays during construction and maintenance the combined monetised value of these benefits is forecast to be £13.4 million commuting user benefit and £44.7 million "other user" benefit, which includes benefits relating to journey time improvements, increased journey time reliability, improved access for business suppliers and customers and reduced vehicle operating costs, such as fuel, vehicle maintenance and mileage related depreciation. Refer to the Case for the Scheme [APP-344, Section 5] for further details. The Scheme would also involve changes to some

Public Rights of Ways (PRoWs) which would lead to a safer experience for users. This includes for Part A:

- A shared footway/cycleway along the parallel link road which extends from West Moor junction to the de-trunked A1 at the Bockenfield loop and Felmoor Park.
- Diverting PRoWs 115/016 and 115/008 under the A1 via Parkwood subway and formalising this route, which is currently used by WCHs, as a recognised PRoW
- The design for all three of the proposed grade separated junctions and the Causey Park overbridge includes a footway adjacent to the carriageways over the bridge, allowing for safer pedestrian crossing of the A1.
- PRoW 422/020 - 422/002 – the PRoW currently crosses the A1 at grade south of the River Coquet and forms part of the informal walking circular loop around the River Coquet, connecting to St Oswald's Way (a Long Distance Walking Route). The footpath PRoW 422/002 will be diverted to run underneath the River Coquet Bridges and connect to PRoW 422/020 on the eastern side of the River Coquet. Users will need to access the new portion of the footpath via steps. This diversion will enhance the users experience as they will no longer have to cross traffic on the A1.
- A new PRoW north of Highlaws Junction. This proposed PRoW would run from Hebron Road to the east of Highlaws Junction, parallel to the Scheme up to the de-trunked A1 directly north of the River Lyne. Existing PRoWs 407/001, 407/002 and 407/018 would connect into the proposed PRoW to create a continuous stretch of footpath from south to north for approximately 1.9 km.
- Permanently diverting traffic from the A1 to be de-trunked onto the new offline portion of the Scheme near to Tritlington School would reduce traffic near to the school, making it safer for people to access and increasing amenity for the school.
- 422/002 and 422/020 - diverted underneath the River Coquet bridge on the southern side of the river
- 115/016 and 115/008 - diverted under the A1 via Parkwood subway
- 423/001 - diverted over Fenrother junction
- 423/017 - diverted over Causey Park overbridge
- For Part B, similar improvements are proposed:
- 110/013, 110/004 - diverted north to the proposed Heckley Fence Accommodation Overbridge;
- 110/019, 110/010, 129/021 - diverted south, running parallel to the A1 before reaching the proposed Heckley Fence Accommodation Overbridge;
- 129/024, 129/004 - diverted north along the B6341.

- 1.1.6. The Scheme would remove the existing at grade PRoWs across the existing A1 with diversions to either Heckley Fence Accommodation Overbridge or Charlton Mires junction. The existing at-grade crossing for agricultural vehicles at Heckley Fence would be via the Heckley Fence Accommodation Overbridge instead. The provision of private access direct to / from the carriageway within the scheme extents will be removed and alternative provision made to adjacent local roads. This will mitigate vehicles entering and leaving the carriageway unsafely.

- 1.1.7. Furthermore, in both Parts A and B, all PMAs have considered vehicle traffic type and usage has been considered for all PMA's and they have been designed to current DMRB standards accordingly - PMAs requiring use by agricultural vehicles will be designed to 4.8 m wide, which is wider than standard. The removal of direct accessed onto the dualled A1 will significantly reduce the risk of vehicles entering the main carriageway unsafely.
- 1.1.8. The offline section of the Scheme also enables a section of alignment which does not meet current design standards to be bypassed, providing a smoother and safer alignment for users.
- 1.1.9. In summary, throughout the design of the A1 in Northumberland road scheme, safety has been at the forefront of design iterations and is now central to the proposed scheme for the DCO. As shown above, this has included specific consideration and adaptation to where other local users interface with the proposed scheme and ensures that where these meet as well as throughout the road, the design creates safe places which will support and link to other wider imperatives, both nationally and locally ensuring its function is both safe and useful.

## 1.2 IS INCLUSIVE

- 1.2.1. *Inclusive environments facilitate dignified and equal use by all. An inter-disciplinary design process involved, and places people's needs and views throughout the development, nurturing well-being and creating a shared sense of ownership of the road. All users and communities were considered carefully in order to reduce barriers to access and participation, particularly mindful of the most vulnerable.*
- 1.2.2. Equality Impact Assessments (EqIA) is being carried out to ensure Part A and Part B are compliant with the Equality Act 2010. An EqIA for the Scheme as a whole (Part A and Part B combined) is currently being undertaken and will be submitted at Deadline 2. The EqIA found that the design of the Scheme would not produce any disproportionately negative effects on protected characteristic groups, and that they had been sufficiently considered throughout the design development. For instance, the accommodation overbridges at Charlton Mires and Heckley Fence are both designed with a gradient that ensures wheelchair users and those with pushchairs would be able to use them. The new footpaths linking Charlton Mires overbridge with surrounding properties and bus stops are also designed to allow two wheelchairs to comfortably pass, in line with best practice guidance. It was raised by a member of the equalities team at Northumberland County Council (NCC) that the relocation of bus stops could significantly increase the walking distance from some properties to the bus stops, which could be difficult for elderly people and those with restricted mobility, as well as people with pushchairs. The EqIA also identified opportunities to prevent potential disproportionate effects on protected groups occurring during the construction of the Scheme, in order to advance equality and foster good relations going forward. One such example raised was an action to ensure communication occurs with protected characteristic groups, or organisations who regularly interact with protected characteristic groups such as the Alnwick General Infirmary and other emergency services,



in advance of and during construction. This communication should include details of diversion lengths and routes, and road closures to ensure protected characteristic groups (particularly the elderly and disabled) are able to sufficiently prepare for unfamiliar routes and road layouts.

- 1.2.3. A Communication Plan (that includes community engagement) is part of the commitments upheld by the Construction Environmental Management Plan (CEMP) [APP-346] and will be developed before work commences on site. A list of contacts is provided as part of the EqIA for subsequent teams to access at later stages of the Scheme. The Construction Traffic Management Plan [APP-347] includes measures to ensure that access to destinations by the emergency services would not be hindered during construction. Information should also be displayed at bus stops to be removed, prior to commencement of construction, to ensure users are aware of changes.
- 1.2.4. A Walking, Cycling and Horse Riding Assessment and Review (WCHAR) has been completed for the Scheme. This identified opportunities to improve and integrate facilities with local, regional or national networks, and to promote inclusivity. As a result, the following measures have been incorporated into the Scheme design: A shared footway/cycleway along the parallel link road which extends from West Moor junction to the de-trunked A1 at the Bockenfield loop and Felmoor Park.
- Diverting PROWs 115/016 and 115/008 under the A1 via Parkwood subway and formalising this route, which is currently used by WCHs, as a recognised PROW
  - All Private Means of Access (PMAs) have considered vehicle traffic type and usage has been considered for all PMA's and they have been designed to current DMRB standards accordingly. PMAs requiring use by agricultural vehicles will be designed to 4.8 m wide, which is wider than standard.
  - PRoW 422/020 - 422/002 – the PRoW currently crosses the A1 at grade south of the River Coquet and forms part of the informal walking circular loop around the River Coquet, connecting to St Oswald's Way (a Long Distance Walking Route). The footpath PROW 422/002 will be diverted to run underneath the River Coquet Bridges and connect to PRoW 422/020 on the eastern side of the River Coquet. Users will need to access the new portion of the footpath via steps. This diversion will enhance the users experience as they will no longer have to cross traffic on the A1.
  - A new PRoW north of Highlaws Junction. This proposed PRoW would run from Hebron Road to the east of Highlaws Junction, parallel to the Scheme up to the de-trunked A1 directly north of the River Lyne. Existing PRoWs 407/001, 407/002 and 407/018 would connect into the proposed PRoW to create a continuous stretch of footpath from south to north for approximately 1.9 km.
  - Permanently diverting traffic from the A1 to be de-trunked onto the new offline portion of the Scheme near to Tritlington School would reduce traffic near to the school, making it safer for people to access and increasing amenity for the school.



- The proposed footway at Charlton Mires Junctions would link the diverted Footpath 129/004, to the east of the Scheme, extend across the A1 and along the footway adjacent to the B6341, to the west of the Scheme, to approximately Rock Lodge.
- The proposed Heckley Fence Accommodation Overbridge would be designed to cater safely for WCHs and vehicular traffic.
- Use of best practice design in accordance with design standard TA90/05 (with for example its guidance on visibility spays and suitable gradients for cyclists or horse riders) and the National Policy Statement for National Networks (NPS NN) which places clear requirements on Applicants to ensure improvements and consideration with regards to the safety of WCHs and improve the amenity of users of the footpaths in the surrounding areas.
- Additionally, landscape planting would provide screening of the road. Low Noise Road Surfacing would reduce noise levels for the wider network of PRow, providing improved amenity for users.

### 1.3 MAKE ROADS UNDERSTANDABLE

- 1.3.1. *Easy to read, a good road is intuitive to use so as to be safe and efficient for all. 'Self-explaining roads' focus on the essentials and eliminate unnecessary and confusing clutter to make them legible, while responding to place and enhancing both environmental and economic outcome*
- 1.3.2. The Scheme will be designed to the appropriate DMRB standards (e.g. CD 350 and CD 351 which detail the design and appearance of highway structures) and therefore would provide a consistent operational environment and familiar carriageway standard and layout that connects the A1's existing dual-carriageway sections, providing a consistent standard of road through this area. Additionally, the grade-separated junctions would be designed to the appropriate DMRB standard and therefore would be an understandable, familiar and consistent design and layout to other junctions on the network. The Scheme would also renew road markings and signage, where required, to clearly communicate the new junctions, de-trunked section and changes to the surrounding roads. Any inconsistencies in existing signing would also be addressed as part of the Scheme signing strategy and any new and renewed signage will be designed to the DMRB, Local Transport Notes, the Traffic Signs Manual and the Traffic Signs Regulations and General Directions.
- 1.3.3. In terms of wider legibility of this part of the A1 in Northumbria, the Scheme would respond to the presence and loss of landscape features and habitats as set out on Figure 7.8 Landscape Mitigation Masterplan Part A [APP-095], Figure 7.10 Landscape Mitigation Plan Part B [APP-144] and in Appendix 9.21 Ancient Woodland Strategy, Part A [APP-247] which in addition to compensating for the lost features and mitigating the impacts of the Scheme, have been designed to be in keeping with the surrounding landscape existing features. For example, the mitigation planting would comprise of native species mixes in keeping with local landscape character and where possible, plant stock would be of local provenance. Minimising the landscape and visual effects of the grade separated junctions through the provision of a strategy of mitigation planting to integrate the junctions within the landscape

and provide screening where required. Where appropriate, existing vegetation would be retained and where replacement of removed planting would be carried out it would be in keeping with the existing landscape, for example avoiding the extensive use of mass planting of woodland, which would screen longer views, in order to retain and reinforce the open, permeable character to the wider landscape.

## 1.4 FITS IN CONTEXT

- 1.4.1. *The aesthetic quality of a road and its design in relation to the places through which it passes, is integral to its function and the experience of those that use it. Good road design demonstrates sensitivity to the landscape, heritage and local community, seeking to enhance the place while being true to structural necessities. It builds a legacy for the future.*
- 1.4.2. The Scheme incorporates both online widening of the existing carriageways and construction of a new offline section of dual carriageway. Online widening reduces the amount of additional land required and contains the Scheme within the existing context of the A1 and the wider surroundings. The offline section of the Scheme would move the trunk road traffic away from the residential receptors along the detrunked section, therefore improving the quality, safety and amenity of the detrunked section by separating the trunk road traffic and retaining the detrunked A1 for local journeys. The offline section, including the alignment of the A1, Fenrother junction and free-flow link road, maintaining east-west local road connectivity and the provision of PMAs has been one of the main areas whereby the Scheme has continually been refined throughout the design development as a result of consultation with landowners and stakeholders, to enable the Scheme to better fit into the existing context. Although the offline section would move A1 traffic away from the receptors along the section to be detrunked, it would introduce new infrastructure closer to properties near to the alignment of the offline section at Fenrother, New Houses Farm and Causey Park. The new bridges and junctions would present an addition of structures that stand out in the view compared to the existing landscape context, and the offline section would result in the direct loss of an area of open countryside within an area of Green Belt Extension. However, the Scheme design would provide several measures to mitigate the impacts upon the landscape context caused by this, including earth bunds, landscape planting and acoustic barriers, to integrate these new features into the existing context. Local landscape topography and existing landscape fabric were also considered in the design and siting of the Scheme, to avoid overtly elevated junctions, viewed across the wider agricultural landscape. Existing vegetation would be retained wherever possible, so as to retain existing landscape features and therefore preserve and integrate the Scheme into the existing landscape context wherever possible. Figure 7.8 Landscape Mitigation Masterplan Part A [APP-095] and Figure 7.10 Landscape Mitigation Plan Part B [APP-144] shows proposed new landscape planting to screen, integrate new features introduced by the Scheme (such as embankments and junctions) into the surrounding landscape, and help reinforce the local landscape character and landscape fabric. This would aid the visual integration of the new features of the Scheme into the existing landscape context. Furthermore, where the Scheme impacts particularly sensitive landscape features such as Dukes Bank Ancient

Woodland and the locally important Coronation Avenue, compensatory and/or replacement planting would be provided and would be in keeping with the existing landscape context. Furthermore, no additional lighting is proposed as part of the Scheme, which further helps the design fit in with the existing context. The new bridges would be of a consistent design and material to visually integrate with other existing overbridges and structures along the A1, avoiding new prominent design features within the landscape. The River Coquet Bridge would be constructed parallel and adjacent to the existing River Coquet bridge and has been carefully designed to fit into the existing context. The new bridge geometry would fit the presence of the current existing bridge, while the deck main elements would be constructed of weathering steel to give a consistent appearance of other structures along the A1. Design parameters for the bridge (such as Parameter 10 for potential movement of the northern pier up to 6m north and the southern pier up to 2m to the north) allow some flexibility to the position of the northern and southern piers, which would allow opportunities to consider how their location could extend views along the river corridor.

- 1.4.3. Where the bridges or junctions are raised, the embankments would be planted to reduce the visual prominence of the structures from surrounding views and to integrate the built features into the surrounding landscape.
- 1.4.4. New overbridges would be constructed of concrete, seeking to keep a consistent design and material to visually integrate with other existing overbridges and structures along the A1 as noted in DMRB (CD 351).
- 1.4.5. The majority of the route of the existing A1 was created as a Turnpike road in the 18th century and is therefore recognised as a heritage asset in its own right (non-designated). The Scheme would retain the route of the road along its entire length, including the section which is to be de-trunked in Part A. The route of the A1 is lined with mileposts, most of which are designated as Grade II Listed Buildings. All would be retained, albeit two mileposts would be subject to careful temporary removal and relocation on the Scheme once construction is completed.
- 1.4.6. The design of the Scheme has considered the presence of existing communities and community facilities on either side of the existing A1 and the locations of existing walking, cycling and horse-riding routes. Through design development mitigation has been embedded into the Scheme including diversions of existing WCH routes, and grade-separated crossings of the A1 to maintain community linkages and improving the safety of the NMU network through the removal of at-grade crossings of the trunk road network.

## 1.5 IS RESTRAINED

- 1.5.1. *Functional, but responding positively and elegantly to the context, good road design allows for the expression of the character and identity of the places and communities through which a road passes. Good road design can enhance a sense of place and add to what we have inherited but does not make unnecessary superficial or superfluous visual statements.*
- 1.5.2. The Scheme design balances both online and offline widening by using the most appropriate method for the context of the location by dualling online where there is sufficient

lateral capacity to minimise land-take and constructing offline where land adjacent to the existing carriageway is constrained by multiple dwellings. The offline section would result in less vehicle traffic along the de-trunked section which would increase the amenity and the sense of place of this area; and improve safety for Tritlington High School. The potential for impacts to landscape would be mitigated primarily through the retention or replacement of vegetation, as well as a mitigation landscape features to integrate the Scheme as shown on Figure 7.8 Landscape Mitigation Masterplan Part A [APP-095] and Figure 7.10 Landscape Mitigation Plan Part B [APP-144]. The replacement vegetation will be locally or regionally sourced from within North East England and will comprise native species. Where ancient woodland would be removed, the Scheme would provide woodland within and near to the same location as that loss, south of the River Coquet, at a ratio agreed with Natural England (12:1), that would provide an overall increase of the woodland habitat. Although ancient woodland is an irreplaceable habitat, the overall increase in woodland area would, once matured, would enhance the sense of place of this area. In addition, structures have been designed so as to avoid unnecessary vertical elements or design statements, which would be inappropriate in this largely rural landscape. As such, bridge structures do not protrude unnecessarily and have a planting mitigation strategy associated with them which is aimed at screening or integrating the structure into the landscape.

- 1.5.3. The design minimises the land take required by the new junctions by utilising a grade-separated design which is appropriate for the forecast traffic flows whilst also being appropriate and sympathetic to the existing landscape. The junctions have been located to tie-in with existing side roads to minimise realignment as far as possible. The new River Coquet bridge will be constructed adjacent to the existing River Coquet bridge, which also minimises land take and visual impacts. For example, the design minimises the land take required by the Charlton Mires Junction by utilising a compact grade-separated design which is appropriate for the forecast traffic flows whilst also being appropriate and sympathetic to the existing landscape, avoiding un-necessary vertical and prominent elements. The junction has been located to tie-in with existing side roads to minimise realignment as far as possible.
- 1.5.4. The proposed footways at the three new junctions and Causey Park overbridge would connect into the existing side roads and, where possible, to existing PRowS which improve the safety, reliability and linkages for WCH wishing to cross the Scheme and utilise the PRow network. Further, enhancement would be made via a new segregated 3 m wide footway/cycleway which would be provided along the length of the eastern side of the proposed link road, between the de-trunked A1 and Felton Road, which would enhance the sense of place by improving access and safety for cyclists alongside the A1. As an example, the proposed footways at the Charlton Mires Junction and Heckley Fence Accommodation Overbridge would connect into the existing side roads and, where possible, to existing PRowS which improve the safety, reliability and linkages for WCHs wishing to cross the Scheme and access the surrounding area. This ensures that the traditional use of the area is maintained and allows the safe use of PRow as a functional means of connecting people to community resources, such as the bus stops, and the local area.



- 1.5.5. Detention basin 18 (DB18) has been combined with the highway earthworks of the River Coquet bridge approach to integrate, and therefore minimise, the earthworks requirement and visual impact of the detention basin.
- 1.5.6. The Scheme includes measures to reduce potential impacts on cultural heritage features. For example, as the potential Iron Age Camp (HER 5043) at East Link Hall has been identified as potentially having buried archaeology, it would be excluded from any mitigation planting and cordoned off to ensure no intrusive ground works are carried out in this location. The detention basin in close proximity to the Scheduled Prehistoric Burial Mound 420m north-west of East Link Hall has also been relocated as part of the design development following consultation with Historic England, and the field in which it is located has been removed from the Order limits to remove any potential impacts on waterlogged archaeological remains.

## **1.6 IS ENVIRONMENTALLY SUSTAINABLE**

- 1.6.1. *Making an important contribution to the conservation and enhancement of the natural, built and historic environment, good road design seeks to achieve net environmental gain. It is multi-functional, resilient and sustainable, allowing for future adaptation and technical requirements, while minimising waste and the need for new materials.*
- 1.6.2. Sustainability has been included throughout the scheme in design and mitigation, with particular focus on sensitive receptors such as landscape and heritage whilst ensuring that it minimises demands on resources where feasible. The Scheme incorporates mitigation and green infrastructure to support wildlife. The existing biodiversity value of the Order limits has been assessed against the value of the same area upon completion of the Scheme, to quantify the change in biodiversity and inform the requirements for compensation to minimise the loss of biodiversity. Habitats of a similar type and character would be created within the vicinity of the area where the loss has occurred. Where this is not possible, habitat creation will occur within other suitable areas identified within the Order limits as identified on Figure 7.8 Landscape Mitigation Masterplan Part A [APP-095] and Figure 7.10 Landscape Mitigation Plan Part B [APP-144]. The Scheme focuses on landscape integration and connectivity to the wider environment. Proposed hedgerows on either side of the road corridor would provide connectivity from south to north. In addition to this, extension of existing woodland blocks has been proposed, providing connectivity between smaller fragmented woodland areas. Where important habitat has been lost as a result of the Scheme, appropriate replacement habitat would be provided of equal or better quality than that lost and, where possible, of equal or greater area/length. This is particularly relevant to linear features within the landscape providing connectivity, such as hedgerows, where fragmented, species-poor hedgerows would be replaced with more species-rich alternative.
- 1.6.3. An exception to this is in relation to watercourses. Unlike terrestrial habitat creation (for example grassland), it is not viable to readily create new lengths of watercourse to replace all that would be lost as a result of the Scheme as this would rely on a water source to

create the habitat. A water source cannot be created and therefore, in the absence of a natural source or diversion of water from an existing watercourse (which could have adverse effects on the existing water course and/or flood management), a watercourse cannot be readily created. Due to this limitation, the approach to mitigating for the loss of watercourse habitat includes improvements to existing watercourses, the design of new channels (as part of watercourse diversions) to increase the biodiversity value in comparison to that lost, the creation of wet woodland and wetland marginal planting.

- 1.6.4. Net gain cannot be claimed for the Scheme as a whole due to the loss of ancient woodland associated with Part A, an irreplaceable habitat. However, the Scheme contributes to net gains for biodiversity (outside of ancient woodland) by achieving a net gain for area-based Habitats of Principal Importance (HPI) for Part A (principally lowland mixed deciduous woodland, lowland meadow and ponds; see Table 1 of Appendix 9.20 Biodiversity No Net Loss Assessment Part A [APP-246]) and area-based HPI and non-HPI for Part B (see Table 5-12 of Appendix 9.11 Biodiversity No Net Loss Assessment Report Part B [APP-309]).
- 1.6.5. All mitigation planting would comprise of native species mixes in keeping with local landscape character. Where possible, existing vegetation within the Order Limits would be retained to reduce impacts relating to habitat loss, ecosystem services, screening and landscape integration. Where replacement planting would be carried out, this would be in keeping with the existing environment, restricting mass planting of woodland habitat, that would screen longer views to maintaining an open, permeable feel to the wider environment. Where possible, habitat features have been reinstated within the same geographical areas, maintaining, connectivity to existing habitat features to be retained. The Scheme design has considered and sought to avoid impacting upon built heritage by identifying the locations of such features and avoiding, wherever possible, built heritage assets of medium and high value such as the listed buildings and scheduled monuments. Only a Grade II listed milestone of medium value would be directly impacted, and it would be repositioned near to its original location to facilitate the works. The Scheme would impact on two non-designated built heritage assets of low value (milepost North of Shipperton Bridge and Charlton Mires Farmhouse), however the effects on these would not be significant with mitigation. In addition to landscape integration and screening, a number of the earthwork mounds, identified on Figure 7.8 Landscape Mitigation Masterplan Part A [APP-095] and Figure 7.10 Landscape Mitigation Plan Part B [APP-144], provide additional environmental functions:
- Mounds 1 and 2, are located directly on top of a foot-and-mouth burial site. Here the depth of growing material has been increased to avoid unnecessary ground disturbance within the affected area;
  - Mounds 10 – 13, are intended to also provide essential barn owl mitigation; and
  - Mound 10 will be increased in height to 4 m to provide acoustic mitigation.
- 1.6.6. As part of the design development, a detention basin was proposed to be located in the same field as a scheduled prehistoric burial mound. Following consultation with Historic England this has been removed from the Scheme design. The detention basin could have



caused direct disruption and damage to features of the Scheduled Monument during construction and indirect effects during operation due to changes in water levels. Surface water flows from the removed detention basin will now be diverted to a detention basin located to the north of Charlton Mires Junction. Several of the proposed culverts, including West Cotting Burn, would be multifunction by incorporating a specified depth natural bed to encourage fish passage and/or a mammal ledge to encourage mammal passage. Wildlife culverts, such as West Shieldhill Culvert are also proposed, to provide mammal passage.

- 1.6.7. The scheme is multi-functional, as detailed above in Section 2 where regard through the EqIA and WCHAR analysis has been included in design for the relevant groups identified within those activities and reports. Whilst the proposed scheme is for a road improvement, its design does not preclude the existing and future non-car uses and users that are in the wider area.
- 1.6.8. Resilience (including for future adaptation through technical requirements) for this road is provided for in a new surface water drainage system would be installed to manage surface water runoff, ensure that flood risk to the Scheme and to people and places elsewhere does not increase. Appendix 10.5 Drainage Strategy Part A [APP-258] and Appendix 10.4 Drainage Strategy Part B [APP-314] includes a range of sustainable methods of attenuation and treatment, including filter drains, grassed storage swale and grassed detention basins. The drainage strategy would be 'future ready' with attenuation capacity for a 1 in 100-year storm event plus 20% climate change allowance.
- 1.6.9. The southern bank of the tributary of the Kittycarter burn at Patterson Cottage would be lowered. This is to ensure that localised surface water flooding issues are improved as part of the Scheme.
- 1.6.10. The new culvert along Kittycarter Burn would include a naturalised bed to encourage fish passage. In addition, the southern tributary of Kittycarter Burn would be diverted and realigned to the east of Charlton Mires Junction. Realigning Kittycarter Burn would reduce the length of culvert required at this location.
- 1.6.11. The new River Coquet Bridge would be constructed from weathered steel. The surface of this will oxidise forming a stable rusty patina protecting the structure from further corrosion and negating the need for regular maintenance including painting and so the use of Volatile Organic Compound (VOC) emissions would be avoided.
- 1.6.12. Waste minimisation and the need for (unnecessary) new materials has been included in the proposed scheme details for DCO. An approach of designing for natural resource optimisation has been implemented throughout the development of the design, which has sought to simplify layout and form, use standard sizes, and maximise the use of renewable or recycled materials resources so as to minimise the generation of waste and reduce the need for new materials. A Construction Environmental Management Plan (CEMP), incorporating a Site Waste Management Plan (SWMP) and Materials Management Plan (MMP) would be implemented in order to identify, monitor and manage materials and arisings on site to improve material and resource efficiency. Surplus earthworks (including

topsoil) generated by the Scheme may also be reused in additional bunds within the Order limits. If required, it is estimated that approximately 160,000 t of earthworks from Part A could be transported to and re-used on Part B. As far as possible materials with the least embedded carbon would be specified in order to minimise environmental impact.

- 1.6.13. The length of the Scheme would comprise of low-noise road surfacing asphalt which would provide betterment for noise receptors.
- 1.6.14. Resource use has been minimised through the retention of the existing A1 as the north-bound carriageway for the Scheme, with minimal change, except resurfacing. The number of overbridges has been limited to the minimum to reduce the need for raw materials for additional structures.

## 1.7 IS THOROUGH

- 1.7.1. *The result of robust processes that create a continual cycle of improvement, good road design starts with an in-depth understanding of people, place and context; learning from best practice worldwide. The design of all elements of the road environment are considered together and integrated into a responsive design.*
- 1.7.2. People, place and context have been considered through the design of the Scheme. Equality Impact Assessments (EqIA) have been carried out to ensure Part A and Part B are compliant with the Equality Act 2010. An EqIA for the Scheme as a whole (Part A and Part B combined) is currently being undertaken and will be submitted at Deadline 2. The EqIA also considered the needs and requirements of all users of the Scheme. The design has been informed by an iterative process of assessment, including environmental, design, traffic and economics assessments which have been undertaken. This began with a Feasibility Study (published in 2014) on the basis of which it was decided to progress the Scheme under the RIS for the current period 2015/16-2019/20, which is now referenced and repeated in RIS2 for 2020–2025. This has continued throughout the development of the design with extensive collaboration between the designers, engineers and environmental specialists. Through regular design integration meetings and mitigation workshops held during the preliminary design stage a collaborative and iterative approach to design has been adopted to ensure that all elements of the road environment are considered together to maximise community benefit, consider Stakeholders' needs and 'design out' any potentially adverse environmental effects.
- 1.7.3. Best practice is embedded in the road design. Current design standards contained in the Design Manual for Roads and Bridges (DMRB) have been applied in conjunction with best practice, including considering the geometry of the existing local road network to provide a design which is sympathetic and will not alter driver perception and induce higher vehicle speeds and potentially unsafe manoeuvres on side roads.
- 1.7.4. Assessment of route options was carried out at the Option Identification stage of the Scheme. These were subject to a desk-based environmental assessment completed with reference to the DMRB which identified key environmental constraints and requirements for further assessment, as well as considering which options provide opportunities for benefits

or enhancements. In keeping with the principals of good design, as well as environmental factors, the options appraisal also considered a wide range of issues including buildability, road safety, operational characteristics (including maintenance), network resilience and the effects on WCHs.

- 1.7.5. The Option Selection stage of the Scheme commenced to further consider options taken forward. Public consultation presented options to the public and other stakeholders for comment.
- 1.7.6. The preferred route options were progressed through a Preliminary Design stage and have been the subject of Environmental Impact Assessment (EIA). The EIA considered a wide range of environmental topics, namely air quality, cultural heritage, landscape and visual, biodiversity, geology and soils, material resources, noise and vibration, people and communities, road drainage and the water environment, climate change, and cumulative effects occurring incrementally with other projects.

## 1.8 IS INNOVATIVE

- 1.8.1. *Responding positively to change, good road design captures opportunities for betterment and develops in tandem with emerging new technologies. Designing to a standard is not the same as achieving good design; an innovative and resourceful approach that is mindful of context is necessary to achieve better outcomes.*
- 1.8.2. The impact of the Scheme has been minimised wherever possible through the 'designing out' of adverse impacts to the surrounding environment and, wherever possible, seeking enhancement. For example, the landscape design includes plans not just for the creation of habitat to mitigate habitat loss and fragmentation occurring as a result of the Scheme but also to go further than this where possible and result in ecological enhancement in the longer term and wherever possible seeking enhancement as follows:
- A detention basin has been removed from an environmental sensitive location (a field in which a Scheduled Monument is present) and flows diverted to a detention basin to the north of Charlton Mires Junction.
  - The landscape design includes plans not just for the creation of habitat to mitigate habitat loss and fragmentation occurring as a result of the Scheme but also to go further than this where possible and result in ecological enhancement in the longer term.
- 1.8.3. The Scheme design proposes a flexible composite pavement but unlike standard designs, an EME2 (Enrobé à module élevé class 2) asphalt binder overlay, together with a low noise surfacing, has been chosen. This variant has never been implemented in a flexible composite pavement design on a Highways England road before. EME2 is the generic title for high strength, long life asphalt base and/or binder and is superior to conventional asphalt mixes. By using analytical design models, construction thickness has been optimised and costs reduced as well. This same analytical process would be adopted to optimise the inlay / overlay of the existing carriageway that is to be incorporated into the permanent works.

- 1.8.4. The Scheme would incorporate an experimental bat culvert as part of mitigation to maintain bat flight paths across the Scheme (referenced as Wildlife Eshott Burn Culvert [APP-107]). The culvert has been deemed experimental as there is no known evidence to support bat usage of a culvert of its size. However, the Scheme is incorporating this solution as an innovative way to seek to mitigate the Scheme's effects. The use of the bat culvert will be monitored post-construction and has been captured in A-B45 of the updated Outline Construction Environmental Management Plan (CEMP) and is submitted at Deadline 1. The results of the monitoring undertaken would determine the effectiveness of the mitigation and inform any alterations to designed mitigation, if required. The findings would also inform the design of future schemes.
- 1.8.5. The Scheme proposes single span overbridges with a prestressed precast concrete beam deck in integral form with supports (columns) within reinforced soil wall abutments to enable more efficient use of precast beams and eliminating the need for expansion joints and bearings. The proposed design for the Burgham underbridge and the extension of Parkwood subway is also integral with a prestressed precast concrete beam deck.

## **1.9 IS COLLABORATIVE**

- 1.9.1. *Collaboration ensures roads are useful to and accepted by the communities they serve. Collaborative working requires a rigorous process that identifies dependencies and wider opportunities and facilitates effective communication and engagement from the start. Community engagement will be led by a local sense of culture, place and value.*
- 1.9.2. Collaborative working has taken place between the design team, ecologists and landscape specialists to develop a mitigation and enhancement strategy that avoids unnecessary clearance of screening vegetation during the construction phase, a suitable strategy to address the loss of ancient woodland and specifies interplanting to reinforce existing and retained screening.
- 1.9.3. Both statutory and options consultation has played a key role in shaping the Scheme. A consultation brochure presented options considered during the Options Selection Stage. Furthermore, as part of the development of the Scheme, engagement outside non-statutory and statutory consultation periods has continued, and has resulted in implemented design changes, as presented in Table 26 of the Consultation Report [APP-021]. Examples include amended PMA alignment at Warreners House and New Houses Farm to negate land severance and minimise land take, relocation of proposed detention basins throughout the length of the scheme, Fenrother free-flow link between Fenrother junction and the de-trunked carriageway and re-location of the ancient woodland compensation planting.
- 1.9.4. A Statement of Community Consultation was produced (see Appendix N of the Consultation Report [APP-021]) (to set out the Applicant's approach to consulting with people living in the vicinity of the Scheme. This includes a range of methods from public consultation events, telephone calls with NCC, deposited documentation, letters and consultation documents and newspaper notices. Targeted consultation with specific landowners has also been undertaken to have due regard to additional matters not previously consulted on.

- 1.9.5. Furthermore, engagement with stakeholder groups has continued throughout the EIA, and since, for the purposes of data collection and discussion and collaboration on assessment methodology and mitigation. This has included the establishment of a Stakeholder Reference Group made up of a wide range of bodies including the Applicant, NCC, Historic England, Environment Agency, Northumberland Area of Ramblers, Arriva, Northumberland Tourist Board, to provide a means for the Applicant to seek the local and technical expertise on relevant issues and local knowledge on the sense of place from an early point in the Scheme development. Core responders (emergency services) have also been consulted to enable the Applicant to develop the Scheme design with the emergency services.

## 1.10 IS LONG LASTING

- 1.10.1. *With quality materials and careful detailing, good road design brings lasting value. The design process requires sufficient time for challenges to be resolved before delivery and is adaptable to future needs and technologies as part of the commitment to whole-life operation, management and maintenance.*

The Scheme has been designed for efficient maintenance, by:

- Complying with the Construction Design and Management (CDM) Regulations 2015;
  - Applying the DMRB Interim Advice Note: Designing for maintenance (IAN) 69/15 to ensure that design for maintenance is considered during the design and construction of roads, roadside structures, and associated technology
  - Ensuring a maintenance access hierarchy has been applied to determine the most appropriate method of access to maintain infrastructure.
- 1.10.2. Network maintenance access tracks have been included on the Scheme. This would involve the Applicant using the local road network and / or third-party land to park vehicles close to the assets, eliminating the need for Temporary Traffic Management and lane closures. Where a PMA is required to access Scheme assets, permanent access rights have been included within the Order limits.
- 1.10.3. Where native hedgerow is to be provided as essential mitigation measures, a three-metre maintenance strip has been provided for long term hedge maintenance.
- 1.10.4. Woodland planting has been designed in accordance with the requirement of having a two-metre offset from the boundary fences to allow future access and five metres from the edge of the carriageway for all planting. Additionally, it would be ensured that climax tree species (i.e. less passively safe) are planted furthest away from the carriageway and smaller trees and shrubs (i.e. passively safe) are planted towards the front of the site.
- 1.10.5. The design ensures the long-term structural stability of the operational highway. The proposed discharge rate from impermeable areas would be set at the current greenfield runoff rate by flow control devices and the use of attenuation features including, for example, detention basins. Attenuation would generally be provided for in the case of a 1 in 100-year event, plus 20% climate change allowance.



- 1.10.6. The pavement design uses an innovative EME2 composite which is a high modulus asphalt, super rut resistant, fatigue resistant and moisture resistant. It was created to build stronger, thinner, longer-lasting pavements. EME2 would offer superior design life over conventional asphalt mixes normally adopted for this type of construction.
- 1.10.7. Precast reinforced concrete elements are proposed as their quality control and safety in manufacturing are higher than cast in-situ options. Higher quality control of reinforcement and pre-stressed concrete cover provide further guarantees of higher durability performance.
- 1.10.8. Avoidance, where possible, of piers at central reserve (choice of single span bridges preferred) and expansion joints (making structures integral), would reduce and eventually avoid a significant amount of maintenance tasks throughout the structures' lifetime.



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