A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010041

6.1 Environmental Statement – Chapter 2 The Scheme

APFP Regulation 5(2)(a)

Planning Act 2008

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

June 2020

Infrastructure Planning

Planning Act 2008

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

The A1 in Northumberland: Morpeth to Ellingham

Development Consent Order 20[xx]

Environmental Statement

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2. THE SCHEME

2.1. CASE FOR THE SCHEME

2.1.1. The A1 is a route of national importance that plays an essential strategic role linking London with Edinburgh. It is one of the country's longest roads, forming part of the Strategic Road Network (SRN), consisting of motorway and dual carriageways with some sections of single carriageway including between Morpeth and Ellingham.

2.1.2. The A1 also plays an important regional role within Northumberland, providing a local route for commuters, holiday makers and agricultural traffic as well as accommodating a higher than average proportion of Heavy Goods Vehicles (HGVs) using the route.

2.1.3. As set out on page 13 of 'Investing in Britain's Future' published in 2013 (**Ref. 2.1**) the A1 in Northumberland is considered to be *"one of the most notorious and longstanding road hotspots in the country"* The need to improve the stretch of road between Morpeth and Ellingham is a longstanding policy objective, of the Alnwick Wide District Local Plan (1997), specifically safeguarding this stretch of road with the aim of delivering the '*upgrading of the A1 Trunk Road'*.

2.1.4. The A1 North of Newcastle Multi-Modal Study, published in 2002, (**Ref. 2.2**) appraised a number of scenarios to improve the A1 between Newcastle and the Scottish Border. These included the dualling of the A1 from Morpeth to Felton and localised improvements between Alnwick and Berwick to improve operations on the trunk road and its accident record. A dualling strategy also specifically considered dualling from Charlton Mires to the south end of the existing short section of dual carriageway at North Charlton.

2.1.5. The A1 North of Newcastle Study published in 2011 (**Ref. 2.3**) considered the evidence that could support options to tackle transport challenges on the A1 corridor between Morpeth and the Scottish border. As part of the study, stakeholder groups in the area were consulted and the following issues were identified:

a. Concerns about the lack of overtaking opportunities.
b. The belief that there is an opportunity to improve regional connectivity and to deliver regeneration opportunities in the North East by improving the A1.
c. The belief that the A1 does not adequately cater for the region's needs and is a barrier to employment and investment in the North East of England.
d. That any improvement to the A1 would need to maintain access to Northumberland's key tourist sites whilst maintaining local environmental qualities.

2.1.6. Based upon these identified issues, a set of study specific objectives were developed that were used to assess the potential impact of a range of transport interventions and packages. These included Network Enhancement Measures such as: "*Highway improvements including the previously identified Morpeth to Felton and Adderstone to*

Belford dualling schemes, as well as provision of overtaking lanes and other junction improvements or small sections of dualling."

2.1.7. Following the 2013 Spending Review, the Government published "*Investing in Britain's Future*". As part of that investment programme, the Government announced a number of feasibility studies to examine problems on the SRN and to identify potential solutions to '*some of the most notorious and longstanding road hot spots in the country*', including the A1 to the north of Newcastle. Similarly, the Autumn Statement 2014 committed to "*Dualling of the A1 as far as Ellingham".*

2.1.8. The A1 North of Newcastle Feasibility Study (the 2015 Feasibility Study), which commenced in February 2014 and was published in 2015 (**Ref. 2.4**), considered the potential opportunities to improve some or all of the A1 between its junction with the A19 at Seaton Burn and the Scottish border. The 2015 Feasibility Study identified a number of issues on the A1 between Morpeth and Ellingham (A1 in Northumberland: Morpeth to Ellingham (the Scheme)), and that the future investment package should include the dualling of the A1 between Morpeth and Felton (Part A: Morpeth to Felton (Part A)) and between Alnwick and Ellingham (Part B: Alnwick to Ellingham (Part B)). The key issues identified in the 2015 Feasibility Study for the whole of the A1 North of Newcastle include:

a. Lack of alternative routes.
b. Inconsistent carriageway standards on the route.
c. Poor junction standards / layout.
d. Large number of at-grade junctions / Private Means of Access (PMAs).
e. Average speeds on the single carriageway sections of the route are significantly lower than sections that have been upgraded to dual carriageway.
f. Relatively high proportion of Heavy Goods Vehicles (HGVs) (and agricultural vehicles) resulting in reduced speeds for following vehicles and potential for driver frustration.
g. Lack of overtaking opportunities.
h. Peak hour traffic speeds significantly below free flow speeds - analysis of TrafficMaster data shows that peak hour traffic speeds are significantly lower than average off-peak speeds.

2.1.9. The 2015 Feasibility Study identified Part A as being the slowest section of the A1 North of Newcastle, with 12 hour average speeds of 50 mph and the majority of the links experiencing 10-20% delay. In contrast, the 2015 Feasibility Study also noted that, in general, dual carriageway sections of the A1 North of Newcastle '*do not experience delay*'.

2.1.10. The findings of the 2015 Feasibility Study were endorsed by the Road Investment Strategy (RIS) for the period 2015/16 - 2019/20, which announced an investment package including the dualling of the A1 between Morpeth and Ellingham. Improvements to the A1 between Morpeth and Ellingham is also included as a committed scheme in the RIS for the period 2020 - 2025 (**Ref. 2.5**). The RIS comprises the Government's investment programme for the road network and Section 3(6) of the Infrastructure Act 2015 places a duty on the Secretary of State to comply with the provisions of the RIS.

2.1.11. As well as presenting the issues identified in the above studies, the **Case for the Scheme** (**Application Document Reference: TR010041/APP 7.1**) identifies the main issues that presently affect traffic travelling along this stretch of the A1 as being:

a. A lack of overtaking opportunities along the single carriageway due to a significant proportion of HGVs using the route, which means overall speed is reduced and it is not safe for other vehicles to overtake. This results in:

i. Driver frustration and the potential for unsafe manoeuvres being undertaken.
ii. A significant level of variability in journey times, which reduces the reliability of the network.

b. The local road network does not provide sufficient alternative routes to the A1 as the vast majority of these routes head east west. When incidents occur on this stretch of the A1, impacts on strategic north south traffic and local road users include significant delays on the A1 or the requirement to undertake long diversions on unsuitable roads.

c. A number of junctions and PMAs along the route can result in increases in delays and increased likelihood of accidents as vehicles enter the main carriageway or slow down to exit.

2.1.12. In addition, traffic flows on the route are highly seasonal and the issues described above are exacerbated during the summer months. An analysis of observed daily traffic flows shows that daily flows in July and August are approximately 18% and 22% higher for Part A and 19% and 32% higher for Part B than the annual average respectively.

2.1.13. The A1 in Northumberland: Morpeth to Ellingham (the Scheme) is designed to address the issues set out in **paragraphs 2.1.8** to **2.1.11**, improve the safety and speed of journeys along the route, and increase resilience along the network.

2.1.14. In summary, there is longstanding support at national and local levels of planning, transport and economic policy for the principle of dualling the A1 in Northumberland. The Scheme's fulfilment of the strategic objectives of the National Policy Statement for National Networks (NPS NN) is detailed in **Section 3.7** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**). Similarly, as detailed in **Section 3.5** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP 7.1**), in addition to being a committed scheme in the RIS, the Scheme would contribute towards the objectives of the Castle Morpeth District Local Plan, Alnwick District Wide Local Plan, Emerging Northumberland Local Plan, Northumberland Local Transport Plan and Northumberland Economic Strategy 2015 – 2020.

2.2. SCHEME OBJECTIVES

2.2.1. The Scheme objectives have been identified to address the issues identified in **Section 2.1** above. The objectives of the Scheme are to:

a. Improve journey times on this route of strategic national importance.
b. Improve network resilience and journey time reliability.

c. Improve safety.
d. Maintain access for local traffic whilst improving conditions for strategic traffic.
e. Facilitate future economic growth.

2.2.2. **Section 3.6** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**) details how each of these objectives have been fulfilled by the Scheme.

2.2.3. In addition, the design of the Scheme would be carried out in accordance with the Performance Specification set out in the 2015 RIS (**Ref. 2.5**), which identified targets and requirements relating to the environment, cyclists, walkers and other vulnerable users of the network (such as horse riders). The Scheme would also seek to support the aim of no net loss of biodiversity.

2.3. SCHEME LOCATION

2.3.1. The Scheme is located within the county of Northumberland and forms part of the Applicant's strategic road network (SRN). It comprises the following:

a. Part A is located on the A1 between Warreners House Interchange at Morpeth (at approximately easting: 418218, northing: 588444 and the existing dual carriageway at Felton (at approximately easting: 417482, northing: 600795). It is approximately 12.6 km in length.
b. The southern extent of Part B is located approximately 15 km north of the northern extent of Part A and is located along the A1 between Alnwick (at approximately easting: 420007, northing: 614583) and Ellingham (at approximately easting: 416944, northing 623054). It is approximately 8 km in length.

2.3.2. The Scheme location is provided on the **Location Plan** (**Application Document Reference: TR010041/APP/2.1**). Location plans are also provided in **Figure 1.1: Location Plan: Part A** of this ES and in **Figure 1.2: Location Plan: Part B** of this ES.

2.3.3. The Order Limits comprise all the land required to build and operate the Scheme, whether required temporarily for construction purposes or on a permanent basis and are described in **Section 4.1** of **Chapter 4: Environmental Assessment Methodology** of this ES. The Order Limits, within which powers are being sought pursuant to the application for a DCO and of which this ES forms part of the application, are also shown in **Figure 4.1: Boundary Plan: Part A** of this ES**, Figure 4.2: Boundary Plan: Part B** of this ES, and also on the **Land Plans** (**Application Document Reference: TR010041/APP/2.2**).

OVERVIEW OF SURROUNDING AREA

2.3.4. The surrounding area to the Scheme is a generally open and rural landscape of medium to large scale intensive farmland with arable and pasture fields enclosed by hedgerows, some tree-lined, and some stone walls, as shown in **Figure 2.1: Environmental Constraints Plan: Part A** and in **Figure 2.2: Environmental Constraints Plan: Part B** of this ES. The following text describes the area surrounding the Scheme.

2.3.5. The Scheme also includes land proposed to be temporarily used as a main construction compound for the Scheme (Main Compound). The Main Compound would serve both Part A and Part B and is described in this chapter under Part A in which is it situated. **Chapter 4: Environmental Assessment Methodology** of this ES sets out the approach to the assessment of the impacts associated with the establishment and use of the Main Compound in this ES.

Part A

2.3.6. There are numerous small areas of woodlands, both conifer plantations and broadleaf woodland adjacent to the A1. The southern extent of Part A is located within designated Green Belt, as shown in **Figure 7.10: Green Belt**, **Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)). The area around Part A is moderately elevated (generally between about 80 m and 150 m Above Ordnance Datum (AOD)) and gently rolling with the topography generally falling towards the coast to the east.

2.3.7. The towns of Morpeth and Felton constitute the main urban areas near to Part A. In addition, smaller hamlets or villages, such as Hebron, Fenrother and Espley, are near to Part A and are interspersed along its length. Isolated residential and commercial properties lie within close proximity, together with farm holdings and community facilities. The Tritlington Church of England First School is located adjacent to Part A, situated along the existing section of the A1 just north of Priest's Bridge (refer to **paragraph 2.5.44** to **2.5.55** for clarification of the 'de-trunked section'). A network of Public Rights of Way (PRoW) surrounds, and at some locations, crosses Part A. This network includes the St Oswald's Way long-distance walking route, which follows the route of the River Coquet under the existing A1.

2.3.8. The nearest Air Quality Management Area (AQMA) to Part A is Newcastle City Council AQMA No.5 (Gosforth), which is approximately 6.5 km to the south. Two Noise Important Areas (NIA) lie adjacent to Part A: one at Northgate Farm adjacent to the southbound side of the A1 just north of Morpeth and the other at Field View adjacent to the southbound side of the A1.

2.3.9. Part A lies within areas designated as an Area of High Landscape Value (AHLV), predominately the northern extent around the River Coquet. Key visual receptors include individual rural and commercial properties and recreational viewpoints from PRoW.

2.3.10. The Northumbria Coast Special Protection Area (SPA) and Ramsar, Northumberland Marine SPA and North Northumberland Dunes Special Areas of Conservation (SAC) are located within 10 km of Part A. The River Coquet and Coquet Valley Woodlands Site of Special Scientific Interest (SSSI), the Coquet River Felton Park Local Wildlife Site (LWS) and the Dukes Bank Ancient Woodland are located within the Order Limits of Part A. The Order Limits of Part A and surrounding area also contains multiple priority or notable habitats and records of, or potential for, numerous protected or notable species including, for example, great crested newts, bats, barn owls and breeding birds.

2.3.11. Within the Order Limits of Part A, there are 6 designated heritage assets (Grade II Listed mileposts), nine non-designated assets and fifteen areas identified as being of potential to contain further non-designated remains, which have the potential to be directly impacted as a result of Part A. There are 18 historic landscape types recorded within the Order Limits of Part A.

2.3.12. Within a 1 km boundary of Part A, there are 61 Listed Buildings, one Scheduled Monument (Felton Old Bridge) and two Conservation Areas (Felton and West Thirston). Six of the historic buildings lie on or adjacent to the carriageway and comprise Grade II mileposts.

2.3.13. Part A crosses, or lies near to a number of watercourses, with the River Coquet and Longdike Burn (located north of Causey Park Bridge) designated as Main Rivers. The majority of Part A would be located within the low-risk Flood Zone 1 (where the risk of fluvial flooding is less than 1 in 1000 (0.1%) in any year). However, some sections would be located in the medium-risk Flood Zone 2 (where the risk of fluvial flooding is between 1 in 1000 (0.1%) and 1 in 100 (1%) in any year) and the high-risk Flood Zone 3 (where the risk of fluvial flooding is greater than 1 in 100 (1%) in any year).

2.3.14. The majority of Part A is underlain by Secondary A Aquifer in the bedrock and by Secondary (undifferentiated) Aquifer in the superficial deposits. The sands and gravels are classified as a Secondary A Aquifer along the River Coquet and Longdike Burn. The southern section of Part A, just to the north of Morpeth, is located within a Source Protection Zone (SPZ).

2.3.15. The Preliminary Sources Study Report (PSSR) (2016) for Part A (refer to **Appendix 11.1: Preliminary Sources Study Report, Volume 7** of this ES (**Application Document Reference: TR010041/APP/6.7**)) identifies two coal mining areas, one at Causey Park Hagg and the other adjacent to Eshott Airfield. The PSSR also indicates that there are nine mine entries within 200 m of the Order Limits of Part A. Unrecorded mine entries may occur in addition to these. The Unexploded Ordnance (UXO) hazard plan contained in the PSSR considers the site to be a low risk of encountering below ground UXO.

Main Compound

2.3.16. The Main Compound is located approximately 1.5 km south west of Felton within Part A, and approximately 16 km south of the Part B Main Scheme Area. This temporary construction compound would be used for both Part A and Part B.

2.3.17. The Main Compound is bordered by existing tree and hedgerow planting on all boundaries. There are a number of residential receptors within the vicinity of the Main Compound: West Moor Houses located 400 m west of the A1; Glenshotten situated 480 m north east of the Main Compound; and Thirston New Houses located 200 m east of the Main Compound. Eshott Airfield is located immediately south of the Main Compound, with the Main Compound located within Eshott Airfield's safeguarding zone. There are no National Trails, National Cycle Routes or PRoW within 500 m of the Main Compound. The nearest AQMA to the Main Compound is the Newcastle City Council's AQMA No.5 (Gosforth), which is

approximately 34 km to the south of the Main Compound. There are no NIAs within 1 km of the Main Compound.

2.3.18. A single statutory nature conservation site is located within 2 km of the Main Compound; the River Coquet and Coquet Valley Woodlands SSSI, which is located approximately 500 m north of the Main Compound. Coquet River Felton Park LWS is also located approximately 500 m north of the Main Compound. Additionally, habitats at the boundary of the Main Compound provide some value for nesting birds.

2.3.19. There is one Grade II listed milepost recorded within the Main Compound boundary although a recent site inspection failed to locate it in this location. The Main Compound lies within one historic landscape character type. There are three non-designated assets recorded within 500 m of the Main Compound (two below ground assets and one built heritage asset). There are nine designated built heritage assets within 1 km of the Main Compound.

2.3.20. The Main Compound is located in close proximity to one watercourse; an unnamed tributary of the Thirston Burn which flows along its northern boundary. The unnamed tributary of Thirston Burn discharges into the Thirston Burn approximately 2 km downstream of the Main Compound. The Thirston Burn discharges into the River Coquet approximately 3 km downstream of the Main Compound. At this location and immediately north of the Main Compound, the River Coquet is a Main River and forms part of the River Coquet and Coquet Valley Woodlands SSSI. A surface water pond is also located approximately 400 m to the south east of the Main Compound. The bedrock geology is classified as Secondary A Aquifer and the majority of the superficial deposits are classified as Secondary A Aquifer. There are no active or historical landfills within 250 m of the Main Compound.

2.3.21. The Main Compound is located within the low-risk Flood Zone 1 where the risk of flooding from fluvial sources is less than 1 in 1,000 (0.1%) in any year. The Main Compound is also at low risk of flooding from surface water sources.

Part B

2.3.22. There are numerous small areas of woodlands adjacent to the existing A1. To the east, the landform gradually rises to approximately 100 m AOD near Rennington Moor. To the west, the land is slightly hillier with more undulations and a high point of approximately 140 m AOD near White House Folly. A number of natural resources and areas classified or protected under legislation and policy are located within the corridor and surrounding area as detailed below.

2.3.23. Part B comprises two sections for assessment purposes as shown in **Figure 1.2: Location Plan: Part B** of this ES. The two sections of Part B are:

a. **Part B Main Scheme Area**: The area within the Order Limits between Alnwick and Ellingham including Charlton Mires Site Compound. Charlton Mires Site Compound is

located within the Order Limits to the east of the existing A1, in a field to the south of Charlton Mires.

b. **Lionheart Enterprise Park Compound**: A construction compound located to the south of Alnwick in Lionheart Enterprise Park. The Lionheart Enterprise Park Compound is split into two sites (eastern site and western site) which are located either side of the existing Highways England maintenance depot.

2.3.24. In addition, for assessment purposes, Part B also addresses the:

a. **Main Compound**: The construction compound, which would be located within Part A, to the west of Thirston New Houses. It would be shared by Part A and Part B. The overview of the surrounding area of the Main Compound is described above in Part A.

2.3.25. The three construction compounds (Charlton Mires Site Compound; Lionheart Enterprise Park Compound; and Main Compound in relation to its use by Part B) are collectively called the Compounds in the assessment of Part B. The location of the Charlton Mires Site Compound and the Lionheart Enterprise Park Compounds is shown in **Figure 2.6: Temporary Construction Works: Part B** of this ES. The location of the Main Compound is shown on **Figure 2.5: Temporary Construction Works: Part A** of this ES.

Part B Main Scheme Area

2.3.26. The largest town within 5 km of the area of permanent works in Part B is Alnwick, which is located south-west of the most southern extent of the Part B Main Scheme Area. Smaller hamlets and villages such as Denwick, South Charlton, North Charlton and Brownieside are interspersed throughout the length of the Part B Main Scheme Area. In addition, isolated residential dwellings, commercial properties and several farms lie adjacent to the Part B Main Scheme Area, within the Order Limits of Part B. A network of PRoW cross and lie within 500 m of the Part B Main Scheme Area. There are no National Cycle Routes or National Trails within 500 m of the Part B Main Scheme Area.

2.3.27. The nearest AQMA to Part B is the Newcastle City Council's AQMA No.5 (Gosforth), which is approximately 46 km to the south of Part B. There are no NIAs within 1 km of Part B; the closest is approximately 3.8 km north of Part B.

2.3.28. Alnwick Castle Registered Park and Garden is located approximately 900 m to the south west of the Part B Main Scheme Area. Northumberland Coast Area of Outstanding Natural Beauty (AONB) lies approximately 3 km to the east of the Part B Main Scheme Area at its closest point. The former[1] Kyloe Hills and Glendale AHLV and intermediate area of landscape value are situated approximately 320 m north of the Part B Main Scheme Area. In addition, an unnamed former[1] area of high landscape value is situated approximately

[1] This is a former designation because the designation was in the Alnwick District Local Plan, which has since been superseded.

250 m to the west of the Part B Main Scheme Area. Key visual receptors include individual rural properties and recreational viewpoints from PRoW.

2.3.29. No statutory ecological sites are located within the Order Limits of the Part B Main Scheme Area. Four Special Areas of Conservation (SAC), one Special Protection Area (SPA) as well as one SPA and Ramsar site are located within 10 km of the Part B Main Scheme Area. Longhoughton SSSI is located 1.9 km south east of the Part B Main Scheme Area and Hulne Park LWS is situated 1.5 km west of the Part B Main Scheme Area. There is no ancient woodland within 1 km of the Part B Main Scheme Area, but Swineclose wood is an area of ancient semi-natural woodland 5.18 hectares (ha) in size, located 1.6 km to the north east of the Part B Main Scheme Area. The Order Limits of the Part B Main Scheme Area and surrounding area also contains habitats of principal importance and records of, or potential for, numerous protected or notable species including, for example, bats, barn owls and breeding birds.

2.3.30. There are no designated built heritage assets within the Order Limits of Part B. There are seven Scheduled Monuments located within 1 km of the Part B Main Scheme Area. Two Scheduled Monuments (North Charlton Medieval Village and open field system and Camp at West Linkhall) abut the Order Limits of Part B and two are located in close proximity (approximately 5 m (Ellsnook Round Barrow, 175 m north-east of Heiferlaw Bridge) and 20 m (Prehistoric Burial Mound, 420 m north-west of East Linkhall)) to the Order Limits of Part B.

2.3.31. There are also 38 Listed Buildings, with two of the Listed Buildings also designated as Scheduled Monuments, the Grade I Alnwick Castle Registered Park and Garden, and Rock Conservation Area within 1 km of the Order Limits of Part B. A total of 48 non-designated heritage assets, which were identified via the Historic Environment Record (HER) and through the assessment, are within 500 m of the Order Limits of Part B. Two non-designated built heritage assets (Milepost north of Shipperton Bridge and Charlton Mires) and three non-designated below ground heritage assets (Stone Cists and Tumulus, two flint flakes of Neolithic and Bronze Age date, and earthworks at Heckley House) are within the Order Limits of the Part B Main Scheme Area. There are 9 historic landscape types recorded within the Order Limits of the Part B Main Scheme Area. There is also potential for underground unknown buried archaeological remains.

2.3.32. The majority of the Order Limits of the Part B Main Scheme Area is located in the low risk Flood Zone 1 where the risk of flooding from fluvial sources is less than 1 in 1,000 (0.1%) in any year. However, there are small areas of Flood Zones 2 and 3 at the southern section of the Order Limits of the Part B Main Scheme Area to the north-west of Denwick, and to the east of Shipperton Bridge, where the risk of flooding from fluvial sources is greater than 1 in 100 in any year. It should be noted the Part B alignment is not located within Flood Zones 2 and 3. Sections of the Order Limits of the Part B Main Scheme Area are at high, medium and low risk of flooding from surface water sources.

2.3.33. The Part B Main Scheme Area alignment would cross five watercourses and their associated tributaries. There are no main rivers within 500 m of the Part B Main Scheme Area.

2.3.34. The Part B Main Scheme Area is underlain by Secondary A Aquifer in the bedrock. The majority of the Part B Main Scheme Area is underlain by Secondary (undifferentiated) Aquifer in the superficial deposits. Small sections of superficial deposits classified as Secondary A Aquifer are located in the northern and southern sections of the Part B Main Scheme Area. The Part B Main Scheme Area is not located within a SPZ.

2.3.35. The PSSR (2017) for Part B (refer to **Appendix 11.1: Preliminary Sources Study Report, Volume 8** of this ES (**Application Document Reference: TR010041/APP/6.8**)) identifies that Part B Main Scheme Area is underlain by known coal seams which may have been worked in the past. The PSSR suggests that there is low risk level for UXO.

2.3.36. The Charlton Mires Site Compound would be located in an agricultural field to the east of the existing A1 and south of Charlton Mires. Refer to **Figure 2.6: Temporary Construction Works: Part B** of this ES The southern unnamed tributary Kittycarter Burn is situated along the eastern and southern extent of Charlton Mires Site Compound. The hydraulic model undertaken for Part B has identified that the Charlton Mires Site Compound is at risk of fluvial flooding from the southern unnamed tributary of Kittycarter Burn. A hedgerow also lines the eastern and southern extent of Charlton Mires Site Compound. It is understood that Charlton Mires Site Compound is underlain with Secondary A aquifer in the bedrock as well as Secondary A and Secondary (undifferentiated) aquifer in the superficial deposits.

Lionheart Enterprise Park Compound

2.3.37. The Lionheart Enterprise Park Compound is located approximately 4 km south of the Part B Main Scheme Area, to the south of Alnwick. The Lionheart Enterprise Park Compound is split into two sites (eastern site and western site); with a site located either side of the Applicant's existing maintenance depot. The Lionheart Enterprise Park Compound would utilise an area that has been identified within the local plan for commercial development. It is anticipated that the temporary use of the Lionheart Enterprise Park Compound would not impact on commercial development at this location, because it is likely that the temporary use would be complete before the land is used for commercial development.

2.3.38. The Lionheart Enterprise Park Compound is bordered by an existing hedgerow to the south of the eastern site and majority of the western site. An existing industrial estate is located to the north of both sites and an existing PRoW to the west of the western site. There is a total of five PRoW within 500 m of the Lionheart Enterprise Park Compound. No National Trails or National Cycle Routes are located within 500 m of the Lionheart Enterprise Park Compound. The Genix Healthcare NHS Dentist is situated approximately 150 m from the Lionheart Enterprise Park Compound. The Duchess's Community High School is located approximately 500 m to the west of the Lionheart Enterprise Park Compound.

2.3.39. The nearest AQMA to the Lionheart Enterprise Park Compound is the Newcastle City Council's AQMA No.5 (Gosforth), which is approximately 45 km to the south. There are no NIAs within 1 km of the Lionheart Enterprise Park Compound. Sensitive receptors are predominantly commercial as the Lionheart Enterprise Park Compound is located on an industrial estate. The nearest residential receptor is the new Hogs Head Inn and hotel approximately 400 m to the west.

2.3.40. No statutory ecological designated sites are located within 2 km of the Lionheart Enterprise Park Compound. However, habitats at the boundary of the Lionheart Enterprise Park Compound provide some value for nesting birds where clearance is required for access.

2.3.41. Four Grade II listed buildings lie within 1 km of the Lionheart Enterprise Park Compound, but none are located within it. There are two landscape character types. Part of the Lionheart Enterprise Park Compound has already been subject to archaeological evaluation as part of an earlier Highways England planning application for the maintenance depot and access road (Ref. 16/04691/FUL). The surveys identified furrow type features and drains of negligible importance.

2.3.42. The Lionheart Enterprise Park Compound is located within 500 m of two ordinary watercourses; the Willow Burn and the Cawledge Burn which are both located to the south. Superficial deposits underlying the Lionheart Enterprise Park Compound consists of Glaciofluvial deposits (Devensian) consisting of sand and gravel. The majority of the superficial deposits are classified as Secondary A Aquifer.

2.3.43. The Lionheart Enterprise Park Compound is also located within the low-risk Flood Zone 1 where the risk of flooding from fluvial sources is less than 1 in 1,000 (0.1%) in any year. There is a small area 400 m to the south that is in the high-risk Flood Zone 3 where the risk of flooding from fluvial sources is greater than 1 in 100 in any year, however the Lionheart Enterprise Park Compound is at low risk of flooding from surface water sources. The land immediately adjacent to the Cawledge Burn is at a medium risk of surface water flooding; however, this land is located outside the Order Limits of the Lionheart Enterprise Park Compound.

2.3.44. A historical landfill site, East Cawledge, is located 186 m to the north of Lionheart Enterprise Park Compound. Records show that the historical landfill was first recorded in 1927 and last recorded in 1972, there are no details relating to the waste types deposited.

2.4. BASELINE SCENARIO

2.4.1. Paragraph 3 of Schedule 4 to the EIA Regulations requires 'a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the Scheme as far as natural changes from the baseline scenario can be assessed within reasonable effort on the basis of the availability of environmental information and scientific knowledge'.

2.4.2. The baseline scenario and future baseline (how the baseline conditions would change and evolve in the future, without the introduction of the Scheme) for each environmental topic is discussed within the **Technical Chapters 5** to **15**, **Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for Part A and of **Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for Part B.

2.4.3. Information concerning other future proposed developments that are likely to change baseline conditions in the vicinity of the Scheme are presented in **Chapter 16: Assessment of Cumulative Effects**, **Volume 4** of this ES (**Application Document Reference: TR010041/APP/6.4**).

2.4.4. In the future, wider environmental changes are predicted to occur over time as a consequence of factors such as climate change, which could increase the risk and intensity of flood events and affect the road network. For Part A refer to **Chapter 10: Road Drainage and the Water Environment, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) and **Chapter 14: Climate, Volume 2** of this ES for further information. For Part B refer to **Chapter 10: Road Drainage and the Water Environment, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) and **Chapter 14: Climate, Volume 3** of this ES for further information.

2.4.5. The text below provides an overview of the baseline scenario relevant to Part A and Part B.

PART A

2.4.6. The existing A1 between Morpeth and Felton consists solely of single carriageway (i.e. one lane in each direction) standard highway. The speed limit for the existing A1 is 60 mph. A footway is adjacent to the east of the existing A1 between the A697 junction and Hebron road and also to the east of existing A1 between Tritlington Church of England First School and Causey Park Hag Lodge. There are nine lay-bys (two bus stop lay-bys and seven parking lay-bys) along the existing A1 which would be removed by Part A.

2.4.7. Existing junctions and structures along the existing A1 between Morpeth and Felton are shown on **Figure 2.3: Existing Junctions and Structures: Part A** of this ES, and comprise the following:

a. Junction between the existing A1 and the A697, comprising a northbound slip road and an overbridge for the southbound slip road.
b. Approximately 39 at-grade junctions comprising 20 direct accesses to property and 19 minor side road or informal field access.
c. Existing overbridge for the B6345.
d. Parkwood Subway: The existing structure is an in situ reinforced concrete box structure with reinforced concrete wing walls.
e. River Coquet bridge: The superstructure comprises three continuous spans of 49 m, 83 m and 49 m in a straight horizontal alignment, with a total length of 181 m.
f. Neither the existing A1 or immediate connecting roads between Morpeth and Felton are currently lit.

2.4.8. Surface water runoff from this section of the existing A1 is currently collected by a system of gullies and transported to a number of outfalls to various watercourses along the existing A1 through an underground piped system. There are also sections of combined kerb drainage and filter drains.

Main Compound

2.4.9. Felton Road is located to the south of the Main Compound. There is an existing at grade junction (junction at the same level or height to the road it connects with) between the A1 and Felton Road, located approximately 250 m west of the Main Compound at its closest point.

PART B

2.4.10. The text below provides an overview of the baseline scenario for Part B. The baseline scenario for the Main Compound is set out for Part A above.

Part B Main Scheme Area

2.4.11. The existing A1 between Alnwick and Ellingham consists solely of single carriageway (i.e. one lane in each direction) standard highway. The speed limit for the existing A1 is 60 mph. There are three existing bus stops along this section of the existing A1 and the surrounding road network, including one formal bus stop (with the relevant road markings and infrastructure) and two informal bus stops (where the driver stops by demand or where drivers collect passengers at an informal stop). The formal bus stop (South Charlton, Charlton Mires bus stop) is located southbound on the A1 near the existing junction at Charlton Mires. An informal bus stop (South Charlton, Charlton Mires bus stop) is located northbound on the A1, north of the B6347 near Charlton Mires.

2.4.12. Arriva Bus also identified another informal bus stop where drivers collect passengers at an informal stop on the B6341 near the junction with the B6347 (outside of Rock Lodge). Arriva Bus also confirmed that there are two Stage Points (marker for drivers to determine costing) located to the west of Charlton Hall and that these points are not informal bus stops. Refer to **Appendix 4.2: Environmental Consultation** of this ES. A footway is located to the east of the existing A1 to the north and south of the at-grade junction at Charlton Mires. The footway links the bus stop locations in each direction. There are eight lay-bys (one bus stop lay-by and seven parking lay-bys) along the existing A1. Refer to **Figure 2.2: Environmental Constraints Plan: Part B** of this ES.

2.4.13. Existing junctions and structures along the existing A1 between Alnwick and Ellingham are shown on **Figure 2.4: Existing Junctions and Structures: Part B** of this ES, and comprise the following:

a. Rock South Farm junction: At-grade junction (junction at the same level or height to the roads they connect) to the west of Rock South Farm. The junction is between the existing A1 and an unnamed access road for Rock South Farm.

b. Charlton Mires junction (southern junction): At-grade junction (junction at the same level or height to the roads they connect) to the north of Rock Lodge. The junction is between the existing A1, B6347 and B6341.
c. Charlton Mires junction (northern junction): At-grade junction (junction at the same level or height to the roads they connect) at Charlton Mires. The junction is between the existing A1 and B6347.
d. West Linkhall junction (southern junction): At-grade junction (junction at the same level or height to the roads they connect) north of Patterson Cottages. The junction is between the existing A1 and oxbow layby to the south of West Linkhall.
e. West Linkhall junction (northern junction): At-grade junction (junction at the same level or height to the roads they connect) at West Linkhall. The junction is between the existing A1 and oxbow layby to the east of West Linkhall.
f. East Linkhall junction: At-grade junction (junction at the same level or height to the roads they connect) to the west of East Linkhall. The junction is between the existing A1 and unnamed access road for East Linkhall, West Lodge, Charlton Hall and Blossom Plantation Pods. North Charlton Underpass: An existing underpass underneath the A1 at North Charlton.

2.4.14. There are a further 23 direct accesses to this section of the existing A1, including 22 field accesses and one residential property access (Charlton Mires Farm), that would be stopped up. Neither the existing A1 or immediate connecting roads between Alnwick and Ellingham are currently lit.

2.4.15. Surface water runoff from this section of the existing A1 is currently collected by a system of gullies and transported to a number of outfalls to various watercourses along the existing A1 through an underground piped system. It is understood that there are no existing flow controls or pollution prevention measures in place.

Lionheart Enterprise Park Compound

2.4.16. The Lionheart Enterprise Park Compound is located within Lionheart Enterprise Park. The industrial estate was extended in 2017 from 12 ha to 22 ha. The extension includes a new access road with a Highways England maintenance depot and fire station. The new access road links with an unnamed road and A1068, which connects with the A1. There is an existing grade separated junction (junction at a different level or height to the road it connects with) between the A1 and A1068, located approximately 500 m north of the Lionheart Enterprise Park Compound.

BASELINE TRAFFIC

2.4.17. Traffic forecasts have been developed for two scenarios: a Do Minimum (DM) and a Do Something (DS). The DM scenario includes all development categorised as Near Certain or More than Likely but excludes the Scheme (refer to **Chapter 4** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**) for further details). The DS scenario is nearly identical to the DM scenario, with only the addition of the Scheme.

2.4.18. To enable the EIA to be undertaken, future traffic levels are predicted. This is usually undertaken for the opening year and the design year, which is conventionally taken as the fifteenth year after opening. For the Scheme, this was undertaken using economic projections and known developments based upon an opening year predicted to be in 2023 and a consequent design year of 2038. Since that time, the opening year has been put back to 2024. Updated Goods Vehicle Growth from DfT Road Traffic Forecasts (2018) have also become available. Therefore, the Applicant has considered whether the predictions made using an opening year of 2023 are materially affected by this change. A sensitivity analysis was carried out, in order to test whether these predicted traffic levels would materially affect assessments for the revised opening year and design year. The result of this sensitivity analysis was that there would be increases in vehicle movements (up to 4%) in the opening year (2024), and a decrease in predicted vehicle movements (up to 3%) in the design year (2039). Based on this level of change, the traffic data used to support the ES can be considered to be a reasonable representation of traffic in the new opening year of 2024. Therefore there is not anticipated to be a material change in outcomes of those assessments that use traffic data, and the results and conclusions to date are considered to reasonably represent the impacts in 2024.

2.4.19. The assessments presented within this ES have compared the DS scenario with both the current and future baseline under a DM scenario. It is considered that the future baseline of the Order Limits under a DM scenario would remain relatively unchanged - i.e. land use and the built environment as well as other features are not likely to alter within the Order Limits. These scenarios have been modelled for the 2023 opening year and 2038 design year. This is further discussed in **Chapter 4: Environmental Assessment Methodology** of this ES.

2.4.20. Several challenges to the optimal operation of traffic movement have been observed on the A1 between Morpeth and Ellingham including a lack of safe overtaking opportunities along the single carriageway, exacerbated by HGVs, leading to variability in journey times which reduces the reliability and resilience of the network. **Chapter 4** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**) outlines these challenges in more detail.

Part A

2.4.21. In 2015, approximately 19,600 vehicles per day used the section of A1 between Morpeth and Felton, with 11% of that traffic comprising HGVs. There was an increase in average two-way traffic volumes from 2015 to 2018 of 3.3%. As previously discussed in **Section 2.1** above, there are several challenges to traffic movement along this section of the A1. Within a five-year period of January 2012 to December 2016, there were approximately 48 recorded Personal Injury Accidents (categorised as 1 Fatal, 6 Serious and 41 Slight). In 2017, there were two accidents (both categorised as Slight) and in 2018 there were 8 accidents (two categorised as Serious and six as Slight) along the section of A1 between Morpeth and Felton.

2.4.22. In the DM scenario, in the design year (2038), it is estimated that approximately 25,400 vehicles per day would use this section of the A1, with 10% of that traffic comprising HGVs. This suggests that the issues currently experienced by travellers along the A1 (refer to **Section 2.1** for details) would be exacerbated due to increased traffic volumes. Further information on the existing and forecast traffic flows are provided in **Chapter 4** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**).

Part B

2.4.23. In 2015, approximately 10,260 vehicles per day used the section of the A1 between Alnwick and Ellingham, with 15% of that traffic comprising HGVs. There was an increase in average two-way traffic volumes from 2015 to 2017 of 9.7%. The automatic Highways England traffic count that is located along Part B has stopped recording data since April 2018 and therefore further traffic data is unavailable. As previously discussed in **Section 2.1** above, there are several challenges to traffic movement along this section of the A1. Within a five-year period of January 2012 to December 2016 there were approximately 12 recorded Personal Injury Accidents (categorised as 2 Fatal, 5 Serious and 5 Slight). In 2017, there were three accidents (2 Serious and 1 Slight) with six casualties along the extent of Part B. There were no accidents along Part B in 2018.

2.4.24. In the DM scenario, in the design year (2038), it is estimated that approximately 16,250 vehicles per day would use this section of the A1, with 8% of that traffic comprising HGVs. This suggests that the issues currently experienced by travellers along the A1 (refer to **Section 2.1** for details) would be exacerbated due to increased traffic volumes. Further information on the existing and forecast traffic flows are provided in **Chapter 4** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**).

2.5. SCHEME DESCRIPTION

2.5.1. The **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**) show the Scheme layout (including the de-trunked A1). The **Engineering Section Drawings** (**Application Document Reference: TR010041/APP/2.7**) show the proposed levels of the Scheme above and below the existing ground levels. Each component of the Scheme is described in detail below.

2.5.2. The Scheme is described by reference to "chainages", which are measures in metres from the commencement of Part A in Morpeth and Part B in Alnwick. These enable the approximate location of features to be identified and are shown on the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**), **Figure 7.8: Landscape Mitigation Masterplan**, **Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**) for Part A, and **Figure 7.10: Landscape Mitigation Plan**, **Volume 6** of this ES (**Application Document Reference: TR010041/APP/6.6**) for Part B.

SCHEME OVERVIEW

Part A

2.5.3. Part A can be divided into two main categories of works: provision of a new dual carriageway, both online and offline; and works to the de-trunked section of the A1. Part A comprises 12.6 km of dualling of the existing A1 single carriageways between Warreners House Interchange at Morpeth and the dual carriageway at Felton (both online and along a new offline section), de-trunking of a section of the existing A1, four overbridges (three of which are new junctions), an underbridge, a new subway, a bridge over the River Coquet, new and extended culverts and new access tracks together with new and/or improved ancillary features.

2.5.4. To facilitate the construction of Part A, statutory utilities would need to be diverted (refer to **paragraphs 2.5.166** to **2.5.171** for detail). In particular, the diversion of sections of a National Grid high-pressure gas main, a Northern Gas Networks pipeline and a Northern Powergrid overhead electricity line near Causey Park (refer to **paragraph 2.5.172** to **2.5.180** for detail).

2.5.5. At the southern extent of Part A, the dualling of the existing single carriageway section of the A1 would begin in proximity to Northgate Hospital. This is to the northwest of Morpeth where the existing dual carriageway ends and the A1 becomes single carriageway.

2.5.6. From Northgate Hospital to Priest's Bridge, a stretch of approximately 2.9 km of the existing A1 would be used as the southbound carriageway and a new northbound carriageway would be constructed adjacent to the west of the existing carriageway. Both carriageways would comprise two 3.65 m wide lanes with 1 m hard strips on either side. Access from the A1 to residential properties around Warreners House would be removed and stopped up, and new access arrangements for these properties would be provided to the east and south.

2.5.7. At Priest's Bridge, Part A would include approximately 6.1 km of offline widening with the construction of new dual carriageway to the west of the existing A1 (the offline section). This new offline section would move away from the existing line of the A1 towards the west of Earsdon Moor, passing east of Fenrother New House Farms and Causey Park and tying-back into the existing A1 to the east of Burgham Park and west of Felmoor Park. Both carriageways would comprise two 3.65 m wide lanes with 1 m wide hard strips to either side.

2.5.8. A new grade-separated junction with a bridge over the A1 would be constructed where the new road crosses the side road between the existing A1 and Fenrother. Connectivity from Causey Park across the new dual carriageway would be maintained by a new overbridge on the line of the existing side road to Causey Park. An underbridge would be constructed at Burgham Park to enable the road from Longhorsley to the existing A1 to pass under the new dualled A1.

2.5.9. From Burgham Park to the northern extent of Part A, the offline section would tie in with the existing A1 dual carriageway. The widening would be online for approximately 3.6 km and the existing A1 (including the existing bridge over the River Coquet) would form the new northbound carriageway. A new southbound carriageway (including construction of a new bridge over the River Coquet) would be constructed on the eastern side.

2.5.10. Bywell Road is a rural 3.8 km long single carriageway connecting the A697 to the existing A1 in an east-west direction. Along this road, connections to the A697 and A1 are both in the form of at-grade junctions. Bywell Road would be realigned north from its existing junction with the A1, which would be removed, to connect to West Moor Road, with an at-grade junction, to the west of the proposed West Moor Junction. From there, access to the A1 would be via the new junction.

2.5.11. Between Priest's Bridge and Felmoor Park, the existing A1 would be bypassed by the offline section of Part A. The existing section of the A1 in this area (de-trunked A1) would cease to be a trunk road and would be passed to the ownership of Northumberland County Council (NCC) who would have responsibility for its future maintenance as a local access road.

Part B

2.5.12. Part B comprises approximately 8 km of dualling of the existing A1 single carriageways (online widening), one new junction (Charlton Mires junction), an accommodation overbridge (Heckley Fence Accommodation Overbridge), new and extended culverts, temporary and permanent PRoW diversions and new access roads.

2.5.13. To facilitate the construction of Part B, utilities would need to be diverted (refer to **paragraphs 2.5.272** to **2.5.278** for detail). In particular, the diversion of Northern Powergrid circuit from Denwick to Middlemoor Windfarm Teed and sections of a Northern Gas Networks pipeline (refer to **paragraphs 2.5.279** to **2.5.281** for further detail).

2.5.14. The entire length of Part B from Alnwick to Ellingham would include online widening to the east of the existing A1. The width of each mainline carriageway would be 9.3 m and comprise of two 3.65 m wide lanes with 1 m hard strips either side. A total of 23 direct accesses on to the A1, including 22 field accesses and one residential property access (Charlton Mires Farm), would be stopped up and alternative safer accesses provided.

2.5.15. A new grade-separated junction, with a bridge over the A1, would be constructed at Charlton Mires. The B6347 to the west of the Charlton Mire junction would be realigned to accommodate a roundabout and access to the junction. An accommodation overbridge would provide connectivity to the south of Part B, located east of Heckley Fence.

TEMPORARY AND PERMANENT LAND TAKE

2.5.16. **Figure 4.1: Boundary Plan: Part A** of this ES illustrates the proposed Order Limits and the indicative permanent boundary (identifying land that would be required permanently) for Part A. **Figure 4.2: Boundary Plan: Part B** of this ES illustrates the proposed Order Limits and the indicative permanent boundary (identifying land that would be required

permanently) for Part B. **Chapter 4: Environmental Assessment Methodology** of this ES provides further details the of Order Limits, and the **Land Plans** (**Application Document Reference: TR010041/APP/2.2**) illustrate the definitive permanent and temporary boundaries. The assessments reported within the ES take account of the powers of deviation contained in the **draft DCO** (**Application Document Reference: TR010041/APP/3.1**), which is used to define assessment parameters (refer to **Section 2.12** below).

The Scheme

2.5.17. A total of approximately 362 ha of land is required for the construction of the Scheme, of which approximately 241 ha would be permanently required (including land already owned by the Applicant).

Part A

2.5.18. A total of approximately 242 ha of land is required for the construction of Part A, of which approximately 167 ha would be permanently required (including land already owned by the Applicant). One residential property (North Gate House) located at chainage 11000 would be acquired and demolished, and land containing smaller areas of woodland (some of which is located in private land), arable field margins, hedgerows and isolated trees would be permanently required.

2.5.19. The majority of temporary land would be reinstated to its original use prior to operation on completion of Part A in agreement with the landowner. However, there is one location, east of the A1 near Eshott airfield and Northumberland Woodland Burials (approximately chainage 21000 – 21400) where essential hedgerow mitigation is proposed outside of the permanent boundary, within third party land, implemented and maintained by agreement (refer to **Chapter 7: Landscape and Visual, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for further information).

2.5.20. The potential effects upon the environment as a result of the permanent and temporary works have been considered within this ES. For the majority of **Technical Chapters 5 to 15, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**), unless otherwise stated, the indicative permanent boundary depicted on **Figure 4.1: Boundary Plan: Part A** of this ES has been used for assessment purposes of this ES. In practice, owing to powers of deviation, the areas of permanent land acquisition maybe slightly larger than those shown on the ES plans.

Part B

2.5.21. A total of approximately 120 ha of land is required for the construction of Part B, of which approximately 75 ha would be permanently required (including land already owned by the Applicant). The majority of land permanently required comprises agricultural land. Two residential properties and the associated outbuildings would need to be acquired and demolished to accommodate the new Charlton Mires Junction. These properties are

Charlton Mires Farm and East Cottage, which are both located at approximate chainage 58860. The agricultural land associated with Charlton Mires Farm would be retained by the landowner, where possible. There is an assumption that the Applicant would acquire the agricultural land associated with East Cottage as part of the blight notice. Smaller areas of woodland (some of which is located in private land), arable field margins, hedgerows and isolated trees would be permanently required.

2.5.22. Temporary land would be reinstated to its original use prior to operation on completion of Part B in agreement with the landowner.

DESCRIPTION OF PART A

Dualling of the Existing Single Carriageway and Provision of a New Dual Carriageway

2.5.23. Part A would upgrade the Morpeth to Felton section of the A1 from a single carriageway road to dual carriageway standard. This would be achieved by a combination of approximately 6.5 km of online widening and approximately 6.1 km of new offline highway to provide two carriageways in each direction and increase capacity.

2.5.24. The speed limit of 70 mph would apply along the A1. The speed limit for the de-trunked section is discussed in **paragraph 2.5.50** below.

Warreners House to Priest's Bridge (Online Widening)

2.5.25. From the southern extent of Part A, dualling of the existing single carriageway section of the A1 would begin where the A1 meets the A697 near Northgate Hospital and Warreners House, Morpeth (approximate Grid Reference NZ 18231 88595), where the existing dual carriageway finishes. Between here and Priest's Bridge (approximate Grid Reference NZ 18579 91676), which is a length of approximately 2.9 km, the existing A1 would be used as the southbound carriageway and a new northbound carriageway would be constructed adjacent to the west of the existing carriageways. Both carriageways would comprise two 3.65 m wide lanes with 1 m hard strips either side.

2.5.26. The earthworks within this section of Part A would comprise both cuttings and embankments, with the proposed Highlaws Junction raised upon embankments (refer to **paragraphs 2.5.58** to **2.5.59** for further details of this junction).

2.5.27. A parking lay-by is proposed on the northbound carriageway at chainage 11200 just north of Warreners House.

2.5.28. Footways along this section of Part A would be retained. The existing southbound carriageway footway around chainage 11900 would be extended to provide connectivity across the proposed Highlaws Junction.

2.5.29. The existing bus stops on the northbound and southbound carriageways at chainage 10959 near Warreners House would both be removed and would not be replaced.

2.5.30. The existing bus stops on the northbound and southbound carriageways between chainages 12000 and 12200, near Strafford House, would both be removed.

2.5.31. The existing bus stops on the northbound and southbound carriageways at Low Espley at chainage 13300 would both be removed.

2.5.32. On the A697 at Espley (outside of the Order Limits of Part A), a bus stop on both the northbound and southbound carriageways would be formalised including the provision of new bus stop signs (with further detail, for example new street furniture and road markings, to be confirmed at the detailed design stage). These would be offsite works, outside of the Order Limits of Part A (refer to **Section 2.11**).

Priest's Bridge to Burgham Park (Offline Widening)

2.5.33. At Priest's Bridge (approximate Grid Reference NZ 18579 91676), Part A would include approximately 6.1 km of offline widening with the construction of new dual carriageway to the west of the existing A1 (the offline section). This new offline section would move away from the existing line of the A1 towards the west of Earsdon Moor, passing east of Fenrother, New Houses Farms and Causey Park and tying back into the existing A1 to the east of Burgham Park and west of Felmoor Park at approximate Grid Reference NZ 17830 97354. Both carriageways would comprise two 3.65 m wide lanes with 1 m hard strips either side.

2.5.34. The proposed de-trunked section of the existing A1 is discussed further in **paragraph 2.5.44**.

2.5.35. The majority of this section of Part A would be within cutting, with some sections upon embankment, particularly over Burgham Park Underbridge, and over culverts. The proposed Fenrother Junction would be raised upon embankments (refer to **paragraphs 2.5.60** to **2.5.62** for further details of this junction).

2.5.36. A parking lay-by and abnormal load bay are proposed on both the northbound and southbound carriageway around chainage 14200 at Priest's Bridge. A parking layby is also proposed on the northbound carriageway at chainage 17400, just south of Causey Park Overbridge, and on the southbound carriageway at chainage 18900 just south of Burgham Park Underbridge. A further parking layby is also proposed on the southbound carriageway at chainage 16500.

2.5.37. No footways are proposed along this section of Part A.

Burgham Park to Parkwood (Online Widening)

2.5.38. From Burgham Park, where the proposed offline section ties in with the existing A1 at approximate Grid Reference NZ 17830 97354, to the northern extent of Part A, where it would tie in with the existing A1 dual carriageway (approximate Grid Reference NU 17476 00762), the widening would be online for approximately 3.6 km. The existing A1 (including the existing bridge over the River Coquet) would form the new northbound carriageway, and a new southbound carriageway (including a new bridge to carry the new southbound carriageway of the A1 over the River Coquet, as detailed in **paragraphs 2.5.94** to **2.5.101**) would be constructed on the eastern side.

2.5.39. Bywell Road is a rural 3.75 km long single carriageway connecting the A697 to the existing A1 in an east-west direction. Along Bywell road, connections to the A697 and A1 are both in the form of at-grade junctions. Under Part A, Bywell Road would be extended north from its existing junction with the A1 (which would be removed) to connect at West Moor Road, with an at-grade junction, to the west of the proposed West Moor Junction. From there, users would be able to access the new junction for the A1.

2.5.40. Within this section of Part A, the majority of earthworks would comprise cutting, the key areas being either side (north and south) of the proposed River Coquet bridge. The proposed West Moor Junction would be raised on embankments using material generated by Part A (or imported from a quarry as described in **paragraph 2.8.36**), as would the main carriageway where it passes over the existing Parkwood Culvert and the proposed Parkwood Subway (refer to **paragraphs 2.5.149** to **2.5.151 and paragraphs 2.5.102** to **2.5.104** respectively for further details of these structures).

2.5.41. A parking lay-by is proposed on the northbound carriageway at chainage 20100, around the tie-in of the offline section with the existing A1.

2.5.42. There is currently no footway provision at the existing A1 along this section, nor Bywell Road. No new footways are proposed.

2.5.43. The existing bus stops on each side of Felton Road, at its western extent, would be removed. Two new bus stops, one on each side of the road, would be provided further to the east along Felton Road.

De-trunked Section of the Existing A1

2.5.44. Between Priest's Bridge and Felmoor Park, the existing A1 would be bypassed by the offline section of Part A. The de-trunked A1 would cease to be a trunk road and would be passed to NCC, as local highway authority, who would own and be responsible for future maintenance of the former alignment as a local highway. The de-trunked section of the A1 would continue to provide access to properties and communities along its length, but with those accesses being safer as a result of anticipated traffic volumes being lower.

2.5.45. The southern extent of the de-trunked A1 would be stopped-up. At this location, a fence with vehicle and pedestrian access gates would be provided, together with a turning head. The stretch of existing A1 between the alignment of Part A (where the offline section begins) and the stopped-up point of the de-trunked A1 would be retained by the Applicant and part of the area would be landscaped (refer to **Section 2.6** for further details on proposed landscape design) and part of the carriageway would remain paved, enabling access for maintenance of an existing culvert and utilities apparatus.

2.5.46. The existing junction between the A1 and Fenrother Lane, just north of the Tritlington Church of England First School, would be altered to tie-in to the proposed Fenrother Lane free-flow link road, which would be provided under Part A. The proposed free-flow link road would change the junction priority, giving users priority over those on the de-trunked A1 to

the south which would become a side-road. Refer to **paragraph 2.5.61** for further details of the proposed Fenrother free-flow link road.

2.5.47. The de-trunked A1 would be extended northwards between Felmoor Park and the proposed West Moor Junction / Felton Road, by the construction of a proposed link road parallel to the east of Part A. A tie-in is proposed to the existing access road extending to the east towards Eshott Airfield, several residential properties and a local firewood supplier (the Flying Logman). The proposed link road would allow direct and easy access between the de-trunked A1 and the proposed West Moor Junction / Felton Road.

2.5.48. Access to Part A for residents located along the de-trunked A1 would be via the proposed link road and the proposed West Moor Junction for those travelling to and from the north and via the proposed Fenrother Junction for those travelling to and from the south.

2.5.49. Once Part A is operational, all current A1 traffic would follow the route of the offline section of Part A, therefore allowing the de-trunked A1 to be used as a local access road for communities, properties and businesses in this area. With Part A, in 2038 (the design year) it is estimated that an average of approximately 1,784 vehicles per day would use the de-trunked A1. This is an approximate 93% reduction in traffic flow compared to the 2038 design year without Part A, where it is anticipated an average of approximately 25,400 vehicles per day would use this section of the A1.

2.5.50. The national speed limit of 60 mph would apply along the de-trunked A1.

2.5.51. Existing footways along the de-trunked A1 would be retained. Furthermore, a new segregated 3 m wide footway / cycleway would be provided along the length of the eastern side of the proposed link road, between the de-trunked A1 and Felton Road.

2.5.52. To fit better with the layout of Part A, some existing bus stops along the de-trunked A1 would be removed, and new ones proposed. Two bus stops are proposed to be relocated on the northbound and southbound carriageways from chainage 31500 to just north of the proposed Fenrother free-flow link road at chainage 31900.

2.5.53. Two existing bus stops would be retained on the northbound and southbound carriageways, to the south of Burgham Park Underbridge at chainage 35500 to chainage 35600.

2.5.54. There would be no change to the bus services that would use the de-trunked A1.

2.5.55. The existing layby at chainage 36100, on the southbound carriageway of the de-trunked A1, would be retained.

Junctions

2.5.56. Three new grade-separated junctions are proposed for Part A, to replace the existing at-grade junctions and provide new efficient and safer access onto the upgraded A1 from existing side roads. Each new junction would include a bridge over the main alignment of Part A connecting to the side roads, so traffic can move along the main alignment of Part A

without flow disruption, thereby reducing delays and improving safety. The layout of these junctions has been designed to minimise land take required.

2.5.57. Each of the proposed new overbridges at these three junctions would comprise an integral single span bridge with a pre-stressed precast concrete beam deck. The clear span between the abutments would be between 36 m and 41 m, and the headroom height of the bridges would be 6 m (greater than the standard headroom of 5.3 m, to allow for known local over height movements to help to ensure consistency and resilience on the section of the road). This section of the A1 is not an official abnormal load route although High Highlaws Road forms part of an abnormal load route due to height restrictions at the A697 overbridge approximately 1.2 km to the south of the A1.

Highlaws Junction

2.5.58. The proposed Highlaws Junction would be located at approximate Grid Reference NZ 18416 89821 in the area of Low Espley. The junction would connect with High Highlaws Road to the West and Hebron Road to the east. Refer to the **Structures Engineering Drawings and Sections** (**Application Document Reference: TR010041/APP/2.8**).

2.5.59. Footways would be provided over the junction (refer to the **Rights of Way and Access Plans** (**Application Document Reference: TR010041/APP/2.5**)).

Fenrother Junction

2.5.60. The new Fenrother Junction is proposed along the offline section of Part A where it crosses Fenrother Lane to the east of Fenrother and west of the Tritlington Church of England First School at approximate Grid Reference NZ 18249 92554. Fenrother Lane (west) would connect over a bridge to Fenrother Lane (east). Refer to the **Structures Engineering Drawings and Sections** (**Application Document Reference: TR010041/APP/2.8**).

2.5.61. Fenrother Lane (east) would be altered to a free-flow link from the proposed Fenrother Junction to the de-trunked A1 to the south. Traffic using this free-flow link would have priority over traffic along the de-trunked A1. An access spur from the proposed Fenrother Free Flow link to adjacent private properties is also proposed.

2.5.62. Footways would be provided over the bridge, with connectivity to wider areas provided.

West Moor Junction

2.5.63. The new West Moor Junction is proposed just to the west of Eshott Airfield at approximate Grid Reference NZ 17424 98864. West Moor Road would connect over a bridge to Felton Road. The proposed Bywell Road extension would also connect to West Moor Road at this Junction (refer to **paragraph 2.5.39**). Furthermore, the proposed link road between the de-trunked A1 and Felton Road (refer to **paragraphs 2.5.47** and **2.5.48**) also connects at the east of the new West Moor Junction in the form of a roundabout, allowing traffic to move on and off the proposed link road, the main alignment of Part A, Felton Road and the bridge to West Moor Road. Refer to the **Structures Engineering Drawings and Sections** (**Application Document Reference: TR010041/APP/2.8**).

2.5.64. Footways would be provided over the bridge, with connectivity to wider areas provided.

Residential Properties

2.5.65. One residential dwelling (North Gate House, located on the western side of the A1 approximately 100 m north of the A697 junction) would need to be demolished to accommodate widening works. Pursuant to the Compensation Code[2] (**Ref. 2.6**), homeowners of the residential properties would be eligible to claim financial compensation.

Private Means of Access and other Access Tracks

2.5.66. The paragraphs below describe proposed changes to private means of access (PMA) and other access tracks from the southern extent of Part A to the northern extent. Refer to the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**) for full details. Refer to the **Rights of Way and Access Plans** (**Application Document Reference: TR010041/APP/2.5**) for details of the PMAs to be stopped up.

2.5.67. For all proposed and improved PMA and other access tracks, the minimum carriageway width would be 3 m providing appropriately located passing bays, where required. Where agricultural vehicles are anticipated to use the access arrangements, the width would be increased to 4.8 m. Each PMA has been designed to take into account the vehicles that would use it, including types and frequency of use.

New Access Track off West View

2.5.68. Currently, residential properties around Warreners House at the southern extent of Part A have direct access onto the A1. Direct vehicular access would be closed.

2.5.69. The new 4.8 m wide proposed access track would connect Warreners Cottages and Warreners Barns to the currently closed cul-de-sac at the northern extent of West View Road. A 3 m wide spur would connect Warreners House to the new access track. Users would then follow the existing arrangements for the residents of West View, accessing the A1 at St Leonards Junction via Morpeth Bypass.

2.5.70. To facilitate the additional vehicle movements and to ensure safety, West View would be widened, and parking bays and a footway would be provided.

2.5.71. The proposed access track would also connect with Northgate Farm and Capri Lodge. Furthermore, it would extend further north to allow field access.

[2] The rights to compensation and methods and procedures for assessing the correct amount are derived from what is commonly referred to as the “Compensation Code”. This is made up of Acts of Parliament, case law and established practice. The principal Acts are the Land Compensation Acts of 1961 and 1973 and the Compulsory Purchase Act 1965.

New Access Tracks off Hebron Road

2.5.72. Existing vehicle access onto the A1 from Strafford House would be closed. As alternative access onto the A1, an access track would be provided, linking Strafford House to Hebron Road at Highlaws Junction.

2.5.73. Currently, a private road provides Hebron Hill Farm, located to the east of Part A at approximate Grid Reference NZ 18921 90206, with direct access to the A1 at approximate Grid Reference NZ 18479 90183. However, direct access along this section of the A1 would be closed. Instead, a proposed track providing field access would be provided at Highlaws Junction extending from Hebron Road, parallel to Part A, to the north around chainage 12500 (approximate Grid Reference NZ 18541 90581). The existing private road to Hebron Hill Farm would be connected to this proposed field access track.

New Access Track off High Highlaws Road

2.5.74. The proposed access track would extend from High Highlaws Road at the proposed Highlaws Junction, parallel to Part A, northwards to meet with the unnamed road leading west to Espley at approximate Grid Reference NZ 18539 90915 in Low Espley. Direct access at this point onto the A1 would be closed.

Proposed Field Accesses at Fenrother Junction

2.5.75. Two field accesses are proposed at Fenrother Junction as follows:

a. From Fenrother Lane (west) a field access is proposed towards the east to provide access into the field located directly south of the proposed Fenrother Junction to the west of Part A, at approximate Grid Reference NZ 18214 92408.

b. From the unnamed field access extending north from Fenrother Lane (west), a field access is proposed to extend to the fields to the north of Fenrother Junction, to approximate Grid Reference NZ 18277 93049.

New Access Track off Causey Park Road

2.5.76. In order to connect New Houses Farm to Part A, a proposed access track would connect the existing unnamed road on which New Houses Farm is located, to Causey Park Road in the north. The proposed access track would run parallel to Part A, on its western side, and would tie into the existing unnamed road from Causey Park Road.

2.5.77. This proposed access track would be 4.8 m in width, without hard strips, and the verges would be widened on the inside of bends to improve driver forward visibility.

Proposed Realigned Access Track off Causey Park Road

2.5.78. The existing unnamed access track extending from Causey Park Road on the western side of Part A (at approximate Grid Reference NZ 18624 95200) towards fields to the north would be realigned slightly to the west at its junction with Causey Park Road, to allow for the construction of Causey Park Overbridge (refer to **paragraphs 2.5.90** and **2.5.91** for further details of this structure).

New Access Track off Bywell Road

2.5.79. From the southern extent of Bywell Road, where it is proposed to be realigned to the north, a field access towards a field to the south would be provided (to its southern extent at approximate Grid Reference NZ 17548 97648).

Road Surfacing

2.5.80. The existing A1 between Morpeth and Felton comprises sections of hot rolled asphalt and sections of Low Noise Surface (LNS).

2.5.81. The length of Part A, along both the offline and online sections, would incorporate LNS, which would provide noise reduction advantages. Exceptions to this are on structures where Hot Rolled Asphalt (HRA) would be used to provide improved waterproofing. The de-trunked A1 (to be determined at detailed design) and local roads to be maintained by NCC would be surfaced with HRA. Polished Stone Values (PSVs), which are used for estimating the skid resistance of the road surface, would be varied across the carriageway to reduce the demand on premium high PSV aggregate and use more local aggregate.

2.5.82. The central reserve design would comprise of up to 80% of slow viscoelastic recycled materials (made predominantly from road planings, some virgin aggregate and foamed bitumen as specified in the Design Manual for Roads and Bridges (DMRB)) for a hardened design.

2.5.83. The following principles would be adopted to ensure sustainability:

a. Re-use of materials on Part A to minimise resource consumption, waste disposal and emissions resulting from material haulage.
b. Whole life-cycle design, including that which maximises the residual life of existing surfacing components.
c. Recycling of end of life materials.
d. Innovative and best practice designs to promote environmental protection and minimise construction periods and traffic disruption.

Signage and Roadside Technology

2.5.84. The existing road signage would be replaced where necessary, to reflect the proposed change in junction layout and the 70 mph speed limit on the main alignment of Part A, and to align with current design standards and regulations. The proposed signage strategy would also address existing signage inconsistencies and errors, such as including currently omitted relevant destinations or roads.

2.5.85. New signage would be provided along the north and southbound carriageways associated with the proposed junctions, at the proposed new junctions and along the de-trunked A1.

2.5.86. The following roadside technology would be provided with Part A:

a. Highways England's National Traffic Control Centre (NTCC) Traffic Monitoring Unit (TMU) and Loops to the south of Priest's Bridge at chainage 13500, with maintenance

access from the access provided for the proposed detention basin (Reference DB4, as detailed at **paragraph 2.5.157**).

b. NTCC TMU and Loops to the south of the proposed West Moor Junction, between chainages 20600 and 20700, with maintenance access off the proposed field access off Bywell Road.

c. NTCC automatic number plate recognition camera (ANPR) control unit and the relocated weather monitoring station (currently located within the footprint of the proposed West Moor Junction) to the south of the River Coquet between chainages 21800 and 21900, with maintenance access from the access provided for the proposed detention basin (DB17, as detailed at **paragraph 2.5.157**).

Structures

2.5.87. In addition to the proposed overbridges at the junctions described in **paragraphs 2.5.56** to **2.5.64**, Part A would comprise a new overbridge at Causey Park, a new underbridge at Burgham Park, a new bridge across the River Coquet and an extension to the existing subway at Parkwood. These are described in the paragraphs below.

2.5.88. Proposed new culverts and extensions to existing culverts are described in **paragraphs 2.5.105** to **2.5.151**. The descriptions given are of likely designs and construction methodologies and have been assumed for the purposes of EIA. However, final designs of these structures will be refined during the detailed design stage.

2.5.89. Refer to **Section 2.8** for details on construction methodology.

Causey Park Overbridge

2.5.90. To maintain road connectivity along Causey Park Road across the offline section of Part A, a new overbridge would be constructed. The existing alignment of Causey Park Road would be maintained and would cross the new overbridge via embankments on either side of the main alignment of Part A. Refer to the **Structures Engineering Drawings and Sections** (**Application Document Reference: TR010041/APP/2.8**).

2.5.91. The proposed structure for the new overbridge would comprise an integral single span bridge with a pre-stressed precast concrete beam deck. The clear span between the abutments would be 33 m and the headroom height of the bridge would be at least 6 m.

Burgham Park Underbridge

2.5.92. In order to maintain the route of Burgham Park Road across the offline section of Part A, a new underbridge would be constructed. The existing alignment of Burgham Park Road would be maintained within a cutting, passing underneath the new bridge and the main alignment of Part A which would be upon embankment. Refer to the **Structures Engineering Drawings and Sections** (**Application Document Reference: TR010041/APP/2.8**).

2.5.93. The proposed structure for the new bridge would comprise an integral single span bridge with a pre-stressed precast concrete beam deck. The clear span between the abutments

would be approximately 11 m and the headroom height of the bridge would be approximately 8.4 m.

River Coquet Bridge

2.5.94. A new bridge over the River Coquet would be constructed parallel and to the eastern side of the existing bridge. Refer to the **Structures Engineering Drawings and Sections** (**Application Document Reference: TR010041/APP/2.8**). The existing bridge would carry A1 northbound traffic and the new bridge would carry A1 southbound traffic.

2.5.95. The new bridge would comprise a three-span composite weathering steel / concrete continuous bridge deck with two upright supports, referred to as piers.

2.5.96. The proposed piers would be on the same alignment as the existing piers on the existing northbound bridge. The proposed southern abutment on the new bridge would also be on the same alignment as the existing southern abutment on the existing bridge. The proposed northern abutment on the new bridge would be approximately 25 m further north than the northern abutment on the existing bridge in order to address ground stability issues.

2.5.97. The new structure would not be located within the normal flow of water within the River Coquet valley, which is also the River Coquet and Coquet Valley Woodlands SSSI. The impacts of Part A upon the SSSI are discussed in **Chapter 5: Air Quality, Chapter 7: Landscape and Visual, Chapter 9: Biodiversity** and **Chapter 10: Road Drainage and the Water Environment, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**).

2.5.98. A temporary haul road would be installed in order to construct the north pier. To enable construction of the south pier, a permanent haul road would be cut into the steeply sloped rock embankment south of the River Coquet, to provide access to the new bridge south pier base construction area (refer to **paragraph 2.8.137** to **2.8.139**). A maximum gradient of 1 in 4 and a minimum width of 4 m is proposed for the proposed permanent haul road, and it would only be suitable for use by tracked vehicles. The haul road would be constructed with two changes in direction to provide two intermediate turning areas to ensure the gradient does not exceed 1 in 4. Although a permanent structure, due to its suitability for use only by tracked vehicles, it is not anticipated to be used for access in the long-term. The haul road proposals to access the south pier base will be refined at detailed design and will be designed to avoid impacts to trees outside the Order Limits of Part A (including the extent of their main root systems).

2.5.99. Access to a drainage detention basin (DB18) just south of the River Coquet extends north to provide maintenance access to the southern abutment of the proposed River Coquet bridge. Maintenance access for the north abutment would be via the existing PRoW.

2.5.100. There is potential for the proposed piers to be off-set so the northern pier would move up to 6 m to the north (from the current proposed location) and the southern pier would move up

to 2 m to the north (from the current proposed location) (refer to **Appendix 2.2: Technical Drawings** of this ES. In addition, there would be an allowance to move the proposed piers by a further 2 m in any other direction. Refer to assessment parameter 10 in **Section 2.11** for further details on how this potential change to the proposed piers has been assessed in this ES.

2.5.101. If the proposed piers are off-set by a small amount, the north pier would be located outside of the normal flow of water and the highest recorded flood flow extent within the River Coquet Valley. An offset south pier would also be located outside of the normal flow of water. However, under conditions of the Q10 (a high flow parameter where the flow is equalled or exceeded for 10% of a specified time) or greater, the south pier would very marginally impinge upon the local flow of water.

Parkwood Subway

2.5.102. The existing Parkwood subway is located at the northern extent of Part A, at Grid Reference NU 17460 00345. The existing subway comprises a reinforced concrete box structure beneath the A1 mainline and serves a private access track which provides vehicular access to Felton Demesne Farm. Refer to the **Structures Engineering Drawings and Sections** (**Application Document Reference: TR010041/APP/2.8**).

2.5.103. The existing subway would be extended to the east underneath the widened A1 carriageway. The subway would be an integral single span bridge with a prestressed precast concrete beam deck (constructed off-site and transported to the site). The concrete slab would be cast in-situ over the concrete beams. The beams would be integrally connected to the abutments at each end.

2.5.104. The clear span between the wingwalls (walls next to the main subway structure) would be 4.6 m, the overall span between the abutments would be approximately 12 m, and the headroom height of the bridge would be approximately 5 m.

Culverts

2.5.105. Proposed new and extended culverts to be provided as part of Part A, have each been assigned a reference name and number for hydraulic modelling purposes. The following paragraphs list the culverts pertinent to this assessment (note that missing numerical references relate to other existing features that would not be altered, or the proposed River Coquet bridge (reference 15)). Refer to **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**) and **Appendix 2.3: Culverts Construction Methodology** of this ES.

2.5.106. The design of the culverts has been informed by ecological species survey information. Where relevant, the description of the culverts below details where provision of fish, bat or terrestrial mammal passage is included. Refer to **Section 2.6** for details on culverts proposed for solely wildlife passage. Refer to **Section 2.8** for details on construction methodology.

West Cotting Burn Culvert (Reference 1.4)

2.5.107. This new culvert would be located at chainage 10800 to the east of Part A, to accommodate the new access track off West View detailed at **paragraph 2.5.68** to **2.5.71**. It would be a rectangular shape, have an internal height of 1250 mm and an internal width of 2700 mm and would be 12.8 m in length.

2.5.108. It would comprise a 250 mm natural bed to encourage fish passage and would not include terrestrial mammal passage provision due to the likely low risk of terrestrial mammal casualty with it being a private access with low usage.

East Cotting Burn Culvert (Reference 1.5)

2.5.109. This new culvert would be located at chainage 10800 to the east of Part A, to accommodate the new access track off West View detailed at **paragraph 2.5.68** to **2.5.71**. It would be a rectangular shape, have an internal height of 1200 mm and an internal width of 3000 mm and would be 12.8 m in length.

2.5.110. It would comprise a 200 mm natural bed to encourage fish passage and would not include terrestrial mammal passage provision due to the likely low risk of terrestrial mammal casualty as it is a private access with low usage.

Shieldhill Culvert (Reference 1a)

2.5.111. The existing culvert located to the south of Highlaws Junction at chainage 11815 would be replaced to accommodate the proposed increased width of the main alignment of Part A.

2.5.112. The culvert would maintain the existing discharge capacity. It would be circular in shape with an internal diameter of 1200 mm, and a length of 43.4 m. Scour protection would be provided and would provide a 150 mm natural bed to encourage fish passage.

2.5.113. A separate 40.0 m long 600 mm diameter wildlife culvert (Wildlife Shieldhill Culvert, Reference 1B) would also be provided adjacent to culvert Reference 1a at chainage 11810 to allow for terrestrial mammal passage.

Paradise Culvert (Reference 3)

2.5.114. The existing culvert of Floodgate Burn, located just to the south of Priest's Bridge at chainage 13660, would be replaced to accommodate the proposed increased width of the main alignment of Part A.

2.5.115. The culvert would be circular with an internal diameter of 1800 mm, and a length of 32.7 m. Scour protection would be provided and would provide a 150 mm natural bed to encourage fish passage.

2.5.116. The culvert would allow for mammal passage. The terrestrial mammal shelf would have a top level of 950 mm above the pipe invert level.

2.5.117. The existing 28 m long arch culvert would be demolished, and a new precast concrete pipe constructed in its place, which would extend the culvert by 14.7 m on the inlet (west) side.

Precast concrete head walls would be provided at either side of the culvert to retain road embankments.

Priest's Bridge Culvert (Reference 4)

2.5.118. A new culvert would be provided at chainage 14050 to accommodate the River Lyne underneath the proposed offline section of Part A, where open channel currently exists. It would be a rectangular shape, have an internal height of 3750 mm and an internal width of 4000 mm and would be 53 m in length.

2.5.119. It would comprise a 100 mm natural bed, within a 200 mm low flow channel, to encourage fish passage, and a 500 mm wide shelf would be fixed to the culvert, 950 mm above the culvert invert, to allow terrestrial mammal passage. Furthermore, this would allow for bat passage.

2.5.120. The proposed culvert would be a precast reinforced concrete box culvert, as long as the local ground conditions meet the specification of the precast manufacturer. Upon further investigation at the detailed design stage, it may be necessary to supply piled or reinforced concrete foundations, which would be confirmed at detailed design if required.

North and South Fenrother Burn Culverts (References 5.2 and 5.3)

2.5.121. Two new culverts would be located to the south of the proposed Fenrother Junction, underneath the realigned Fenrother Road (west) as it approaches the junction.

2.5.122. A twin culvert would be located at chainage 15000 (North Fenrother Burn Culvert, Reference 5.2). Each culvert would be rectangular in shape, with an internal height of 1250 mm and an internal width of 1500 mm and 33.1 m in length. The overall external width of the two culverts together would be approximately 3.8 m. It would comprise a 250 mm natural bed to encourage fish passage. Scour protection would be provided.

2.5.123. The second culvert would be located at chainage 14900 (South Fenrother Burn Culvert, Reference 5.3). It would be a rectangular shape, have a height of 1750 mm and a width of 3000 mm and would be approximately 52.7 m in length. It would comprise a 250 mm natural bed to encourage fish passage and would comprise a separate wildlife culvert at this location (refer to **Section 2.6** for further details).

Causey Park Culvert (Reference 6.2)

2.5.124. A new culvert would be provided at chainage 17070 to accommodate the Earsdon Burn underneath the proposed offline section of Part A. It would be a rectangular shape, have an internal height of 2100 mm and an internal width of 3000 mm and would be 36.2 m in length.

2.5.125. It would comprise a 150 mm natural bed to encourage fish passage and would comprise a wildlife ledge with the top level 950 mm above the culvert invert level, to allow terrestrial mammal passage. Scour protection would be provided. Furthermore, the culvert would allow for bat passage through it.

2.5.126. The proposed culvert would be a precast reinforced concrete box culvert. Precast wingwalls would be provided at both ends of the culvert.

Earsdon Burn Culvert (Reference 6.3)

2.5.127. A new culvert would be provided at chainage 17000 to accommodate the Earsdon Burn underneath the new access track off Causey Park Road as detailed at **paragraph 2.5.78**. It would be a rectangular shape, have an internal height of 2100 mm and an internal width of 3000 mm and would be 11 m in length.

2.5.128. It would comprise a 150 mm natural bed to encourage fish passage and would comprise a wildlife ledge with the top level 1000 mm above the culvert invert level to allow for terrestrial mammal passage. Scour protection would be provided. Furthermore, the culvert would allow for bat passage through it.

New Houses Farm Culvert (Reference 7.1)

2.5.129. Part A would require the unnamed watercourse that flows into Earsdon Burn to be diverted parallel to the west of Part A, to the south of the proposed Causey Park Overbridge. A new culvert for this watercourse would be provided between approximate chainages 17090 to 17215, where it would pass through elevated topography.

2.5.130. The culvert would be a circular shape with an internal diameter of 1600 mm and would be 148 m in length. There is insufficient baseflow within this watercourse to consider fish passage measures. Furthermore, terrestrial mammal passages would not be included within this culvert as there would be no highway above and therefore a low risk of casualty. Two manholes would be constructed to provide access to the interior of the culvert.

Little Causey Park Culvert (Reference 7.2)

2.5.131. A new culvert would be provided at chainage 17440, to the south of Causey Park Overbridge, to accommodate the unnamed watercourse that flows into Earsdon Burn underneath the new access track off Causey Park Road.

2.5.132. The culvert would be a circular shape with an internal diameter of 1600 mm and would be 9 m in length. There is insufficient baseflow within this watercourse to consider fish passage measures and it would not include terrestrial mammal passage provision due to the likely low risk of terrestrial mammal casualty as it is a private access with low usage.

Tiny Causey Park Culvert (Reference 8.2)

2.5.133. A new culvert would be provided between approximate chainage 17720 to the west of Part A and immediately downstream of the Wildlife Causey Park culvert (Reference 8.1), to accommodate the new access track off Causey Park Road.

2.5.134. The culvert would be a circular shape, with an internal diameter of 600 mm and would be approximately 6 m in length. There is insufficient baseflow within this watercourse to consider fish passage measures. The culvert would not include terrestrial mammal passage

provision due to the likely low risk of terrestrial mammal casualty with it being a private access with low usage.

South Longdike Culvert (Reference 9.1)

2.5.135. An existing overland flow path, that joins Longdike Burn to the west of Part A, is located at chainage 19090, just south of the proposed Burgham Park Underbridge. A new culvert would be provided at this location to accommodate this overland flow.

2.5.136. The new culvert would be circular in shape with an internal diameter of 1200 mm and would be 39 m in length. Terrestrial mammal passage would be available except within flood conditions. At the west of Part A, a headwall would be constructed from which an open ditch would be created towards the west. The downstream extent of this earthworks channel will be confirmed during the detailed design stage.

Burgham Culvert (Reference 10)

2.5.137. The existing culvert of Longdike Burn, located to the west of the proposed Burgham Park Underbridge, beneath Burgham Park Road, at chainage 19520, would be retained as it is and not extended. It is likely that headwalls and wingwalls would be constructed due to the change in the road level. The current arrangement of the existing culvert is sufficient to accommodate the traffic and the Longdike Burn.

2.5.138. The existing timber baffles that facilitate fish passage would be replaced with a more robust arrangement. As the culvert is not proposed to be modified, terrestrial mammal passage would not be affected.

Bockenfield Culvert (Reference 12)

2.5.139. The existing culvert of Longdike Burn, located to the north of the proposed Burgham Park underbridge at chainage 20000, would be extended to accommodate the proposed increased width of the main alignment of Part A. The extension to the culvert would be an arch shape to match the existing with an internal height of 2490 mm and an internal width between supports of 6100 mm. The extension to the culvert would be 34.4 m resulting in a total length of the culvert (existing + extension) of approximately 64.4 m in length.

2.5.140. The natural bed would be maintained, and the culvert would include a wildlife ledge with the top level at 1.7 m above the invert level of the watercourse to allow terrestrial mammal passage. The culvert would also be of sufficient size to facilitate bat passage. Scour protection would be provided downstream on the left bank to reduce the risk of erosion of the riverbank.

2.5.141. The extended culvert would be a precast concrete arch. Precast wingwalls and spandrel walls (a wall built on the curve of an arch) would be provided at the west end of the culvert to retain the watercourse and road embankments. A sloped earth embankment would extend from the edge of the pavement to the base of the culvert wing. Minor works to the existing culvert would be required for the connection between the extension and the existing culvert.

2.5.142. The two existing bat boxes located on the upstream headwall of this culvert would be removed and reinstated. Refer to **Chapter 9: Biodiversity, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for further details.

Blackwood Hall Culvert (Reference 13)

2.5.143. A new culvert would be provided at chainage 20880, to the south of Blackwood Hall to accommodate an existing ditch.

2.5.144. Three circular culverts would be provided, all with an internal diameter of 450 mm and 54 m in length. The topography at the upstream side would be modified to accommodate surface water attenuation, and the ditch would be in open channel to the east.

2.5.145. Fish passage would not be included due to the proposed culvert serving field drainage only. Terrestrial mammal passage would be available except in flood conditions.

Glenshotton Culvert (Reference 14)

2.5.146. The existing culvert of an unnamed watercourse that flows into Thirston Burn, located to the south of the River Coquet at chainage 21860, would be extended by approximately 23.3 m to the east in order to accommodate the proposed increased width of the main alignment of Part A. It would be a circular shape, with an internal diameter of 1350 mm. The total length of the existing and new section would be approximately 47.6 m.

2.5.147. Scour protection would be provided. There is insufficient cover in this existing culvert to provide a separate mammal culvert for terrestrial mammal passage, and the extension to the existing culvert would not therefore be able to provide a separate mammal culvert. However, free passage would be available for terrestrial mammal passage in the existing culvert, except when in flood.

2.5.148. The extended culvert would comprise the construction of a reinforced concrete precast pipe. Precast headwalls would be provided at the east end of the culvert and precast training walls would run parallel to the watercourse.

Parkwood Culvert (Reference 16)

2.5.149. The existing culvert of Bradley Brook, which flows into Back Burn, located at the northern extent of Part A at chainage 23140, would be extended by approximately 20 m to the east to accommodate the proposed increased width of the main alignment of Part A. It would be a circular shape, with an internal diameter of 900 mm. The total length of the existing and proposed extension would be 145 m.

2.5.150. The downstream culvert extension would comprise a 150 mm natural bed to encourage fish passage, and scour protection would be provided. Terrestrial mammal passage is unlikely due to the length of the culvert and therefore no provision is proposed, however terrestrial mammal passage would be available via Parkwood Subway.

2.5.151. The culvert extension would comprise a precast reinforced concrete pipe.

Drainage

2.5.152. The Environment Agency and NCC have been consulted on the proposed drainage design for Part A.

2.5.153. Refer to the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**) and **Appendix 10.5: Drainage Strategy Report, Volume 7** of this ES (**Application Document Reference: TR010041/APP/6.7**) for details of the proposed drainage design.

2.5.154. Part A would increase the area of impermeable surface by approximately 34 ha, and as such, the overall strategy for the proposed drainage design would be to manage the resulting increase in surface runoff. The drainage strategy includes measures to reduce flood risk and improve water quality.

2.5.155. Highway drainage is generally designed to accommodate a 1 in 1 year design flow without surcharging, and a 1 in 5 year flow without surface flooding of the running lanes (with a 20% allowance for climate change). Attenuation would generally be provided for in the case of a 1 in 100 year event, plus 20% climate change allowance.

2.5.156. The drainage strategy would incorporate the implementation of filter drains, kerb and gully arrangements, combined kerb drainage and concrete surface water channels as the primary means of removing and collecting surface water runoff from the highway. These arrangements would be located adjacent to the hardstrip at the edges of the carriageway of Part A.

2.5.157. The surface water runoff would then be directed into a storage swale (open and natural infiltration basin) and detention basins at the following locations (from the south of Part A to the north) as shown in the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**):

a. A storage swale (reference S1) is proposed on the west of Part A just north of Warreners House, between chainages 11000 and 11200. Maintenance access to the storage swale S1 is from a new proposed direct access/egress point off the existing southbound A697 and via a new dedicated access track off the highway

b. A detention basin (reference DB2) would be located within the proposed Highlaws Junction on the eastern side of the main alignment of Part A, at chainage 12200. Maintenance hardstanding would be provided on Hebron Road, for access to the proposed detention basin.

c. A detention basin (reference DB4) would be located on the western side of Part A just south of Priest's Bridge, at chainage 13500. A proposed maintenance access track and turning head for this proposed detention basin would be provided from the northern extent of the new access track off High Highlaws Road.

d. A detention basin (reference DB6) would be located at Priest's Bridge in between the main alignment of Part A and the de-trunked A1, at chainage 14100. Maintenance

access for this would extend from the proposed turning head at the southern end of the de-trunked A1 where it would be stopped up.

e. A detention basin (Reference DB7) would be located to the north of the proposed Fenrother Junction on the western side of the main alignment of Part A, at chainage 15000. Maintenance access and a turning head are proposed from the existing access extending north off Fenrother Lane (west).

f. A detention basin (Reference DB20) would be located where the proposed Fenrother Lane free-flow link road would merge with the de-trunked A1. It is proposed that this would be maintained by NCC.

g. A detention basin (Reference DB9) would be located south of the proposed Causey Park Overbridge on the western side of the main alignment of Part A, between chainages 16800 and 16900. Maintenance access would be provided off the access track leading to New Houses Farm, just north of where it would be linked to the new access track off Causey Park Road.

h. A detention basin (Reference DB11) would be located south of the proposed Causey Park Overbridge on the eastern side of the main alignment of Part A, between chainages 17100 and 17200. Maintenance access and a turning head would be provided at approximate Grid Reference NZ 18882 94726, off the existing loop-road that bypasses the de-trunked section of the A1 for access to the existing Oak Inn at Causey Park Bridge.

i. A detention basin (Reference DB12) would be located north of the proposed Causey Park Overbridge on the western side of the main alignment of Part A, at chainage 18300. Maintenance access and a turning head would be provided off the existing unnamed access track that extends northwards from Causey Park Road on the western side of Part A.

j. A detention basin (Reference DB13) would be located to the immediate south of Burgham Park Underbridge on the eastern side of the main alignment of Part A, between chainages 19400 and 19500. Maintenance hardstanding would be provided on the de-trunked A1 for access to the detention basin.

k. Two detention basins (References DB15 and DB15a) would be located just north of the proposed Burgham Park Underbridge on the eastern side of the main alignment of Part A, between chainages 20100 and 20200. An existing layby would be used for maintenance access to the detention basins. It is proposed that NCC would be responsible for the maintenance of DB15a (to be included in the Statement of Common Ground (SoCG)). In order to keep the detention basins as dry as possible between use in storms, a filter drain would be constructed within DB15 and DB15a to provide a positive means of ensuring that the basins are fully drained. Any runoff and rainfall would be collected and discharged to the watercourse. This, together with mitigation to keep vegetation short (refer to **Chapter 9: Biodiversity, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for further details) would help to deter birds

from this area, which is close to Eshott Airfield, in order to mitigate the risk of bird strike in the airfield flight path.

l. Two detention basins (References DB17a and DB17b) would be located within the proposed West Moor Junction, one at either side of the main alignment of Part A within the southern junction quadrants, between chainages 21500 and 21600. Maintenance hardstanding would be provided off the junction for access to the detention basins. The proposal is that both DB17a and DB17b would be maintained by NCC (to be included in the SoCG).

m. A detention basin (Reference DB17) would be located to the immediate north of the proposed West Moor Junction on the eastern side of the main alignment of Part A, at chainage 21800. Maintenance access and a turning head would be provided off Felton Road. Similarly, to DB15 and DB15a, mitigation to keep vegetation short (refer to **Chapter 9: Biodiversity, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for further details) would help to deter birds from this area.

n. A detention basin (Reference DB18) would be located to the south of the River Coquet on the eastern side of the main alignment of Part A, between chainages 22300 and 22500. Maintenance access and a turning head would be provided from the northern extent of the proposed maintenance access for DB17 off Felton Road.

o. A detention basin (Reference DB19) would be located at the northern extent of Part A on the eastern side of the main alignment of Part A, between chainages 23200 and 23400. Maintenance access and a turning head would be provided from the B6345 from the north.

p. Between the River Coquet bridge and the proposed Parkwood Subway the northbound carriageway would be drained via a filter drain that would outfall into a new buried geocellular tank (Reference T21) (at approximate chainage 23110) with an approximate dimensions of 12 m x 20 m. This tank would provide 300 m^3 of storage. The southbound carriageway would be drained by a concrete surface water channel with a pipe attached to the east elevation of the subway, connecting into the filter drain to the north and outfalling into DB19. A maintenance hardstanding would be provided on the private road which passes under the subway directly to the east of the tank. Due to the shallow deck at the subway it would not be possible to take the filter drain across it, hence the need to provide attenuation at this location. A geocellular detention tank is proposed to fit within the local constraints.

2.5.158. These detention basins and the storage swale would be located outside the Environment Agency's Flood Zone 2 (land which has between a 1 in 100 and 1 in 1,000 annual probability of river flooding, or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding) and Flood Zone 3 (land which has a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of flooding from the sea) areas.

2.5.159. The proposed detention basins, the tank and the storage swale would:

a. Slow down the rate of surface water runoff flow from the drainage system of Part A into existing watercourses, by storing surface water run-off during peak flow (i.e. heavy rainfall) and gradually releasing the water after the peak flow has passed. In accordance with Section 14 of the National Planning Policy Framework (NPPF) policy requirements, the capacity of the basins has been designed with an additional climate change allowance, which has been agreed with NCC as the Lead Local Flood Authority (LLFA) as 20%.
b. Allow sediments and pollutants, including from spillage events, within the discharge to settle to the bottom of the storage facility and therefore avoid entering existing watercourses.

2.5.160. The runoff would be restricted to limit the discharge to existing greenfield runoff rates, i.e. what the runoff would be if the drained area was undeveloped. From the detention basins, tank and storage swale, the surface water runoff would be discharged into existing watercourses via proposed outfalls. From the proposed outfalls, the discharge would be piped to the watercourse (in the case of the River Coquet, to the riverbank) where a headwall structure would be provided.

2.5.161. The existing River Coquet bridge drainage, including existing treatment methods prior to discharge, is assumed to be retained. The deck drainage discharges at two locations one to the south abutment and one to the north pier. These outfalls discharge directly into the River Coquet via catchpits which provide a level of treatment prior to discharging into the watercourse.

2.5.162. The proposed River Coquet bridge run-off from chainage 22470 to 22710, would be collected in deck drainage units and connect to the concrete surface water channel (SWC) on the southbound carriageway.

2.5.163. The following measures would also be included as part of the drainage strategy for Part A and will be discussed with and set out in a SoCG with both NCC and the Environment Agency:

a. Existing roads and tracks that would not be considered within Part A would retain the current drainage system.
b. Proposed new local access tracks would be drained using over the edge drainage, as the likely increase in the overall runoff is anticipated to be negligible.
c. Runoff from the running lanes and hard strips would follow the road camber to both channels, and to central reservation where there is a crossfall.
d. Runoff to the central reservation would be to concrete V-channels.
e. Where the highway is accommodated within a cutting, the runoff from the cutting would be to the carriageway surface water filter drain, except in one location north of Parkwood Subway to the east of the carriageway where a surface water channel is proposed.
f. Where the highway is to be on an embankment it is proposed that the embankment runoff would be collected in a ditch at the bottom of the embankment and conveyed to the local ditches and watercourses.

2.5.164. Online controls such as vortex flow controls, orifice plate or sliding gates would be provided to restrict discharges to allowable values in accordance with DMRB standards and as agreed with NCC as the LLFA. Drainage along the de-trunked section would be retained as the existing situation. The sections of the existing road which would not be part of the A1 trunk network, would continue to discharge to local watercourses/ land drains as previously.

2.5.165. Drainage discharge from the local road network would be separate from that associated with Part A, as agreed with NCC. As the drainage strategy along these local roads would be to retain the existing network, there are no proposals to provide attenuation to this runoff.

Utilities

2.5.166. Statutory utility services throughout the length of Part A that require diversion include electricity (Northern Powergrid (NPG)), gas (Northern Gas Networks (NGN)), water (Northumbrian Water), and telecommunications (BT Openreach, Virgin Media Sky, Vodafone, City Fibre, GTC and Mast Data-MBNL) and National Grid Gas Transmission. These are predominantly located underground, other than electricity and some side road telecoms that exist as overhead services but would be diverted underground. In addition, there is the requirement to relocate one telecom mast north west of Eshott airfield. Utilities would be diverted from the footprint of Part A to ensure sufficient protection is provided to all utilities and to ensure they are located so as to achieve safe access for future maintenance. The details of these diversions which are within the Order Limits would be developed further at the detailed design stage.

2.5.167. Where these assets run parallel to the existing highway, they would be diverted to run adjacent and parallel to the carriageways of Part A.

2.5.168. Where these assets would cross the carriageway of Part A they would be diverted (underground, where necessary) to cross the alignment on a perpendicular route. Where diversions would be required to accommodate realignment of local roads, these diversions would be located predominantly within local road verges or, for road crossings, would cross the alignment on a perpendicular route.

2.5.169. Telecommunications assets would be located within a designated utilities trench within the permanent highway boundary, predominantly within the proposed dual carriageway verge. All other utilities would be immediately outside the permanent highway boundary within a utilities trench.

2.5.170. Assets that have been identified as needing to be diverted have been identified through consultation with statutory undertakers, in accordance with utility diversionary works process outlined in the Roads and Street Works Act 1991.

2.5.171. Where an existing asset requires diversion as a result of Part A, the relevant statutory undertaker together with the Applicant would be responsible for arranging for the asset to be diverted as part of the construction works. The Applicant would also be responsible for maintaining existing service routes during the construction works until the agreed diversion

route is in place and active. They would also be responsible for the provision of suitable access and working space for all statutory undertaker construction works and tie-ins back to original network and service connections, and for coordination of statutory service contractors and designs, including suitable locations for junction and inspection chambers. Fence lines would be reused where feasible.

Advanced Utilities Diversion Works

2.5.172. In order to construct Part A, a National Grid gas transmission pipeline to the south of the proposed Causey Park Overbridge would need to be diverted, together with a NGN pipeline and a NPG overhead electricity line at this location (the proposed works). Refer to the NPG and NGN Diversions Layout drawing in **Appendix 2.2: Technical Drawings** of this ES.

2.5.173. The proposed works comprise the diversion of approximately 650 m of existing 1050 mm diameter National Grid High-Pressure Gas Main underground pipeline (HPGM) (maximum 84 bar operating pressure) (HPGM) and are anticipated to be undertaken by National Grid to precede the A1 dualling works. To facilitate this, the diversion of a section of NPG overhead electricity line (a 20kV low-voltage overhead line) and a section of a NGN medium pressure below ground gas pipeline is also required. To ensure delivery of these works, powers are also proposed in the **draft DCO** (**Application Document Reference: TR010041/APP/3.1**).

National Grid

2.5.174. The proposed works would comprise the construction of approximately 650 m of new pipe length to connect back to the existing HPGM.

2.5.175. The existing HPGM crosses the offline section of Part A at approximate chainage 17300 / 17400 and therefore needs to be diverted to allow Part A to be constructed. The diversion passes through arable farmland and would comprise two tie-in points to the existing HPGM to the east and west of the main alignment of Part A at this location. From the western tie-in point, the HPGM would be routed north by approximately 350 m, and then directly east by approximately 300 m to achieve a perpendicular crossing of the new alignment, reconnecting at the eastern tie-in point. The existing section of HPGM between the tie-in points would then be left in-situ.

2.5.176. The existing HPGM is constructed from pipe of standard wall thickness. As this does not comply with relevant design standards (**Ref. 2.7**), this would require the installation of heavy wall pipe extending to a minimum of 101.8 m on either side of high density traffic routes such as Part A.

2.5.177. During the construction period of the proposed National Grid diversion, an approximate land take of 110,000 m^2 (approximately 11 ha) would be required, comprising approximately

2,500 m^2 (approximately 0.25 ha) for each of the stopple-pit[3] compounds (5,000 m^2 total (approximately 0.5 ha)) at the east and western tie-in points, approximately 40,000 m^2 (approximately 4 ha) working area for the east and west tie-in locations and approximately 19,000 m^2 (approximately 1.9 ha) along the diversion length. Although the current proposal is to connect the new section of pipe to the existing pipe by outage connection, negating the need for stopple valve arrangement, it is proposed that the land take requirement for stopple pits is retained to allow the proposal to revert to a stopple valve connection solution should that be required. Furthermore, an approximate 39,000 m^2 (approximately 3.9 ha) temporary compound would be required to accommodate site establishment and facilities and material storage during construction, which would be located approximately mid-way between the two tie-in points, north-west of the Bridge House / Joiners Cottage Loop Road.

2.5.178. Following completion of the diversion, the redundant pipeline sections (i.e. the section which the diversion has bypassed) would be grout filled and / or removed by the National Grid Main Works contractor. Removal of the existing pipeline section would require an additional working area of approximately 7,000 m^2 (approximately 0.7 ha).

Northern Powergrid and Northern Gas Networks

2.5.179. The NGN and NPG services currently extend in a north-south direction approximately 400 m west of the existing A1 alignment, crossing the offline section of Part A (and the route of the proposed HPGM diversion) at approximate chainage 17500. It is therefore necessary to divert these utilities to allow Part A to be constructed.

2.5.180. At their northern extent, the NGN and NPG services would be diverted east, to the north of Causey Park Road towards Causey Park Lodge (where a new supply connection to Causey Park Lodge would be made, replacing the existing overhead line connection that currently runs from west to east to the north of Causey Park Road). The proposed diversions would then cross Causey Park Road and continue south parallel to the western side of the de-trunked A1, and then follow the existing loop-road that provides access to the existing Oak Inn on its western side, crossing the Earsdon Burn adjacent to the bridge by directional drill, to a connection point approximately 100 m west of the Oak Inn.

Lighting

2.5.181. The road lighting assessment process is provided of **Appendix 2.1: Lighting Assessment** (**Confidential**) of this ES. The assessment concluded that new lighting provision is not economically justified for Part A. No new lighting would therefore be provided along Part A. The assessment findings have been supported through a Road Safety Engineers (RSE) Assessment (**Appendix E** of **Appendix 2.1: Lighting Assessment (Confidential)** of this

[3] Stopples are valve/plug arrangements to allow completion of connections without requirement for temporary outages in supply.

ES). Construction compounds would, however, be lit (refer to **paragraph 2.8.45** and **2.8.55**).

2.5.182. As there is currently no lighting along the existing A1, no lighting would be provided along the proposed de-trunked A1.

2.5.183. Four lighting columns at West View would be removed and reinstated.

Fencing

2.5.184. The new permanent highway boundary would be fenced with standard wooden post and rail fencing that would be either newly installed or retained from the existing fence lines. Where feasible, existing fence lines would be used.

2.5.185. Between chainage 19900 of Part A and the proposed West Moor Junction, where space within the cross-section is constrained, anti-glare fencing would be provided in place of hedgerow planting (as described in **Section 2.6**) such as flexible PVC anti-glare screening or a close boarded barrier, allowing for filtered views of the wider environment beyond to be retained. Refer to **Chapter 7: Landscape and Visual, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for further details.

2.5.186. Any additional fencing that may be required for environmental mitigation purposes for Part A is identified within **Technical Chapters 5** to **14**, **Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**).

Barriers

2.5.187. The design of Part A includes safety fencing within the central reserve. All the safety fencing would be constructed of steel and would be in accordance with the relevant DMRB standards.

2.5.188. The design allows for safety fencing within the cross-section. The details of this will be developed at detailed design.

Walking, Cycling and Horse Riding Facilities

2.5.189. Part A would change the existing conditions for walkers, cyclists and horse riders (WCH).

2.5.190. It is currently difficult to cross the existing A1 due to the volume and speed of traffic, particularly for those WCHs making east-west journeys, which include those accessing Tritlington Church of England First School on a daily basis. In order to improve safety, once Part A is in operation, WCHs would not be able to directly cross the carriageways of Part A at road level. East-west connectivity would be maintained by new footways provided on the proposed bridges at each new junction and on the proposed Causey Park Overbridge.

2.5.191. Footway and cycleway provision are described in detail above in **paragraphs 2.5.23** to **2.5.55**, together with changes to bus stop provision.

2.5.192. **Table 2-1** below describes the permanent changes to existing PRoW required as a result of Part A. Refer to the **Rights of Way and Access Plans** (**Application Document Reference: TR010041/APP/2.5**) for further details of proposed diversions.

Table 2-1 - Proposed Changes to WCH Routes

PRoW Ref.	PRoW Type	Description
407/001 & 407/002	Footpath	Currently, as this footpath is not easily accessible from the western side of the A1, it is proposed that the PRoW is linked south to PRoW 407/018 on the eastern side of the A1, to increase connectivity. It is also proposed to be extended north to tie in with the de-trunked section of the A1 by Priest's Bridge.
423/001	Footpath	Part A would sever this route with no provision for WCHs. A footway would be provided on the southern side of the Fenrother Junction to allow a safe crossing.
423/006	Footpath	The footpath on both the eastern and western side of Part A would be severed by the offline section. Since these are relatively short sections of footpath and do not tie into a wider network, they would be stopped up.
423/007	Footpath	The footpath would be severed by the offline section of Part A. As the footpath does not tie into a wider network and is relatively short, it would therefore be stopped-up from the western side of the existing A1.
423/013 & 423/017	Footpath	These footpaths would be severed by the A1. 423/017 would be diverted on the eastern side of Part A to Causey Park Overbridge. A footway would be provided over the A1 on the southern side of Causey Park Overbridge and would tie-in with PRoW 423/013, which would be stopped up by Part A.
422/011	Footpath	An existing junction with a footpath on the western side. There is no grade separated WCH route at this location. Users would be diverted to the north to tie-in with the proposed access track to Bywell Road.
422/002	Footpath	This footpath is to the southern side of the River Coquet crossing the A1 at-grade. Part A would sever this crossing point. However, the route of the footpath would be maintained via a diversion under the existing and

PRoW Ref.	PRoW Type	Description
		proposed River Coquet bridges. The PRoW diversion will be developed fully at detailed design.
422/020	Footpath	The footpath to the southern side of the River Coquet crosses the A1 at-grade. Part A would sever this crossing point. However, the route of the footpath would be maintained via a diversion under the existing and proposed River Coquet bridges. The PRoW diversion will be developed fully at detailed design.
115/009	Footpath	Footpath on the northern side of the River Coquet which forms a portion of the St Oswald's Way. This currently crosses beneath the A1 and would be extended underneath the proposed River Coquet bridge on the northern side of the River Coquet to maintain the connection.
115/008	Footpath	There is an underpass in close proximity to the route and, whilst it is not a designated PRoW, it is used by WCHs. Upgrading this route to a recognised PRoW would assist WCHs in crossing the A1 at this point. The footpath would be diverted to pass through the underpass to maintain the connectivity of the routes crossing the A1 north of the River Coquet.
115/016	Footpath	This footpath would be upgraded to a PRoW through the underpass mentioned above to connect PRoW 115/016 to 115/008 to maintain connectivity of the routes crossing the A1 north of the River Coquet.
407/010	Bridleway	Bridleway off existing private access which leads to Hebron Road and which connects Northgate Farm/Hospital and the A697 with North Gate and the local road network, would join a new access track on the eastern side of Part A at Warreners House and extend to West View.
New PRoW north of Highlaws Junction along new field access	Footpath	This proposed PRoW would run from Hebron Road to the east of Highlaws Junction, parallel to the main alignment of Part A up to 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, linking to A1 to be de-trunked.

PRoW Ref.	PRoW Type	Description
407/018	Footpath	This footpath currently runs from Hebron Road to the existing A1 via a property on Hebron Hill. Instead of stopping at the A1, the footpath would connect to the proposed PRoW running from Highlaws Junction to the start of the offline section of Part A.

2.5.193. The design of Part A also includes the following considerations:

a. The proposed footways at the three new junctions link into the existing side roads, and pedestrians are accommodated by footways through the proposed junctions and across the new bridges.
b. The proposed Causey Park overbridge would be designed to cater safely for both pedestrians and vehicular traffic. Provision for other users may be considered at detailed design.
c. The proposed Burgham Underbridge would be designed with access for pedestrians using hardened verges and vehicular traffic, with clear visibility for all users.
d. Use of best practice design in accordance with design standard TA90/05: The Geometric Design of Pedestrian, Cycle and Equestrian Routes and the NN with regards to the safety of WCHs would improve the amenity of users of the footpaths in the surrounding areas. Additionally, landscape planting would provide screening of the road. LNS would reduce noise levels for the wider network of PRoW, providing improved amenity for users.

2.5.194. Refer to **Chapter 12: Population and Human Health, Volume** 2 of this ES (**Application Document Reference: TR010041/APP/6.2)** for further details on the proposed WCH provision for Part A.

Emissions, Waste and Materials

2.5.195. The likely types and quantities of wastes, residues and emissions (such as water, air, soil, noise, vibration, heat, radiation) produced during the construction and operation of Part A are described and assessed within the relevant **Technical Chapters 5** to **15**, **Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**).

2.5.196. The likely impacts upon the use of materials during the construction and operation of Part A are considered within **Chapter 13: Material Resources, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**).

2.5.197. The construction of Part A is anticipated to generate surplus material. A number of essential landscape and biodiversity mitigation bunds are therefore proposed along the length of Part A in order to use the excess material and avoid potential effects associated with its transport and disposal off-site. These bunds are discussed further in **Section 2.6**.

2.5.198. Furthermore, due to the likely surplus material generated, there is an opportunity for material to be used for Part B and other schemes being delivered in the North East by the Applicant. This material would be stored temporarily until the start of construction of these other schemes. This is discussed further in **Section 2.12**.

2.5.199. Should other schemes being delivered by the Applicant not be available to use any remaining surplus material, bunds and slackened earthworks slopes are proposed, as described in **Section 2.12**, which would accommodate the surplus material except for a quantity of topsoil. There is a potential opportunity for the mass haul methodology to be adapted so that all residual surplus material is topsoil. This topsoil would be sold locally.

DESCRIPTION OF PART B

Dualling of the Existing Single Carriageway and Provision of a New Dual Carriageway

2.5.200. Part B would upgrade the section of the A1 between Alnwick (approximate Grid Reference NU 19710 15270) and Ellingham (approximate Grid Reference NU 17005 22504) from a single carriageway road to dual carriageway standard. This would be achieved by approximately 8 km of online widening to the east of the existing A1. The existing A1 would be used as the northbound carriageway and the new carriageway as the southbound carriageway. The width of each mainline carriageway would be 9.3 m and comprise of two 3.65 m wide lanes with 1 m hard strips either side.

2.5.201. As shown in the **Traffic Regulation Plans** (**Application Document Reference: TR010041/APP/2.6**), the national speed limit of 70 mph would apply along the majority of Part B.

2.5.202. However, a local speed limit of 20 mph would apply for Rock South Farm Access Road, West Linkhall Access Road and East Linkhall Access Road.

2.5.203. The earthworks within this section of Part B would comprise both cuttings and embankments, with the proposed Charlton Mires Junction raised upon embankments (refer to **paragraphs 2.5.207** to **2.5.214** for further details of this junction).

2.5.204. The three existing bus stops at Charlton Mires and along the B6341 (as described in **paragraph 2.4.11**) would be extinguished with Part B. To replace these bus stops, two new bus stops are proposed along the B6341 to the west of the A1. One of these new bus stops would be located alongside the southbound lane and the other alongside the northbound lane. No new bus stops are proposed along the route of the A1 for safety reasons.

2.5.205. The existing footway to the east of the existing A1, to the north and south of the at-grade junction at Charlton Mires, links the bus stop locations in each direction. As the bus stops would be replaced on the B6341 with Part B, no new footways are proposed along this section of the main alignment of Part B.

2.5.206. A total of six parking lay-bys are proposed along the route of the improved A1, with three of the parking lay-bys being located along the southbound carriageway and three along the northbound carriageway. The location of the proposed bus stops and parking lay-bys are

shown on the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**).

Charlton Mires Junction

2.5.207. One new grade-separated junction is proposed as part of Part B. The existing at-grade junction (junction at the same level or height to the roads it connects with) at Charlton Mires and Rock Lodge would be replaced with a grade separated junction located at Charlton Mires (approximate Grid Reference NU 17713 20573), called Charlton Mires Junction. Refer to the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**).

2.5.208. The new junction would include an overbridge over the A1 which would connect to the side roads and proposed access roads (refer to **paragraphs 2.5.220** to **2.5.226** for further details on the proposed access roads); this would provide efficient and safer access. The junction would separate the local traffic using the B6347 and B6341 from the strategic traffic using the A1. The junction would remove the need for direct access from B6341 and B6347 on to the A1, improving safety for end-users.

2.5.209. A roundabout would be provided where there is a sharp existing north west bend in the B6347, to the north of Rock Nab. The roundabout would provide safe access to the B6437 west and B6341 as well as northbound carriageway of the A1 and southbound carriageway of the A1 and B6347 east via the new grade-separated junction.

2.5.210. Charlton Mires Junction would include a footway to facilitate safe, pedestrian access. The footway would link the diverted Footpath 129/004[4], to the east of Part B, across the A1 and along the improved B6341, to the west of Part B, to approximately Rock Lodge (refer to the **Rights of Way and Access Plans (Application Document Reference: TR010041/APP/2.5**). The proposed junction would also provide safe access for cyclists and horse-riders, with the junction design including parapets at the correct height for horse-riders.

2.5.211. The proposed junction would comprise an integral single span bridge with a pre-stressed precast concrete beam deck. Construction joints have been minimised as far as possible by the use of precast elements. The total number of construction joints is dependent on the detailed design of Part B. The integral configuration would eliminate the need for conventional bridge expansion joints.

2.5.212. The parapet panels would be constructed from metal. The parapet plinths would be constructed from concrete. It would be determined at detailed design whether the parapet plinths would be precast or cast in situ.

[4] PRoW numbers are defined within NCC's definitive map.

2.5.213. The clear span between the abutments would be approximately 33.2 m and the headroom height of the bridges would be 6.0 m (greater than the standard headroom of 5.3 m, to allow for known local over height movements to help to ensure consistency and resilience on the section of the road). This section of the A1 is not an official abnormal load route.

2.5.214. The dimensions of this structure would be no greater than a span of 37.2 m, the width 10.8 m, the parapet height by no more than 10.1 m above the new road surface.

2.5.215. Refer to **paragraph 2.5.282** for further detail on lighting at Charlton Mires Junction.

Residential Properties

2.5.216. Two residential dwellings would need to be demolished to accommodate the proposed Charlton Mires Junction. These properties include East Cottage and Charlton Mires Farm, which are both located to the east of the existing junction between the A1 and B6347 at Charlton Mires, at approximate chainage 58,860. Pursuant to the Compensation Code (**Ref. 2.6**), homeowners of the residential properties would be eligible to claim financial compensation.

Private Means of Access and Other Access Roads

2.5.217. PMAs would be provided for properties where existing access to the A1 would be stopped up. The paragraphs below describe the proposed changes to PMAs and other access roads through Part B. Refer to the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**) for full details of the proposed access roads, including Rock South Farm Access Road, East Linkhall Access Road and West Linkhall Access Road. Refer to the **Rights of Way and Access Plans** (**Application Document Reference: TR010041/APP/2.5**) for details of the PMAs to be stopped up.

2.5.218. For all proposed and improved PMAs and other access roads, the minimum carriageway width would be 3 m providing appropriately located passing bays, where required. Where agricultural vehicles are anticipated to use the access arrangements, the width would be increased to 4.5 m. Each PMA has been designed to take into account the vehicles that would use it, including types and frequency of use.

Heckley Fence

2.5.219. The direct access between Heckley Fence and the A1, to the south of Part B, would be stopped up for safety reasons. The residents of Heckley Fence would therefore have to travel north along the B6341 and access the A1 from the new Charlton Mires Junction.

Rock South Farm Access Road

2.5.220. Currently, residential properties at Rock South Farm, located approximately 800 m to the east of the A1, have direct access onto the A1. Direct vehicular access would be closed under Part B, for safety reasons.

2.5.221. Alternative access to Rock South Farm would be provided via a new access road that would run east from Rock Midstead adjacent to the existing woodland before running south

towards Rock South Farm, parallel and to the west of an existing agricultural track that also serves as the route for Footpath 129/005.

2.5.222. The proposed access road would be approximately 1.8 km long, 4.5 m wide and would feature passing bays along its length to allow vehicles to safely pass each other.

West Linkhall Access Road

2.5.223. Currently, Patterson Cottage and residential properties at West Linkhall have direct access onto the A1. Direct vehicular access would be closed as under Part B, for safety reasons.

2.5.224. Alternative access would be provided via an access road that links Charlton Mires Junction with Patterson Cottage and residential properties at West Linkhall. The access road would run parallel to, and to the west of, the existing A1. The new access road would be approximately 0.7 km in length, and it would utilise the existing lay-by off the A1. It would have a 6 m wide single lane carriageway for most of its length, with a 4.5 m wide one-lane section in the middle of the road because of a pinch point. The 4.5 m wide section is proposed due to a pinch point at this location which means a 6 m wide carriageway cannot be accommodated. The pinch point is due to constraints including Patterson Cottage, which is a residential property, boarding kennels and Grade II Listed Building, to the west of the A1 and the Camp at West Linkhall Scheduled Monument (NHLE 1016500) to the east of the A1.

East Linkhall Access Road

2.5.225. Currently, properties at East Linkhall, West Lodge, Charlton Hall and Blossom Plantation have direct access onto the A1. Direct vehicular access would be closed under Part B, for safety reasons.

2.5.226. Alternative access would be provided via an access road that links Charlton Mires Junction with properties at East Linkhall, West Lodge, Charlton Hall and Blossom Plantation. The access road would run parallel to, and to the east of, the proposed alignment of the A1. The access road would be approximately 1.5 km long, 4.5 m wide and would feature numerous passing bays along its length to allow vehicles to safely pass each other. A wider two-lane section would be provided at the connection with Charlton Mires junction to allow safe passage of vehicles entering and exiting the junction. At detailed design, the potential to widen the carriageway of the road within the Order Limits to 6 m to allow for two lanes along the length of the access road would be considered.

Road Surfacing

2.5.227. The existing A1 between Alnwick and Ellingham comprises sections of Hot Rolled Asphalt (HRA) and sections of Low Noise Surface (LNS).

2.5.228. The length of Part B would incorporate LNS, which would provide noise reduction advantages. Exceptions to this are on structures where HRA would be used to provide improved waterproofing. The local road network (the road network maintained by NCC) affected by Part B would also be surfaced with HRA. Polished Stone Values (PSVs), which

are used for estimating the skid resistance of the road surface, would be varied across the carriageway to reduce the demand on premium high PSV aggregate and use more local aggregate.

2.5.229. The central reserve design would comprise of up to 80% of slow viscoelastic recycled materials (made predominantly from road planings, some virgin aggregate and foamed bitumen as specified in the DMRB) for a hardened design.

2.5.230. The following principles would be adopted to ensure sustainability:

a. Re-use of materials on Part B to minimise resource consumption, waste disposal and emissions resulting from material haulage.
b. Whole life-cycle design, including that which maximises the residual life of existing surfacing components.
c. Recycling of end of life materials.
d. Innovative and best practice designs to promote environmental protection and minimise construction periods and traffic disruption.

Signage and Roadside Technology

2.5.231. The existing road signage would be replaced where necessary, to reflect the proposed change in junction layout and the national speed limit on the main alignment of Part B (refer to **paragraphs 2.5.200** to **2.5.202** for more detail on the national speed limit), and to align with current design standards and regulations. The proposed signage strategy would also address existing signage inconsistencies and errors, such as including currently omitted relevant destinations or roads.

2.5.232. New signage would be provided along north and southbound carriageways associated with the proposed new junctions.

2.5.233. An initial review of existing technology between Alnwick and Ellingham has been undertaken at preliminary design and it has been identified that there is minimal traffic communication technology across Part B, with only two traffic monitoring units (TMUs) currently being identified.

2.5.234. Of these two TMUs, one TMU is maintained by the Applicant and would be replaced with a TMU of current standard under Part B. The TMU would be located within the Order Limits underneath the carriageway. A roadside cabinet would be located in the highway boundary with a localised solar panel. It is currently unknown who manages the second TMU. Further investigations would be undertaken at detailed design stage to establish ownership. It may be that the second TMU only requires decommissioning and does not require replacement.

Structures

2.5.235. In addition to the proposed Charlton Mires Junction described in **paragraphs 2.5.207** to **2.5.214**, Part B would comprise a new accommodation overbridge at Heckley Fence, as described below.

2.5.236. Proposed new culverts and extensions to existing culverts are described in **paragraphs 2.5.241** to **2.5.257.** The descriptions given are of likely designs and construction methodologies and have been assumed for the purposes of EIA. However, final designs of these structures would be refined during the detailed design stage.

2.5.237. Refer to **Section 2.8** for details on construction methodology.

Heckley Fence Accommodation Overbridge

2.5.238. An accommodation overbridge would be provided across the A1 to the east of Heckley Fence (approximate Grid Reference NU 18940 17305), called the Heckley Fence Accommodation Overbridge. Heckley Fence Accommodation Overbridge would accommodate vehicular movements as well as WCH users. The proposed junction would include parapets at the correct height for horse-riders. Byway 129/022 and Byway 110/013 would be diverted to bridleway standards across Heckley Fence Accommodation Overbridge (refer to the **Rights of Way and Access Plans** (**Application Document Reference: TR010041/APP/2.5**).

2.5.239. The dimensions of the overbridge would comprise a span of approximately 30 m, a width of 6.7 m and a parapet height by no more than 1.8 m above its new road surface. The proposed structure for the new accommodation overbridge would comprise an integral single span bridge with a pre-stressed precast concrete beam deck. Construction joints have been minimised as far as possible by the use of precast elements. The total number of construction joints is dependent on the detailed design of Part B. The integral configuration would eliminate the need for conventional bridge expansion joints.

2.5.240. The parapet panels would be constructed from metal. The parapet plinths would be constructed from concrete. It would be determined at detailed design whether the parapet plinths would be precast or cast in situ.

Culverts

2.5.241. The proposed new and extended culverts to be provided under Part B have each been assigned a reference name and number for hydraulic modelling purposes. The following paragraphs list the culverts pertinent to this assessment. Refer to the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**) and **Appendix 2.3: Culverts Construction Methodology** of this ES for further details.

2.5.242. The design of the culverts has been informed by ecological species survey information. Refer to **Section 2.8** for details on construction methodology.

Denwick Burn (Reference 17.1)

2.5.243. The existing culvert, located at approximately chainage 53470, is already of a sufficient length to convey flows beneath the footprint of the proposed embankment. As such no works are proposed to the existing culvert.

Denwick Burn (Reference 18.1)

2.5.244. The existing culvert, located at approximately chainage 53850, is already of a sufficient length to convey flows beneath the footprint of the proposed embankment. As such no works are proposed to the existing culvert.

Denwick Burn (Reference 19.1)

2.5.245. The existing culvert, located at approximately chainage 54080, would be extended by 21.25 m with the total length of extended culvert 37.75 m. The extension would be a new 600 mm pipe with a manhole located downstream to tie into the existing culvert.

Denwick Burn (Reference 21.1)

2.5.246. The existing culvert, located at approximate chainage 54600, would be extended by 38 m with a new precast concrete 1.2 m pipe, and the construction of a new headwall and wing wall at the culvert outlet. The length of the extended culvert would be 110.3 m.

Heckley Fence (Reference 22.1)

2.5.247. The new accommodation overbridge at Heckley Fence would replace the existing culvert arrangement with a new watercourse crossing immediately to the north of the proposed earthworks for the accommodation overbridge. Pipe sizes and inlets would match the existing culvert and is assumed to be a 300 mm circular pipe that would be approximately 43.75 m in length.

White House Burn Culvert (Reference 23.1)

2.5.248. The existing culvert of White House Burn Culvert, located at approximately chainage 56920, would be extended upstream to accommodate the proposed increased width of the main alignment of Part B. The proposed new extension would be a precast reinforced concrete box with internal 3.23 m width and 3.44 m height. A riser wall would be required to accommodate an elevated 2.2 m wide footpath along the structure, that would be segregated from the drainage channel and protected by a pedestrian guardrail.

2.5.249. The approximate total length of the structure would be approximately 37.3 m including an in-situ concrete stich to materialise the connection between retained structure and new precast units. The extended length would be approximately 15.6 m of the total length. Precast wingwalls would be provided along the north-eastern end of the culvert.

Kittycarter Burn (Reference 24.2)

2.5.250. The existing culvert, located at approximately chainage 58600, would be extended by 26.5 m with a new precast concrete circular 600 mm pipe, and the construction of a new headwall and wing wall at the culvert outlet. The length of the extended culvert would be 50 m.

Kittycarter Burn (Reference 25.1)

2.5.251. The existing culvert, located at approximately chainage 58840, would be demolished and replaced to the new alignment of the tributary of Kittycarter Burn. The new structure would be a circular 600 mm culvert and 17 m in length.

2.5.252. A 150 mm natural bed would be provided within the base of the culvert as it is a new construction as opposed to an extension of an existing structure.

Linkhall Culvert (Reference 26.1)

2.5.253. The existing Linkhall Culvert is located at approximately chainage 59275. The culvert would need to be lengthened to accommodate the proposed main alignment of Part B, including an access road to the west of the main carriageway and a slip road on the opposite side, to the east of the carriageway. The proposed new extension to the culvert would comprise a number of precast reinforced concrete box units, which would have an internal width of 1.88 m and height of 2.25 m. The existing footpath running along the retained culvert would have continuity with a riser wall and scour resistance surface within the new precast units.

2.5.254. The extension of the culvert would have an approximate length of 50.8 m. The total length of the culvert including the length of the retained existing culvert and the cast in-situ concrete stich joint would be 70.9 m.

Shipperton Burn Culvert (Reference 27.1)

2.5.255. The existing Shipperton Burn Culvert is located at approximately chainage 60385 and would need to be extended on the outlet side, to the east of the proposed carriageway. The proposed new extension would be a precast reinforced concrete box with internal 2 m width and 1.25 m height. The extension of the culvert would have an approximate length of 27.6 m. The total length of the culvert would be 47.6 m.

Rock Culvert (Reference 28.1)

2.5.256. A new private access road is proposed located to the west of the existing access track. A new independent culvert is proposed under the new private access road. The new culvert comprises a number of precast concrete pipe units, with an internal diameter of 1.2 m and approximate length of 17.65 m. Concrete wingwalls and headwalls would be provided at both ends of the new culvert.

2.5.257. The existing culvert, located at approximately chainage 58100, would be retained.

Drainage

2.5.258. The Environment Agency and NCC have been consulted on the proposed drainage design for Part B.

2.5.259. Refer to the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**) and **Appendix 10.4: Drainage Strategy Report**, **Volume 8** of this ES (**Application Document Reference: TR010041/APP/6.8**) for details of the proposed drainage design.

2.5.260. The drainage strategy includes measures to reduce flood risk and improve water quality. The southern tributary of Kittycarter Burn would be diverted and realigned to the east of Charlton Mires Junction in order to reduce the length of culvert required. Refer to the **Drainage Strategy Report** (**Appendix 10.4, Volume 8** of this ES (**Application Document Reference: TR010041/APP/6.8**)) for further detail.

2.5.261. In addition, an existing flood issue regarding fluvial flooding from the tributaries of Kittycarter Burn was identified through consultation with NCC and statutory consultation. The fluvial flooding associated with the tributary of Kittycarter Burn has affected isolated properties to the west of the A1. This is due to the existing culvert underneath the A1 along the western tributary of Kittycarter Burn not conveying flow through the structure efficiently. To avoid flood risk increasing in this area as a result of Part B, the bank to the south of the watercourse would be lowered. Refer to **Chapter 10: Road Drainage and the Water Environment, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for further detail.

2.5.262. Part B would increase the area of impermeable surface by 12.3 ha, and as such, the overall strategy for the proposed drainage design would be to manage the resulting increase in surface runoff. The drainage design would manage surface runoff from existing impermeable surfaces and proposed impermeable surfaces within Part B catchment areas.

2.5.263. Highway drainage is generally designed to accommodate a 1 in 1 year design flow without surcharging, and a 1 in 5 year flow without surface flooding of the running lanes (with a 20% allowance for climate change). Attenuation would generally be provided for the 1 in 100 year event, plus 20% climate change allowance.

2.5.264. The drainage strategy would incorporate the implementation of filter drains, kerb and gully arrangements, combined kerb drainage and concrete surface water channels as the primary means of removing and collecting surface water runoff from the highway. These arrangements would be located adjacent to the hard strip at the edges of the carriageway of Part B.

2.5.265. The surface water runoff would be divided into drainage catchments, primarily on a topographic basis (i.e. draining from high points to low points) and asset ownership. The drainage system for each catchment would feed an outfall into a watercourse. At each outfall location, a dry detention basin would be provided as shown in the **General Arrangement Plans** (**Application Document Reference: TR010041/APP/2.4**):

a. A dry detention basin (Reference DB22) would be located to the east of the A1 between approximate chainages 53,400 and 53,500. A maintenance track and turning head for the proposed detention basin would be provided from a parking layby on the southbound A1.

b. A dry detention basin (Reference DB23) would be located to the west of the A1 to the north east of Heckley House, between approximate chainages 54,550 and 54,650. A maintenance track and turning head for the proposed detention basin would be provided from the B6341 via Byway 110/013.

c. A dry detention basin (Reference DB24) would be located to the west of the A1 between to the north east of Heiferlaw Bank, between approximate chainages 56,920 and 55,770. A maintenance track and turning head for the proposed detention basin would be provided via Footpath 110/010.
d. Two dry detention basins (References DB25 and DB26) would be located to the west of the A1 within Charlton Mires Junction, between chainages 58,700 and 58,910. The proposed maintenance track for DB25 would be from the B6341, and access to DB26 would be via a hardstanding area on the connector road.
e. A dry detention basin (Reference DB27) would be located to the east of the A1 to the north east of Charlton Mires Junction, between approximate chainages 59,000 and 59,140. The proposed maintenance access for DB27 would be from the proposed East Linkhall Access Road. This detention basin was enlarged through the design process to accommodate additional flows from the northern extent of Part B. As flows would be diverted from one catchment to another, this approach was agreed with NCC as LLFA as shown in **Appendix 4.2: Environmental Consultation** of this ES. Refer to **Table 3-4** of **Chapter 3: Assessment of Alternatives** of this ES for further detail on the process that was completed for developing this design.

2.5.266. These detention basins would be located outside of Flood Zone 2 (land which has between a 1 in 100 and 1 in 1,000 annual probability of river flooding, or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding) and Flood Zone 3 (land which has a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of flooding from the sea) areas.

2.5.267. The proposed detention basins would:

a. Slow down the rate of surface water runoff flow from the drainage system of Part B into existing watercourses, by storing surface water run-off during peak flow (i.e. heavy rainfall) and gradually releasing the water after the peak flow has passed. In accordance with Section 14 of the NPPF requirements, the capacity of the basins has been designed with an additional climate change allowance, which has been agreed with NCC as the LLFA as 20%.
b. Allow sediments and pollutants, including from spillage events, within the discharge to settle to the bottom of the basins and therefore avoid entering the existing watercourses.

2.5.268. The runoff would be restricted to limit the discharge to existing greenfield runoff rates, i.e. what the runoff would be if the drained area was undeveloped. From the detention basins, the surface water runoff would be discharged into existing watercourses via proposed outfalls. From the proposed outfalls, the discharge would be piped to the watercourse where a headwall structure would be provided.

2.5.269. The following measures would also be included as part of the drainage strategy for Part B and will be discussed with and set out in a SoCG with both NCC and the Environment Agency:

a. Existing roads and tracks that would not be considered within Part B would retain the current drainage system.
b. Proposed new access roads would be drained using over the edge drainage, as the likely increase in the overall runoff is anticipated to be negligible.
c. Runoff from the running lanes and hard strips would follow the road camber to both channels, and to central reservation where there is a crossfall.
d. Runoff to the central reservation would be to concrete V-channels.
e. Where the highway is accommodated within a cutting, the runoff from the cutting would be to the carriageway surface water filter drain.
f. Where the highway is to be on an embankment it is proposed that the embankment runoff would be collected in a ditch at the bottom of the embankment and conveyed to the local ditches and watercourses. Where there is no possibility of discharging to a local ditch or watercourse, no ditch is proposed. Where the existing ground falls away from the toe of the embankment, no ditch is proposed.

2.5.270. Online controls such as vortex flow controls, orifice plates, sliding gates, would be provided to restrict discharges to allowable values in accordance with DMRB standards and as agreed with NCC as the LLFA.

2.5.271. Drainage discharge from the local road network would be separate from that associated with Part B, as agreed with NCC. As the drainage strategy along these local roads would be to retain the existing network, there are no proposals to provide attenuation to this runoff.

Utilities

2.5.272. Statutory utility services throughout the length of Part B that require diversion include electricity (NPG), gas (NGN), water (Northumbrian Water), and telecommunications (BT Openreach, Virgin Media, Sky and Vodafone). These are predominantly located underground, other than the overhead electricity lines and some side road telecoms, which would be diverted underground.

2.5.273. Utilities would be diverted from the footprint of Part B carriageway to ensure sufficient protection is provided to all utilities and to ensure they are located in a manner to achieve safe access for future maintenance. It is anticipated that the depth of the diversions would be between 0.6 m and 1.2 m. The details of these diversions, which are within the Order Limits of Part B, would be developed further at the detailed design stage.

2.5.274. Where these assets run parallel to the highway, they would be diverted to run adjacent and parallel to the carriageways of Part B.

2.5.275. Where these assets would cross the carriageway of Part B they would be diverted (underground where necessary) to cross the alignment on a perpendicular route at a suitable depth. It is anticipated the depth of the diversions would be between 0.9 m and 1.5 m. Where diversions would be required to accommodate realignment of local roads, these diversions would be located predominantly within local road verges or, for road

crossings, would cross the alignment on a perpendicular route. Some local road statutory diversions may be maintained as overhead routes.

2.5.276. Telecommunication assets would be within a designated utilities trench predominately within the permanent highway boundary predominately within the proposed dual carriageway verge. All other utilities would be outside the permanent highway boundary within a utilities trench.

2.5.277. Assets that have been identified as needing to be diverted have been established through consultation with statutory undertakers, in accordance with utility diversionary works process outlined in the New Roads and Street Works Act 1991.

2.5.278. Where an existing asset requires diversion as a result of Part B, the relevant statutory undertaker together with the Applicant would be responsible for arranging for the asset to be diverted as part of the construction works. The Applicant would also be responsible for maintaining existing service routes during the construction works until the agreed diversion route is in place and active. They would also be responsible for the provision of suitable access and working space for all statutory undertaker construction works and tie-ins back to original network and service connections, and for coordination of statutory service contractors and designs, including suitable locations for junction and inspection chambers. Fence lines would be reused where feasible.

Northern Powergrid Circuit

2.5.279. The NPG circuit from Denwick to Middlemoor Windfarm would need to be diverted as a result of Part B. The circuit comprises of a 66 kV Extra High Voltage (EHV) underground cable and associated fibre optic pilot cables. The existing EHV cable extends in a north south direction, roughly parallel to the proposed alignment, crossing the proposed alignment between chainages 53200 and 60500. Refer to the **Works Plans** (**Application Document Reference: TR010041/APP/2.3**) for further details.

2.5.280. Approximately 7.5 km of 66 kV EHV transmission cable would need to be diverted from within the proposed highway boundary to a utilities trench. Provision is made in the **draft DCO** (**Application Document Reference: TR010041/APP/3.1**) for the utilities trench to be offset up to 14 m from the edge of proposed earthworks within private land adjacent to the proposed highway boundary, with rights for its retention and maintenance being secured under the proposed DCO from the third party landowners.

2.5.281. However, the 66 kV cable and its trench may be provided within the new highway boundary, which would entail a greater amount of permanent land take but remove the need to interfere with private land after completion of the works as a result of the operation or maintenance of the cable. This option would mean a slightly different landscaping treatment within the wider highway boundary. Refer to **Section 2.11** for further details on how this option has been assessed in this ES.

Lighting

2.5.282. The road lighting assessment process is provided within **Appendix 2.1: Lighting Assessment (Confidential)** of this ES. The assessment concluded that new lighting provision is not economically justified for Part B. No new lighting would therefore be provided along Part B. The assessment findings have been supported through a RSE Assessment (**Appendix E** of **Appendix 2.1: Lighting Assessment (Confidential)**, of this ES).

Fencing

2.5.283. The new permanent highway boundary would be fenced with standard wooden post and rail fencing that would be either newly installed or retained from the existing fence lines. Where feasible, existing fence lines would be used.

Barriers

2.5.284. The design of Part B includes safety fencing within the central reserve. All the safety fencing would be constructed of steel and would be in accordance with the relevant DMRB standards.

2.5.285. The design allows for safety fencing within the cross-section. The details of this would be developed at detailed design.

Walking, Cycling and Horse Riding Facilities

2.5.286. Part B would change the existing conditions for WCH users.

2.5.287. A network of PRoW surround and traverse Part B. The PRoW network provides access between residential properties and recreational routes, within Rennington, Rock and South Charlton. There are no National Trails or National Cycle Routes within 500 m of the Order Limits of Part B.

2.5.288. It is currently difficult for WCHs to cross the existing A1 due to the volume and speed of traffic, particularly for those WCHs making east-west journeys (**Ref. 2.8**). In order to improve safety, once Part B is in operation, WCHs would not be able to directly cross the A1 at carriageway level. East-west connectivity would be maintained by the new footway provided on the proposed Charlton Mires Junction and provisions (including appropriate parapets for WCHs) at the Heckley Fence Accommodation Overbridge.

2.5.289. Footway provision is described in detail above in **paragraph 2.5.210** and changes to bus stop provision in **paragraph 2.5.204**.

2.5.290. **Table 2-2** below describes the permanent changes to existing PRoW required as a result of Part B. Refer to the **Rights of Way and Access Plans** (**Application Document Reference: TR010041/APP/2.5**) for further details of proposed diversions.

Table 2-2 - Proposed Changes to WCH Routes

PRoW Ref.	PRoW Type	Description
110/004	Footpath	The connection to Footpath 129/014 would be severed by Part B. The southern section of Footpath 110/004 would be retained along its existing route. The PRoW would however be extinguished from the point at which it meets an existing track, located to the north of Broom House, to the existing A1. At this location, the PRoW would be diverted north along an existing track to the proposed Heckley Fence Accommodation Overbridge, at which point it would cross the A1 via the overbridge which would be constructed to bridleway standard. The diverted route would meet the existing PRoW network at Footpath 129/023 which would then be followed southwards to Broxfield. The total length of the diversion would be 4.4 km, compared to a previous length of 1.8 km along the existing PRoW network.
129/014	Footpath	Footpath 129/014 would be extinguished. The PRoW diversion would be the same as Footpath 110/004.
110/013	Byway	The existing Byway 110/013 crosses the A1 at Broxfield and would be severed by Part B. Byway 110/013 would be diverted north to the proposed Heckley Fence Accommodation Overbridge via a proposed bridleway, at which point it would cross the A1 via the overbridge via the proposed Byway Open to All Traffic (BOAT). The diverted route would meet the existing PRoW network at Footpath 129/023 which would then be followed southwards to Broxfield. The total length of the diversion is 3.1 km, compared to a previous length of 1.0 km along the existing PRoW network. The majority of Byway 110/013 would retain its byway classification, except for the eastern section which is to be extinguished.
129/022	Byway	Byway 129/022 would be extinguished. The PRoW diversion would be the same as Byway 110/013.
129/023	Footpath	No change to PRoW.
110/019	Footpath	The connection to Footpath 110/003 would be severed by Part B. Footpath 110/019 would be diverted south, running parallel to the A1 before reaching the proposed Heckley Fence Accommodation Overbridge where users would cross over the A1, travel eastwards along the diverted PRoW, and then northwards along Byway 129/023 and Footpath 129/005 to Rock South Farm. The

PRoW Ref.	PRoW Type	Description
		total length of the diversion is 4 km, compared to a previous length of 1 km along the existing PRoW network.
110/003 / 129/009	Footpath	Footpaths 110/003 and 129/009 (1 km) would be extinguished as the connection to Footpath 110/019 would be severed by Part B, making them redundant. The PRoW diversion would be the same as Byway 110/019.
110/010 / 129/021	Footpath	Footpath 129/021 would be diverted south, running parallel to the A1 before reaching the proposed Heckley Fence Accommodation Overbridge where users would cross over the A1, travel eastwards along the diverted PRoW, meeting the existing PRoW network at Byway 129/023. The diversion would then continue northwards along Footpaths 129/023 and 129/005 to Rock South Farm. The total length of the diversion is 4.6 km, compared to a previous length of 1 km along the existing PRoW network.
129/005	Footpath	No change during operation.
129/006	Footpath	No change to PRoW.
129/004	Footpath	The connection to Footpath 129/024 would be severed by Part B. The PRoW diversion would be the same as Footpath 129/024.The total length of the diversion would be 1.7 km, compared to a previous length of 0.15 km along the existing PRoW network.
112/038 218/024	Bridleway	No change to PRoW.
129/013	Footpath	Footpath 129/013 would be extinguished. No PRoW diversions would be provided because Byway 129/022 would be extinguished as a result of Part B making Footpath 129/013 redundant. Footpath 129/013 links Byway 129/022 with Byway 129/023.

PRoW Ref.	PRoW Type	Description
129/012	Footpath	No change to PRoW.
110/011	Byway	No change to PRoW.
129/024	Footpath	Footpath 129/024 (0.15 km) would be extinguished as the connection to Footpath 129/004 would be severed by Part B, making it redundant. Footpath users would be diverted north along the B6341 and cross over the A1 at Charlton Mires Junction, using footways provided along the road's edge. Users would then cross the B6347 East and continue south along the PRoW diversion, parallel to the A1, until it meets the existing PRoW network at Footpath 129/004. The total length of the diversion would be 1.9 km, compared to a previous length of 0.15 km along the existing PRoW network.
112/045	Byway	Byway 112/045 is located partially within the Order Limits of Part B at its northern extent. No change to PRoW.
141/013	Footpath	No change to PRoW.

2.5.291. The design of Part B also includes the following:

a. The proposed footway at Charlton Mires Junctions would link the diverted Footpath 129/004, to the east of Part B, extend across the A1 and along the footway adjacent to the B6341, to the west of Part B, to approximately Rock Lodge.

b. The proposed Heckley Fence Accommodation Overbridge would be designed to cater safely for WCHs and vehicular traffic.

c. Use of best practice design in accordance with design standard TA90/05: The Geometric Design of Pedestrian, Cycle and Equestrian Routes and the NPS NN with regards to the safety of WCHs would improve the amenity of users of the footpaths in the surrounding areas. Additionally, landscape planting would provide screening of the road. LNS would reduce noise levels for the wider network of PRoW, providing improved amenity for users.

2.5.292. Refer **to Chapter 12: Population and Human Health**, **Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for further details on the proposed WCH provision under Part B.

Emissions, Waste and Materials

2.5.293. The likely types and quantities of wastes, residues and emissions (such as water, air, soil, noise, vibration, heat, radiation) produced during the construction and operation of Part B are described and assessed within the relevant **Technical Chapters 5** to **15, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**).

2.5.294. The likely impacts upon the use of materials during the construction and operation of Part B are considered within **Chapter 13: Material Resources, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**).

2.5.295. Due to the likely surplus material generated from Part A, there is an opportunity for material to be used within Part B. Where useable, this material would be stored temporarily.

2.6. ENVIRONMENTAL DESIGN

2.6.1. This section presents the environmental mitigation measures that are proposed to reduce likely significant effects, and these have been used to inform the design of Scheme on an iterative basis.

LANDSCAPE

Part A

2.6.2. Refer to **Chapter 7: Landscape and Visual, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) and **Figure 7.8: Landscape Mitigation Masterplan, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**) for comprehensive details relating to proposed landscape mitigation for Part A.

2.6.3. The landscape strategy for Part A addresses the requirement to mitigate both landscape and biodiversity effects identified within the assessments. The assessments have focused on the retention or replacement of vegetation, ecological enhancement, protected species mitigation and landscape integration and screening.

2.6.4. A review of the existing landscape elements within and around Part A, together with the assessment findings presented in **Chapter 7: Landscape and Visual**, **Volume 2** of this ES (**Application Document Reference**: **TR010041/APP/6.2**), has been used to inform the nature of the proposed landscape mitigation measures. These measures have been used to inform the design of Part A, on an iterative basis. Where possible, existing vegetation has been retained. Where lost, replacement planting is proposed. This would be in keeping with the existing landscape and includes hedgerows, woodland blocks, scattered shrubs and trees of native species (including those along Coronation Avenue) and species-rich grassland.

2.6.5. Where the hedgerow planting is considered essential mitigation to reduce potential significant environmental effects, it is proposed within the permanent boundary in most instances, with the exception of that proposed at approximate chainage 20400 – 21000 where it would be within the temporary boundary (refer to **Chapter 7: Landscape and**

Visual, Volume 2 of this ES (**Application Document Reference: TR010041/APP/6.2**) for further details).

2.6.6. All other hedgerow planting is proposed to be placed outside the permanent boundary, within third party land, and is expected to be maintained by the relevant landowner. The cross-section design of Part A has in part been informed by long-term maintenance requirements, incorporating a 3 m grassed maintenance strip (on the Applicant's side of the boundary), to the front of all hedgerows identified as being essential mitigation. Where hedgerows are not considered as being essential mitigation and are located within third party land, the proposed maintenance strip, along the hedgerow's frontage on the Applicant's side, has been reduced to 1 m. Refer to the Indicative Cross-Sections drawing and the Pinchpoint Cross-Sections drawing for Part A in **Appendix 2.2: Technical Drawings** of this ES. These cross-sections have been subject to minor modifications during the production of this ES, for example a change from filter drain to surface water channel in the east verge from approximately chainage 22710 to chainage 23090. However, these amendments do not change the key design principles on which the cross sections are based.

2.6.7. As discussed above, the construction of Part A is anticipated to generate surplus material. In order to re-use this excess material, to reduce potential environmental impacts associated with its transport and disposal, a number of bunds are proposed along Part A. Two types of bunds are proposed as follows:

a. Essential mitigation, where the bunds would provide a purpose other than to re-use material on site, for example for landscape screening or protected species mitigation (these are shown in purple on **Figure 7.8: Landscape Mitigation Masterplan, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)). These are described in **paragraph 2.6.8** below.

b. Bunds that have been assessed within Assessment Parameters, as it is not known for certain that they would ultimately be within the final design of Part A and therefore constructed. Inclusion of these bunds within the final design of Part A is dependent on the extent to which surplus material generated by Part A is used on other schemes. These are discussed further in **Section 2.12.**

2.6.8. The proposed bunds that would form part of the essential mitigation for Part A would have a gradient no steeper than 1:3 and comprise the following:

a. Proposed bunds 1 and 2: Would be located at the proposed Highlaws Junction and would be 2 m in height.

b. Proposed bunds 7, 8 and 9: Would be located at the proposed Fenrother Junction and would be 2 m in height.

c. Proposed bund 10: Would be located to the north of Fenrother Junction, to the east of the main alignment of Part A, between chainages 15900 to 16300, and would be 4 m in height (for screening and barn owl mitigation).

d. Proposed bund 11: Would be located to the south of the proposed Causey Park Overbridge, to the east of the main alignment of Part A, between chainage 16600 and 16900, and would be 3 m in height (for screening and barn owl mitigation).
e. Proposed bund 12: Would be located to the south of DB9, to the west of the main alignment of Part A, between chainages 16700 and 16800, and 2 m in height (for barn owl mitigation).
f. Proposed bund 13: Would be located to the north of Fenrother Junction, to the west of the main alignment of Part A, between chainages 16000 to 16300, and would be 2 m in height (for barn owl mitigation).

Part B

2.6.9. Refer to **Chapter 7: Landscape and Visual, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) and **Figure 7.10: Landscape Mitigation Plan**, **Volume 6** of this ES (**Application Document Reference: TR010041/APP/6.6**) for comprehensive details relating to proposed landscape mitigation for Part B.

2.6.10. The landscape strategy for Part B addresses the requirement to mitigate both landscape and biodiversity effects identified within the assessments. The assessments have focused on the retention or replacement of vegetation, ecological enhancement, protected species mitigation and landscape integration and screening. The landscape and visual elements of the landscape strategy are detailed below and the ecological elements in the 'Biodiversity' section.

2.6.11. A review of the existing landscape elements within and around Part B, together with the assessment findings presented in **Chapter 7: Landscape and Visual, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**), has been used to inform the nature of the proposed landscape mitigation measures. These measures have been used to inform the design of Part B, on an iterative basis. Where possible, existing vegetation has been retained. Where lost, replacement planting is proposed. This would be in keeping with the existing landscape and includes hedgerows, woodland blocks, scattered shrubs and trees of native species and species-rich grassland.

2.6.12. Where the hedgerow planting is considered essential mitigation to reduce potential significant environmental effects, it is proposed within the permanent boundary (refer to **Chapter 7: Landscape and Visual, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for further details).

BIODIVERSITY

Part A

2.6.13. A review of the existing ecology within and around Part A, together with the assessment findings presented in **Chapter 9: Biodiversity, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**), has been used to inform the nature of the proposed ecological mitigation measures which are shown on **Figure 9.2: Ecological**

Mitigation Plan, Volume 5 of this ES (**Application Document Reference: TR010041/APP/6.5**). The majority of proposed ecological mitigation planting is discussed as part of the landscape proposals above and is therefore illustrated in **Figure 7.8: Landscape Mitigation Masterplan, Volume 5** of this ES. The proposed ecological mitigation measures include the following factors, which have informed the design of Part A:

a. As Part A would result in the loss of ancient woodland, compensatory habitat is proposed as part of an Ancient Woodland Strategy (refer to **Appendix 9.21: Ancient Woodland Strategy, Volume 7** of this ES (**Application Document Reference: TR010041/APP/6.7**)). However, due to the irreplaceable nature of this habitat, the quantity of compensatory woodland proposed is greater than the quantity of ancient woodland lost (12:1 ratio). Through liaison with land owners, a suitable site was identified to the southwest of the River Coquet Bridge (Woodland Creation Area), adjacent to the ancient woodland, for compensatory planting, with the location and size agreed through consultation with Natural England (refer to **Appendix 4.2: Environmental Consultation** of this ES). This area would also comprise habitat associated with the nearby Coquet River Felton Park Local Wildlife Site (LWS). Access for maintenance would be provided parallel to the west of the main alignment of Part A, extending from the proposed West Moor Junction to the north to the Woodland Creation Area.
b. Baseline ecology surveys identified two areas of potential risk to badger mortality as a result of a collision with vehicles along Part A due to the proximity to setts or badger territories. These are located to the north of Highlaws Junction and at Causey Park. The ecological mitigation proposes badger fencing, which has been used to direct badger movement to crossing points integrated within Part A (culverts with mammal shelves or wildlife passages). The fencing would be installed along appropriate linear features along the boundary of Part A, mitigation hedgerows or stand-alone fences, and would ensure appropriate easement for maintenance access.
c. Baseline ecology surveys identified four great crested newt ponds within proximity to Part A, two at Burgham Park Golf Club and two northwest of the River Coquet Bridge. Part A would result in the loss of great crested newt terrestrial habitat and, therefore, compensatory habitat would be required as part of a European Protected Species (EPS) licence. The ecological mitigation has identified areas allocated for habitat creation to address impacts to great crested newts, which are included in the Landscape Mitigation Masterplan (**Figure 7.8 Landscape Mitigation Masterplan, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)).

2.6.14. The following wildlife culverts are proposed for the sole purpose of protected species mitigation proposed to ensure the safe passage of protected species across Part A. These wildlife culverts are in addition to the culverts discussed in **paragraphs 2.5.105** to **2.5.151**, which include some culverts that also provide for protected species passage in addition to their function for drainage purposes:

a. **Wildlife Fenrother Culvert**. A new wildlife culvert would be provided at chainage 14930 (Reference 5.4, **Appendix 2.2: Technical Drawings** of this ES, at the proposed Fenrother Junction beneath Fenrother Lane (west). The culvert would be circular with a diameter of 600 mm and is proposed to ensure the safe passage of otter and potentially badger.
b. **Wildlife Causey Park Culvert.** A new wildlife culvert (Reference 8.1, **Appendix 2.2: Technical Drawings** of this ES would be provided at chainage 17600, at the proposed Causey Park Overbridge, beneath Causey Park Road. The culvert would be circular with a diameter of 600 mm and is proposed primarily for the safe passage of badger.
c. **Wildlife Eshott Burn Culvert.** A new wildlife culvert (Reference 8a, **Appendix 2.2: Technical Drawings** of this ES would be provided at chainage 18300, to the north of the proposed Causey Park Overbridge, beneath the main alignment of Part A. The culvert would be circular with a diameter of 1500 mm and is proposed as mitigation to provide safe passage for bats.
d. **Wildlife Burgham Culvert.** A new wildlife culvert would be provided at chainage 19520 (Reference 10a, **Appendix 2.2: Technical Drawings** of this ES, at the proposed Burgham Park Underbridge, underneath Burgham Park Road to the west of the main alignment of Part A. The culvert would be a precast concrete culvert 900 mm wide and 600 mm high and is proposed to ensure the safe passage of great crested newts.

Part B

2.6.15. A review of the existing ecology within and around Part B, together with the assessment findings presented in **Chapter 9: Biodiversity, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**), has been used to inform the nature of the proposed ecological mitigation measures. These measures are shown on **Figure 7.10: Landscape Mitigation Plan, Volume 6** of this ES (**Application Document Reference: TR010041/APP/6.6**) and include the following factors, which have informed the design of Part B:

a. Baseline ecology surveys and desk study data records identified areas of the carriageway with increased incidents of barn owl *Tyto alba* mortality. Scrub and tree planting has been incorporated into the design in order to prevent suitable barn owl foraging habitat from establishing. In areas where this is not possible, a maintenance regime has been prescribed whereby a short sward is to be maintained to reduce the viability of habitats to support prey species.
b. Baseline ecology surveys identified a number of bat boxes within a parcel of woodland in the vicinity of North Charlton at the northern end of Part B. Surveys confirmed the presence of a Natterer's bat *Myotis nattereri* maternity colony and roost, individual pipistrelle *Pipistrellus* sp. roosts, a soprano pipistrelle *Pipistrellus pygmaeus* breeding roost, as well as evidence of use by noctule bats *Nyctalus noctula.* This parcel of woodland and collection of bat boxes is of key importance to a number of bat species in the area, and therefore all bat boxes would be removed from their current position and

erected on nearby trees to the south east, lining Charlton Hall Road. The repositioning of bat boxes would be supplemented by the erection of additional bat boxes in the area, and planting of further trees to the south and north of the woodland to be lost. The bat boxes would need to be checked twice a year by the Applicant between April / May and August / September for a length of time to be confirmed with Natural England. In addition, the landowner would not be able to fell any trees within the Order Limits of Part B at this location and any essential maintenance that needs to be completed on the trees would need to be under the supervision / guidance of an experience bat licenced ecologist. The erection and maintenance of the bat boxes has been agreed with the landowner. Refer to **Chapter 9: Biodiversity, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for further detail.

c. Baseline ecology surveys identified 14 bat roosts in buildings associated with Charlton Mires Farm and East Cottages as well as the associated outbuildings and sheds. These buildings would be demolished to facilitate construction of Part B. Roosts identified within these buildings comprised primarily soprano pipistrelle, all with less than five bats per roost. Owing to the loss of all roosts associated with these buildings, bat boxes would be erected on trees lining the B6347 road and further bat boxes would be erected on poles north of Charlton Mires Junction, in proximity to newly planted areas of woodland.

d. To further increase suitable roosting locations for bats and to compensate for loss of roosting opportunities within trees which would be felled under Part B, bat boxes would be installed north of DB23.

e. A naturalised bed for the Kittycarter Burn (Reference 25.1) culvert has been incorporated into the design of Part B to maintain the viability of the bed and channel in order to support aquatic species as well as improve fish passage opportunities.

f. The southern tributary of Kittycarter Burn would be diverted and realigned to the east of Charlton Mires Junction between approximately chainage 58840 and 59020. The design would be further developed during detailed design in line with consultation with the Environment Agency and NCC as LLFA. Realigning Kittycarter Burn would reduce the length of culvert required at this location.

NOISE

Part A

2.6.16. Four noise barriers are proposed for Part A. A 4 m high reflective barrier is proposed near Causey Park (PNB2) and a 4 m high absorptive barrier near New Houses Farm (PNB3). A 3 m high reflective barrier is proposed near Northgate Farm (PNB1) and near Felmoor Park and Bockenfield Holiday Park (PNB4), however further investigation is required at detailed design stage to determine whether there is space for the required foundations for these barriers. Refer to **Chapter 6: Noise and Vibration, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for comprehensive details relating to proposed noise mitigation for Part A.

Part B

2.6.17. As Part B would not generate significant adverse operational noise effects at identified noise-sensitive receptors, mitigation is not required in relation to operational noise effects. Noise barriers are therefore not proposed for Part B. Refer to **Chapter 6: Noise and Vibration, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for further details.

2.7. CHANGES TO TRAFFIC FLOWS

2.7.1. Future traffic forecasts have been developed using the A1 in Northumberland traffic model, an assignment traffic model which includes the impacts of variable demand modelling, for Part A and Part B and for the Scheme.

2.7.2. Future demand is based on future developments considered Near Certain or More than Likely (for housing, employment and infrastructure), in addition to general traffic growth. The model can be used to predict total traffic demand on the network and route choice based on travel times, congestion and mode choice. This information is set out in **Chapter 4** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**) which includes a copy of the uncertainty log identifying these future developments (**Annex B** of the **Case for the Scheme**). These development assumptions are taken into account in **Chapter 15: Assessment of Combined Effects, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for Part A and **Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for Part B, and in **Chapter 16: Assessment of Cumulative Effects, Volume 4** of this ES (**Application Document Reference: TR010041/APP/6.4**) for the Scheme.

2.7.3. As stated in **paragraph 2.4.17** to **2.4.20** above, traffic forecasts have been developed for two scenarios: a DM scenario and a DS scenario. These scenarios have been modelled for Part A and Part B, for 2023 (which represents the opening year) and 2038 (which represents the opening year + 15 years (design year)). These scenarios have also been modelled for the Scheme for 2023.

2.7.4. A comparison of the flows for the Scheme is presented in **Table 2-3** below. The table shows the difference between the DM and DS in Annual Average Daily Traffic (AADT) as a percentage increase. **Figure 2.3** below shows the forecast two-way AADT for the opening year, 2023, for both DM and DS for the Scheme.

Table 2-3 - Percentage increase for do minimum and do something AADT (two-way, vehicles): The Scheme

Location	2023	2038
A697 to Highlaws	34.6%	45.8%
Highlaws to Fenrother	42.6%	56.5%
Causey Park to Burgham	35.9%	48.1%
South of Charlton Mires	26.5%	34%
North of Charlton Mires	14.2%	21.9%

2.7.5. The table shows that in the DS scenario flows are consistently higher than in the DM scenario in all sections. **Figure 2.3** and **Figure 2.4** below show the increases in 2023 and 2038, with a significant increase shown in both directions. The increase is due to re-distribution as well as increased variable demand which is a result of the increased capacity and reduced journey times on the improved section of the A1.

2.7.6. The impact of the Scheme on traffic flows is described in more detail in **Chapter 4** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**).

Figure 2.3 - Do Minimum and Do Something network flows (AADT in vehicles, 2023): The Scheme

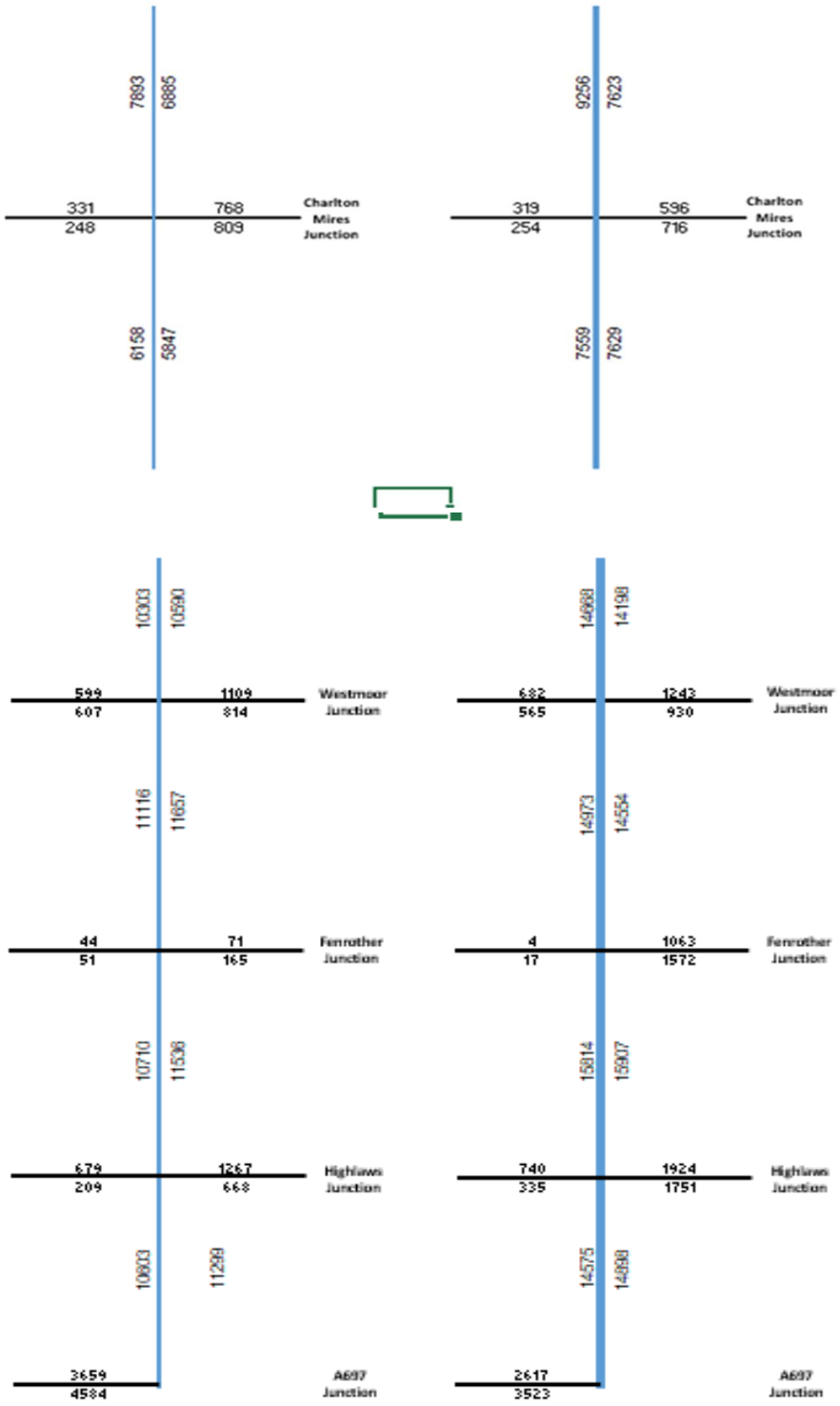
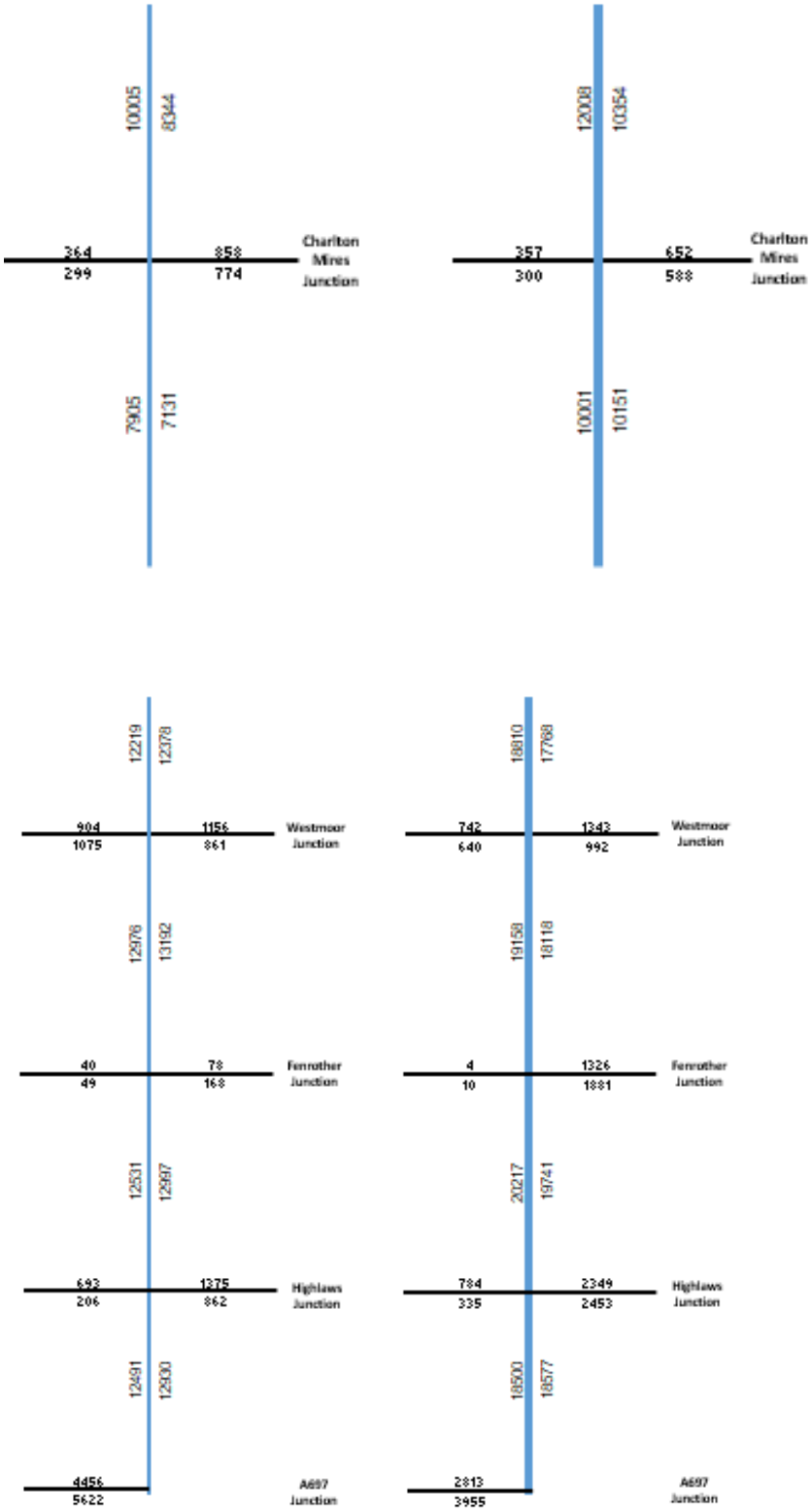


Figure 2.4 - Do Minimum and Do Something network flows (AADT in vehicles, 2038): The Scheme



PART A

2.7.7. A comparison of the flows for Part A is presented in **Table 2-4** below. The table shows the difference between the DM and DS in Annual Average Daily Traffic (AADT) as a percentage increase. **Figure 2.5** below shows the forecast one-way AADT for the opening year, 2023, for both DM and DS for Part A, and **Figure 2.6** for the design year, 2038.

Table 2-4 - Percentage increase for do minimum and do something AADT (two-way, vehicles): Part A

Location	2023	2038
A697 Junction to Highlaws Junction	34%	43%
Highlaws Junction to Fenrother Junction	27%	54%
Fenrother Junction to West Moor Junction	40%	40%
North of West Moor Junction	32%	45%

2.7.8. The table shows that in the DS scenario flows are consistently higher than in the DM scenario in all sections. **Figure 2.5** and **Figure 2.6** below shows the increases in 2023 and 2038, with a significant increase shown in both directions. The increase is due to re-distribution as well as increased variable demand which is a result of the increased capacity and reduced journey times on the improved section of the A1.

2.7.9. The impact of Part A on traffic flows is described in more detail in **Chapter 4** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**).

Figure 2.5 - Do Minimum and Do Something network flows (AADT in vehicles, 2023): Part A

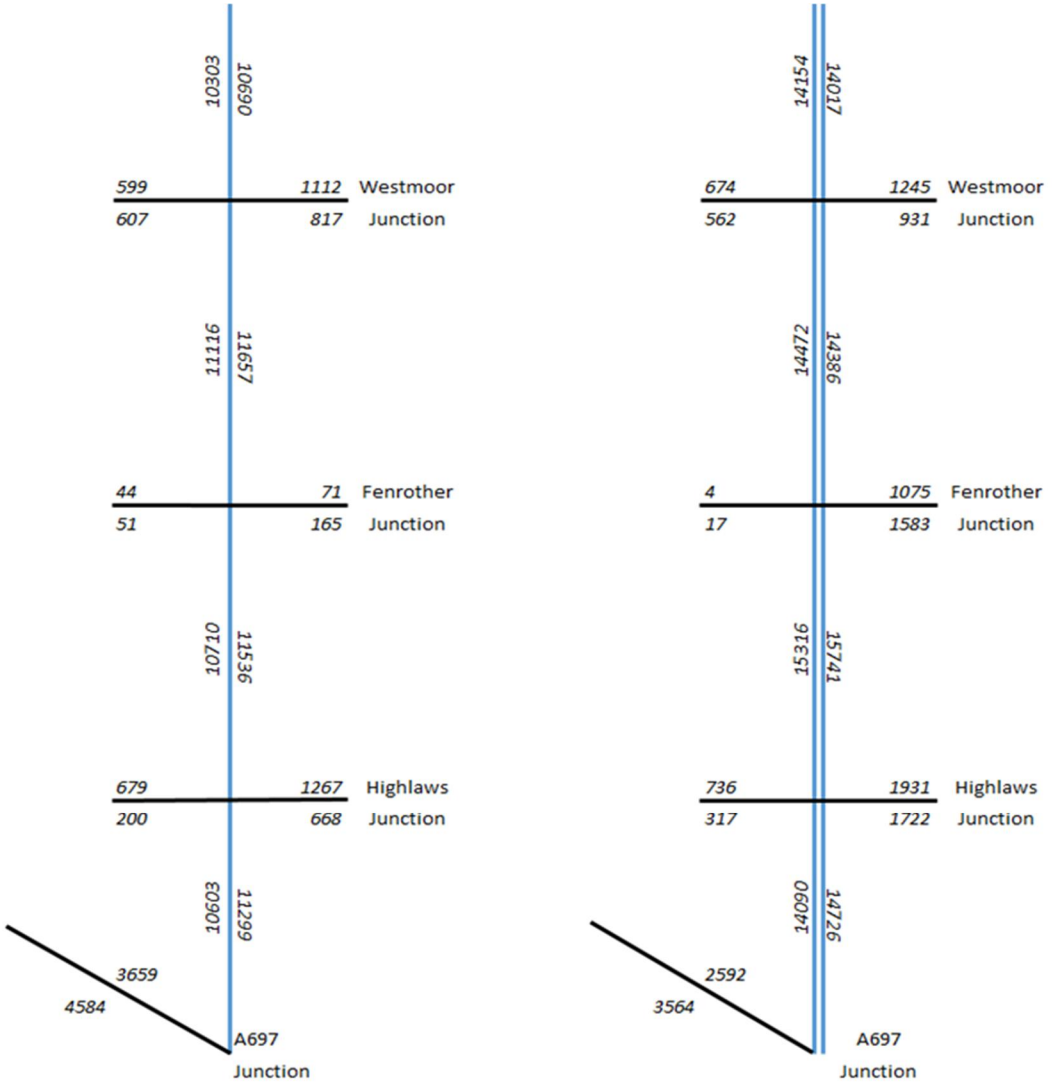
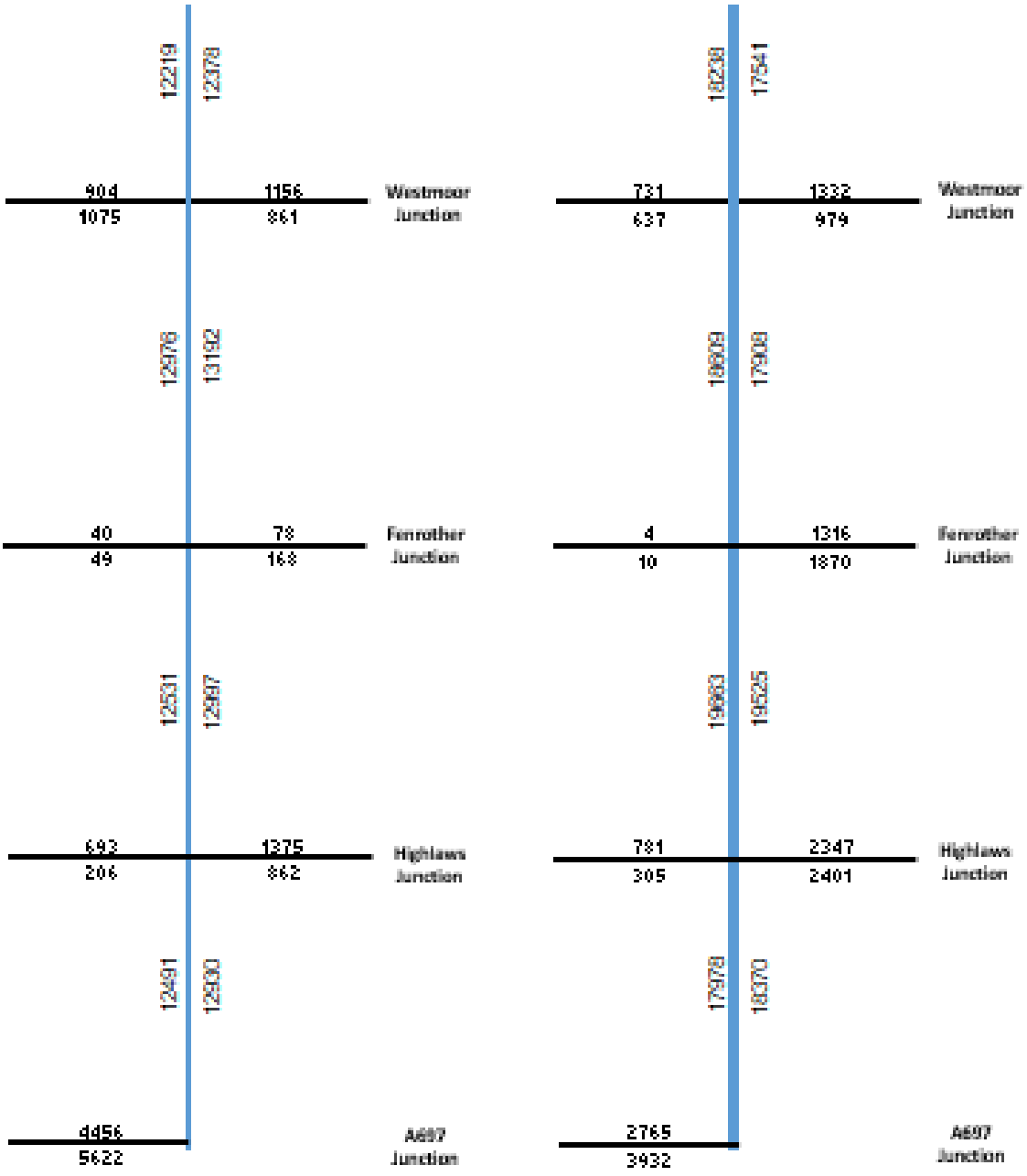


Figure 2.6 - Do Minimum and Do Something network flows (AADT in vehicles, 2038): Part A



PART B

2.7.10. A comparison of the flows for Part B is presented in **Table 2-5** below. The table shows the difference between the DM and DS in AADT as a percentage increase. **Figure 2.7** below shows the forecast one-way AADT for the opening year, 2023, for both DM and DS for Part B, and **Figure 2.8** for the design year, 2038.

Table 2-5 - Percentage Difference Between Do Minimum and Do Something AADT (two-way, vehicles): Part B

Location	2023	2038
A1 North of Charlton Mires Junction	+7%	+12%
A1 south of Charlton Mires Junction	+17%	+22%

2.7.11. The table shows that in the DS scenario flows are consistently higher than in the DM scenario along the length of Part B. **Figure 2.7** below shows the increases in 2023 and **Figure 2.8** below shows the increases in 2038, with a significant increase shown in both directions. The increase is due to re-distribution as well as increased variable demand which is a result of the increased capacity and reduced journey times on the improved section of the A1.

2.7.12. The impact of Part B on traffic flows is described in more detail in **Chapter 4** of the **Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**).

Figure 2-7 - Do Minimum and Do Something Network Flows (AADT in Vehicles, 2023): Part B

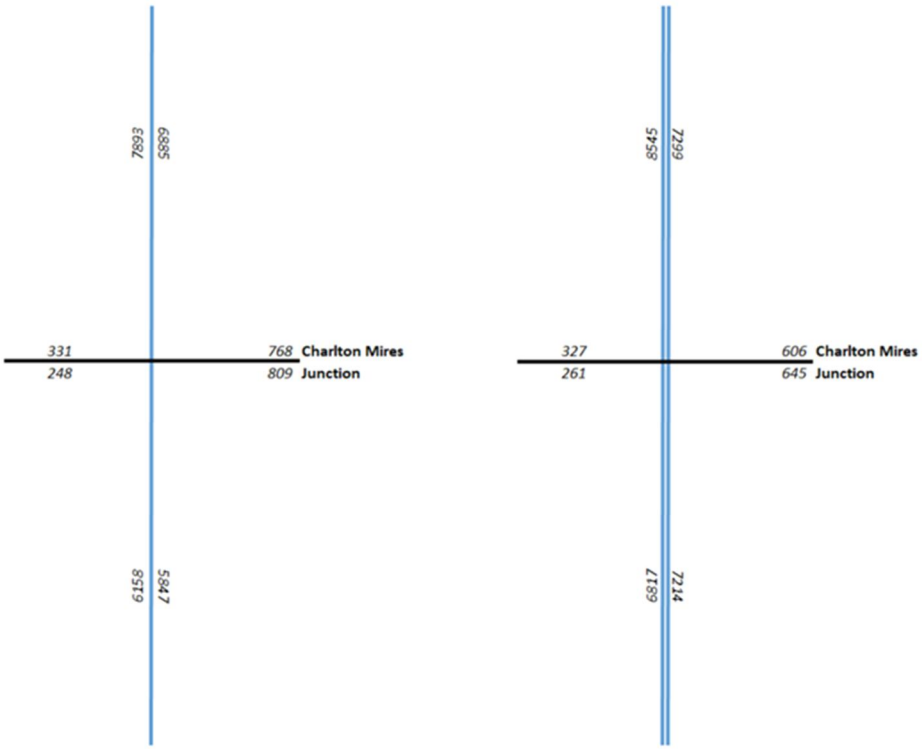
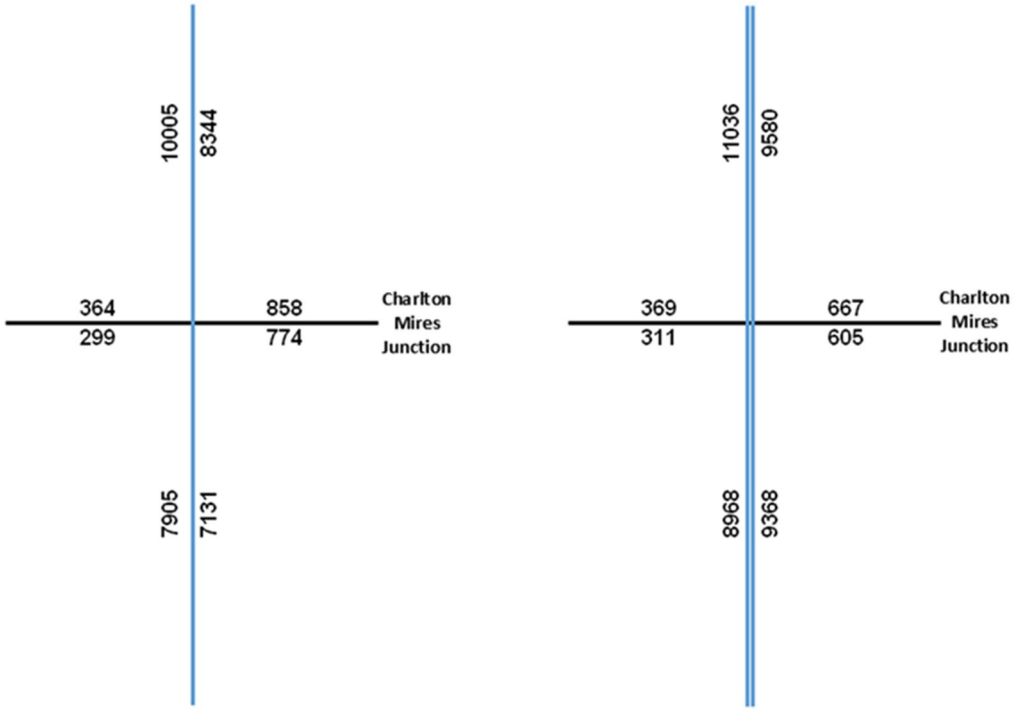


Figure 2-8 - Do Minimum and Do Something Network Flows (AADT in Vehicles, 2038): Part B



2.8. CONSTRUCTION

CONSTRUCTION PROGRAMME

Part A

Diversion Works

2.8.1. The assumed duration for the proposed NGN and NPG diversions is currently 4 months, followed by the main National Grid HPGM diversion expected to take 6 months. These works would be carried out under the permitted development rights of the respective statutory undertakers. However, to ensure delivery of the diversions, powers are sought for them in the **draft DCO** (**Application Document Reference: TR010041/APP/3.1**).

2.8.2. It is anticipated that certain environmental surveys would commence in January 2021, where possible, in order to inform protected species licence applications (Great Crested Newt, Badger and Bat) and meet the proposed programme.

Main Construction for Part A

2.8.3. This ES assumes that construction would commence in December 2021 starting with mobilisation and site set up activities and would last for approximately 30 months with mainline works planned to be completed by May 2024 (contract completion in August 2024). The key anticipated construction dates are presented in **Table 2-6** below and **Insert 2-1** - Anticipated Construction Programme. Should the anticipated construction programme dates change, the assessment findings in **Technical Chapters 5** to **15, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) would not alter.

Table 2-6 - Anticipated Construction Programme

Activity	Anticipated Start Date	Anticipated End Date
Mobilisation	December 2021	March 2022
Main Compound set up	March 2022	April 2022
Site clearance for new offline section	March 2022	May 2022
Boundary fencing for new offline section	May 2022	June 2022
Statutory undertaker diversions (additional to the HPGM, NGN and NPG works)	March 2022	January 2024
Northbound online dualling works	March 2022	March 2024
Southbound online dualling works	March 2022	August 2024

Activity	Anticipated Start Date	Anticipated End Date
Offline new carriageway works (including traffic management installation and removal)	March 2022	December 2023
Highlaws Junction	March 2022	May 2023
Fenrother Junction	August 2022	December 2023
Causey Park Overbridge	August 2022	October 2023
Burgham Park Underbridge	March 2022	October 2023
West Moor Junction	March 2022	May 2023
River Coquet bridge construction	March 2022	December 2023
River Coquet bridge open	December 2023	
Parkwood Subway	December 2022	May 2023
New Access Track off West View	March 2022	August 2022
Bywell Road extension	October 2022	March 2023
Link Road between Felmoor Park and the proposed West Moor Junction / Felton Road	December 2022	May 2023
Works to de-trunked A1	August 2023	December 2023
Scheme open to traffic	May 2024	
Scheme Design Year (15 years after opening)	2039	

Insert 2-1 - Anticipated Construction Programme

Activity	Dec-21 MONTH 1	Jan-22 MONTH 2	Feb-22 MONTH 3	Mar-22 MONTH 4	Apr-22 MONTH 5	May-22 MONTH 6	Jun-22 MONTH 7	Jul-22 MONTH 8	Aug-22 MONTH 9	Sep-22 MONTH 10	Oct-22 MONTH 11	Nov-22 MONTH 12	Dec-22 MONTH 13	Jan-23 MONTH 14	Feb-23 MONTH 15	Mar-23 MONTH 16	Apr-23 MONTH 17	May-23 MONTH 18	Jun-23 MONTH 19	Jul-23 MONTH 20	Aug-23 MONTH 21	Sep-23 MONTH 22	Oct-23 MONTH 23	Nov-23 MONTH 24	Dec-23 MONTH 25	Jan-24 MONTH 26	Feb-24 MONTH 27	Mar-24 MONTH 28	Apr-24 MONTH 29	May-24 MONTH 30	Jun-24 MONTH 31	Jul-24 MONTH 32	Aug-24 MONTH 33
Mobilisation																																	
Main temporary construction compound set up																																	
Site clearance for new offline section																																	
Boundary fencing for new offline section																																	
Statutory undertaker diversions (additional to the HPGM, NGN and NPG works)																																	
Northbound online dualling works																																	
Southbound online dualling works																																	
Offline new carriageway works (including traffic management installation and removal)																																	
Highlaws Junction Construction																																	
Fenrother Junction Construction																																	
Causey Park Overbridge Construction																																	
Burgham Park Underbridge Construction																																	
West Moor Junction Construction																																	
River Coquet bridge Construction																																	
River Coquet bridge open																									x								
Parkwood Subway																																	
New Access Track off West View																																	
Bywell Road extension																																	
Link Road between Felmoor Park and the proposed West Moor Junction / Felton Road																																	
Works to de-trunked A1																																	
Scheme open to traffic																															x		

2.8.4. The main construction works for Part A would be divided into six key phases to ensure that two-way traffic is maintained on the A1 as far as is reasonably possible. The exceptions to this would be for a limited number of nighttime and evening closures, for example for traffic switches and bridge beam lifts etc. At these times, alternative diversion routes would be available. Any diversion routes would be agreed with NCC. In-principle discussions have already been undertaken. The diversion routes are detailed in the **Construction Traffic Management Plan (CTMP)** (**Application Document Reference: TR010041/APP/7.4**). The CTMP would be developed in consultation with NCC and approved by the Secretary of State as set out in **Requirement 4, Schedule 2** of the **draft DCO** (**Application Document Reference: TR010041/APP/3.1**).

2.8.5. The proposed phasing below would seek to ensure priority of critical early areas of construction being mindful of seasonal constraints e.g. bird-nesting and bat roost occupation, salmon spawning, squirrel breeding.

Phase 1

2.8.6. Phase 1 works would commence in March 2022 and have a duration of three months. It would comprise:

a. Traffic would be managed via narrow lanes through the online sections.
b. Commence southern online widening to the west.
c. Commence northern online widening to the east.
d. Commence works to Burgham Park Underbridge, West Moor Junction and the new River Coquet Bridge.

Phase 2

2.8.7. Phase 2 works would take place between May 2022 and December 2022 and would comprise:

a. Traffic would be managed via narrow lanes through the online sections.
b. Continuation of works to the southern online widening to the west, the northern online widening to the east, to Burgham Park Underbridge, West Moor Junction and the new River Coquet Bridge.
c. Commencement of works to the offline works between chainage 13800 to 17600, Highlaws Junction, Fenrother Junction and Causey Park Overbridge.

Phase 3

2.8.8. Phase 3 works would take place between December 2022 and May 2023 and would comprise:

a. Traffic would be managed via narrow lanes through the online sections and would then be switched to the newly constructed southern widening to the west.
b. Commencement of the southern widening to the east.
c. Construction of the offline section of Part A to its full extent between chainage 13800 to 20500.

d. Continuation of works to the northern online widening to the east, Causey Park. Overbridge, Burgham Park Underbridge and the new River Coquet Bridge.
e. Completion of works to Highlaws Junction, Fenrother Junction and West Moor Junction.

Phase 4

2.8.9. Phase 4 works would take place between May 2023 and October 2023 and would comprise:

a. Traffic would be managed via narrow lanes through the online sections.
b. Continuing of works to the southern online widening to the east, the northern online widening to the east and the new River Coquet Bridge.
c. Completion of Causey Park Overbridge and Burgham Park Underbridge.

Phase 5

2.8.10. Phase 5 works would take place between October 2023 and January 2024 and would comprise:

a. Traffic would be switched to the completed offline alignment and over the new River Coquet Bridge.
b. Continuation of works to the southern online widening to the east.
c. Commencement of the northern online widening to the west.
d. Works to the de-trunked A1.

Phase 6

2.8.11. Phase 6 works would take place between January 2024 and August 2024 and would comprise:

a. Traffic would be managed via the completed northbound carriageway whilst tie-in works are completed.

2.8.12. The phasing above demonstrates that the proposed online widening would be carried out whilst two-way traffic is maintained on the existing A1, protected by a Temporary Vertical Concrete Barrier (TVCB) or steel barrier system such as Varioguard. The traffic would then be switched onto the newly constructed carriageway allowing refurbishment of the existing carriageway.

2.8.13. The offline section would be constructed traffic free, allowing local access through the works by means of controlled crossings or utilising local diversion routes. Once completed, traffic would then be transferred onto the new alignment of the A1, allowing de-trunking works to be completed.

2.8.14. Standard working hours would be from 7.00 am until 7:00 pm, Monday to Friday. However, extended hours including nighttime, weekend and Bank and Public Holiday working would be required for some construction operations and would be subject to approval in advance by NCC as outlined in the **Outline Construction Environmental Management Plan** (**Outline CEMP**) (**Application Document Reference: TR010041/APP/7.3**). Refer to **paragraph 2.8.28** for more detail on the Outline CEMP. These operations would include

traffic management installation, traffic management switches, carriageway resurfacing, bridge beam installation and construction of the new River Coquet Bridge. Construction operations on the strategic network would also be subject to approval in advance by the Applicant as well as NCC. Any overnight full closures of the A1 would be carried out overnight between 8:00 pm and 6:00 am. NCC would be notified in advance of these works.

2.8.15. The anticipated peak monthly workforce would be approximately 730 personnel, with approximately 538 personnel on site per month on average.

CONSTRUCTION PROGRAMME

Part B

Main Construction for Part B

2.8.16. This ES assumes that construction would commence in December 2021, starting with mobilisation and set up activities, and would last for approximately 22 months with works planned to be completed by November 2023 (contract completion in February 2024). The key anticipated construction dates are presented in **Table 2-7** below and **Insert 2-2**. Should the anticipated construction programme dates change, the assessment findings in **Technical Chapters 5 to 15**, **Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) would not alter.

Table 2-7 - Anticipated Construction Programme

Activity	Anticipated Start Date	Anticipated End Date
Mobilisation	December 2021	April 2022
Site Clearance	March 2022	April 2022
Fencing Works	March 2022	May 2022
Statutory Undertakers Works	March 2022	July 2023
Southbound Carriageway Works	April 2022	June 2023
Northbound Carriageway Works	July 2023	October 2023
B6347 Links	April 2022	November 2022
B6341 Links	June 2022	August 2022
East Linkhall Access Road	November 2022	February 2023
Rock Farm Access Road	April 2022	June 2022

Activity	Anticipated Start Date	Anticipated End Date
Heckley Fence Accommodation Overbridge	June 2022	May 2023
Charlton Mires Junction	June 2022	October 2023
Landscaping Works	November 2023	January 2024
Scheme Open to Traffic	November 2023	
Scheme Design Year (15 years after opening)	2038	

Insert 2-2 - Indicative Construction Programme

	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24
Activity	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	MONTH 6	MONTH 7	MONTH 8	MONTH 9	MONTH 10	MONTH 11	MONTH 12	MONTH 13	MONTH 14	MONTH 15	MONTH 16	MONTH 17	MONTH 18	MONTH 19	MONTH 20	MONTH 21	MONTH 22	MONTH 23	MONTH 24	MONTH 25	MONTH 26
Mobilisation																										
Site Clearance																										
Fencing Works																										
Statutory Undertakers Works																										
Southbound Carriageway Works																										
Northbound Carriageway Works																										
B6347 Links																										
B6341 Links																										
East Linkhall Access Road																										
Rock Farm Access Road																										
Heckley Fence Accommodation Overbridge																										
Charlton Mires Junction																										
Landscaping Works																										
Scheme Open to Traffic																								x		

2.8.17. The main construction works for Part B would be divided into six key phases to ensure that two-way traffic is maintained on the A1 as far as is practically possible. The exceptions to this would be for a limited number of nighttime and evening closures, for example, for traffic management, road surfacing and bridge beam lifts, etc. At these times, alternative diversion routes would be available. Any diversion routes would be agreed with NCC. In-principle discussions have already been undertaken. The diversion routes are detailed in the **CTMP** (**Application Document Reference: TR010041/APP/7.4**).

2.8.18. The proposed phasing below would seek to ensure priority of sensitive and critical construction activities including, for example, demolition of Charlton Mires Farm and East Cottages, offline works for Rock South Farm Access Road (critical to maintain access for residents when the existing Charlton Mires junction is closed off) and initial construction activities at Charlton Mires Junction. The proposed phasing has been mindful of seasonal constraints e.g. bird-nesting and bat roost occupation.

Phase 1

2.8.19. Phase 1 works would take place between March 2022 and July 2022 and would comprise:

a. Traffic would be running through narrow lanes along the northbound carriageway, approximately chainage 52,900 to 61,200, for southbound online widening.
b. Traffic would be running through narrow lanes along the northbound carriageway, approximately chainage 58,900 to 59,200, for northbound widening at Charlton Mires Junction.
c. Offline works at Charlton Mires Junction to west for side roads, approximately chainage 58,200 to 58,900.
d. Offline works for Rock South Farm Access Road, chainage 0000 – 1,800.
e. Demolition of Charlton Mires Farm and East Cottage residential properties.

Phase 2

2.8.20. Phase 2 works would take place between July 2022 and June 2023 and would comprise:

a. Traffic would be running through narrow lanes along the northbound carriageway, approximately chainage 52,900 to 61,200, for southbound online widening.
b. Traffic would be switched to new northbound carriageway at Charlton Mires approximately chainage 58,900 to 59,200.
c. Offline works at Charlton Mires Junction to west for side roads, approximately chainage 58,200 to 58,900.
d. Offline works for Rock South Farm Access Road, approximately chainage 0000 to 1,800.

Phase 3

2.8.21. Phase 3 works would take place between June 2023 and September 2023 and would comprise:

a. Traffic would be switched to the new southbound carriageway, approximately chainage 52,900 to 61,200, for northbound works. This includes improvement works to the existing

northbound carriageway to formally convert it from two-way (existing A1 layout) to one-way operation. It would also include drainage improvement works, resurfacing, road marking changes and completion of works in the central reserve.

b. The new west side of Charlton Mires Junction would be open to traffic.

c. Offline works at Charlton Mires Junction to east for side roads, approximately chainage 58,200 to 58,900.

d. Offline works for Rock South Farm Access Road, approximately chainage 0000 to 1,800.

Phase 4

2.8.22. Phase 4 works would take place between September 2023 and October 2023 and would comprise:

a. Northbound traffic would be switched to new refurbished northbound carriageway so A1 fully operational as dual carriageway, approximately chainage 52,900 to 61,200.

b. All side roads and accommodation roads would be opened to traffic.

Phase 5

2.8.23. Phase 5 works would take place between October 2023 and November 2023 and would comprise:

a. Heckley Fence Accommodation Overbridge would be completed.

b. Charlton Mires Junction would be completed.

Phase 6

2.8.24. Phase 6 works would take place between November 2023 and January 2024 and would comprise:

a. Completion of landscaping works only. This would require temporary lane closures for safety reasons. However, to minimise the need to close lanes once the road is open to traffic, there is an expectation that mitigation planting would be completed ahead of opening where practicable.

2.8.25. The phasing above demonstrates that the proposed online widening would be carried out whilst two-way traffic is maintained on the existing A1, protected by a TVCB or steel barrier system such as Varioguard. The traffic would then be switched onto the newly constructed carriageway allowing refurbishment of the existing carriageway.

2.8.26. Standard working hours would be from 7:00 am until 7:00 pm, Monday to Friday. However, extended hours including nighttime, weekend and Bank Holiday working would be required for some construction operations and would be subject to approval in advance by NCC as outlined in the **Outline CEMP** (**Application Document Reference: TR010041/APP/7.3**). These operations would include traffic management installation, traffic management switches, carriageway resurfacing, bridge beam installation, statutory diversions, drainage works, and construction of Charlton Mires Junction and Heckley Fence Accommodation Overbridge. The construction of Charlton Mires Junction and Heckley Fence

Accommodation Overbridge would also require 24-hour closures of the B6347 to the west and east of the A1. Any overnight full closures of the A1 would be carried out overnight between 8:00 pm and 6:00 am. NCC would be notified in advance of these works.

2.8.27. The anticipated peak monthly workforce would be approximately 160 personnel, with approximately 120 personnel on site per month on average.

GENERAL CONSTRUCTION ENVIRONMENTAL MANAGEMENT

2.8.28. A CEMP would be prepared to describe the measures to be implemented to manage potential environmental impacts from the Scheme during construction. This will be developed from the **Outline CEMP** (**Application Document Reference: TR010041/APP/7.3**) which accompanies the **draft DCO** (**Application Document Reference: TR010041/APP/3.1**) (refer to further details below). The main contractor would be responsible for producing, maintaining, implementing and monitoring the requirements contained in the CEMP. The CEMP would contain a Register of Environmental Actions and Commitments (REAC). The REAC identifies the commitments included within this ES to address the potential environmental effects of the Scheme. The REAC would be the main vehicle for communicating essential environmental information to the Applicant and the body who would be responsible for the future maintenance and operation of the asset, and therefore for ensuring environmental mitigation is implemented during construction. The Outline CEMP contains the following:

a. Introduction and background to the Scheme
b. Scheme Team Roles and Responsibilities
c. REAC (split into three sections, one for the Scheme presenting common commitments, one for Part A and one for Part B)
d. Consents and Permissions requirements
e. Environmental asset data and as built drawing requirements
f. Details of maintenance and environmental monitoring requirements
g. Induction, training and briefing procedures for staff

EARTHWORKS STRATEGY

2.8.29. There is a requirement for excavation, movement and deposition of earthworks materials within the Order Limits. Quantities will not be confirmed until detailed design has been carried out. Therefore, the quantities that follow are an approximation.

Part A

2.8.30. Part A anticipates a cut requirement of approximately 705,000 m^3 and a fill requirement of approximately 385,000 m^3, meaning a surplus of approximately 320,000 m^3 of fill would be generated. Surplus material would be used as described in **Section 2.6** and **Section 2.12**. The plant that would be used for this would consist of dozers, articulated dump-trucks and excavators. However, some earthworks excavations and filling would require road wagons

and compaction rollers in addition. It should be noted that these volumes were prepared during design development and will be revisited at detailed design.

2.8.31. Topsoil strip would generate approximately 150,000 m^3 of material and 60,000 m^3 of topsoil placement, leaving a potential surplus of approximately 90,000 m^3. The southern online section is likely to generate a strip volume of 27,000 m^3, the offline section is likely to generate a strip volume of 84,000 m^3, and the northern online section is likely to generate a strip volume of 39,000 m^3. Construction compounds would generate topsoil strip in addition to these quantities and it is anticipated that this would be stored and used to reinstate the compound areas once works are completed.

2.8.32. The proposed strategy at the construction compounds (refer to **paragraphs 2.8.41** to **2.8.47** for details) would be to store the topsoil within the compound footprint, potentially as screening bunds and re-spread on demobilisation and would be in line with the Department for Environment Food and Rural Affairs (Defra) (**Ref. 2.9**). Topsoil would be temporarily stored within topsoil storage areas at a maximum height of 2 m and a gradient of no greater than 1:2 (refer **Chapter 7: Landscape and Visual, Volume 2** of this ES **(Application Document Reference: TR010041/APP/6.2**) for further information). The surplus topsoil would be either be used within the proposed environmental bunds or taken off site for sale or reuse (refer to **Section 2.6**). Topsoil stripping activities in most areas of the Scheme would be carried out by dozers, excavators and articulated dump-trucks.

Part B

2.8.33. Part B anticipates a cut requirement of approximately 180,000 m3 and a fill requirement of approximately 290,000 m3, meaning approximately 85,000 m3 of imported would be required to construct Part B. Potential for the use of surplus material from Part A is described in **Section 2.5**. The plant that would be used for the earthworks would consist of dozers, articulated dump-trucks, compaction rollers and excavators. However, some earthworks excavations and filling would require road wagons in addition. It should be noted that these volumes were prepared during preliminary design development and would be revisited at detailed design.

2.8.34. Topsoil strip would generate approximately 26,000 m^3 of material and approximately 18,000 m^3 of topsoil placement, leaving a potential surplus of approximately 8,000 m^3. The Compounds would generate a total of approximately 29,400 m^3 of topsoil strip in addition to these quantities and it is anticipated that this would be stored and used to reinstate the compound areas once works are completed.

2.8.35. The proposed strategy at the Compounds (refer to **paragraphs 2.8.48** to **2.8.55** for details) would be to store the topsoil within the compound footprint, potentially as screening bunds and re-spread on demobilisation and would be in line with the Department for Environment Food and Rural Affairs (Defra) (**Ref. 2.9**). Topsoil would be temporarily stored within topsoil storage areas at a maximum height of 2 m and a gradient of no greater than 1:2 (refer to **Chapter 7: Landscape and Visual, Volume 3** of this ES (**Application Document**

Reference: TR010041/APP/6.3) for further information). Topsoil stripping activities in most areas of the Scheme would be carried out by dozers, excavators and articulated dump-trucks.

BORROW PITS AND MATERIALS SOURCING

2.8.36. There would be no borrow pits within the boundaries of the Scheme and all imported materials required for capping layers, starter layers, sub-base and gravels would be sourced from an operational quarry, as locally as possible, where available.

2.8.37. Additionally, for Part B, imported materials could potentially be sourced from Part A as described in **Section 2.5**.

TEMPORARY LAND REQUIREMENTS

Soil Storage Areas

2.8.38. There would be a requirement to temporarily stockpile topsoil on identified soil storage areas within the Order Limits until needed for placement. Twelve topsoil storage areas would be required along the length of Part A for the duration of the construction works (refer to **Figure 2.5: Temporary Construction Works: Part A** of this ES locations). This figure excludes for N-Grid, NGN, NPG diversions. Seven topsoil storage areas would be required along the length of Part B for the duration of the construction works (refer to **Figure 2.6: Temporary Construction Works: Part B** of this ES for locations).

2.8.39. Topsoil storage heaps would be of a maximum of 2 m in height and stacked no closer than the canopy spread of any boundary vegetation. The existing soil within the storage areas would be stripped and stored for re-use and the storage areas would be restored to the previous land use following the works.

2.8.40. Topsoil storage areas have been located such that they may be easily accessed both for deposition of stripped soil and loading of soil for transportation to areas of placement or transportation off-site via road wagons. The location of storage areas considers existing watercourses and the ground profile to ensure suitability and minimise any potential impacts upon groundwater flows / ponding.

Construction Compounds

Part A

2.8.41. Two compounds would be temporarily required to facilitate the construction of Part A. Refer to **Figure 2.5: Temporary Construction Works: Part A** of this ES for locations.

2.8.42. The Main Compound would be located at the northern end of Part A, adjacent to the proposed West Moor Junction to the west of Thirston New Houses, occupying an area of approximately 50,000 m^2 (approximately 5 ha). The access to the compound would be off Felton Road. This compound would be used by both Part A and Part B.

2.8.43. A smaller satellite compound would be located in the southern area of Part A adjacent to the proposed Fenrother Junction, occupying an area of approximately 20,000 m^2 (approximately 2 ha). The access to the compound would be off Fenrother Lane (East).

2.8.44. Both compounds would comprise the following facilities and services:

a. Secure manned gated access
b. Secure Perimeter Fencing
c. Compounds lit during hours of darkness for security and welfare use
d. One Way system in operation
e. Segregated pedestrian accesses
f. Site Offices (single storey)
g. Welfare
h. Staff parking on Tarmac Surfacing
i. Commercial Vehicle Parking
j. Secure Storage
k. Waste facilities
l. Fuel Storage
m. Traffic Management Yard (including vehicle recovery base and accommodation at one compound)
n. Materials Storage
o. Plant Storage and Maintenance area
p. Sub-Contractors Area

2.8.45. The compounds would be lit during hours of darkness for security and welfare use by directional lighting to avoid light spill and disturbance. This is further discussed in the **Statement Relating to Statutory Nuisance** (**Application Document Reference: TR010041/APP/6.15**).

2.8.46. Each proposed bridge site may also comprise a small temporary compound. These may be fenced, depending upon the location. This will be further developed at detailed design. These sites have been assumed for the purposes of the assessment.

2.8.47. Furthermore, an additional temporary compound would be required to the east of the main alignment of Part A, just south of the River Coquet. This would be used as the laydown area for the construction of the new bridge over the River Coquet. It would consist of a hardcore compound area with welfare and storage for plant and materials associated with the bridge construction. An access route down to the river valley would be provided from this location (refer to **paragraph 2.8.137** to **2.8.139** for more details). An area of land to the north of the River Coquet would also be temporarily required to facilitate the construction of the new River Coquet bridge.

Part B

2.8.48. Two Compounds would be temporarily required to facilitate the construction of Part B. Refer to **Figure 2.6: Temporary Construction Works: Part B** of this ES for locations. The Compounds include:

a. Lionheart Enterprise Park Compound
b. Charlton Mires Site Compound

2.8.49. Furthermore, Part B would share the use of the Main Compound with Part A. As discussed in **paragraph 2.8.42** the Main Compound would be located approximately 16 km south of Part B, at the northern end of Part A. Refer to **Figure 2.5: Temporary Construction Works: Part A** of this ES for the location.

2.8.50. The Lionheart Enterprise Park Compound would be located either side of the existing Highways England maintenance depot at Lionheart Enterprise Park, to the south of Alnwick. The Lionheart Enterprise Park Compound would be located approximately 4 km south of the Part B Main Scheme Area. The Lionheart Enterprise Park Compound would occupy an area of approximately 40,000 m2 (approximately 4 ha). Access to the Lionheart Enterprise Park Compound would be off the unnamed road to the north.

2.8.51. A smaller site compound would be located within the Order Limits of Part B to the east of the existing A1, in an existing field to the south of Charlton Mires. This site compound is called Charlton Mires Site Compound and would occupy an area of approximately 8,000 m^2 (approximately 0.8 ha). The purpose of this compound is to facilitate the construction of Charlton Mires Junction.

2.8.52. Both the Main Compound and the Lionheart Enterprise Compound would include the facilities and services listed in **paragraph 2.8.44** above. It is anticipated that welfare facilities, site office and construction plant, materials and waste would be located at the Lionheart Enterprise Park Compound and the majority of site supervision staff located within the Main Compound. Welfare facilities and site materials would also be located at the Charlton Mires Site Compound.

2.8.53. The shared use of the Main Compound for Part A and Part B would comprise the following activities which are additional to the use of the Main Compound for Part A alone:

a. Additional staff and car parking spaces required (10).
b. Additional fuel storage.
c. Additional plant servicing and refuelling resources.
d. Additional vehicle (plant and materials) and people (shared resources) movements between the Main Compound and Part B

2.8.54. The main vehicular journeys between the Lionheart Enterprise Park and the Part B Main Scheme Area are likely to be to transport staff (including the workforce, contractor staff and client staff), traffic management, contractor attendances (fuel bowser, road sweeper etc.), contractor deliveries (including materials and plant) as well as other vehicle movements

(including wagons and wheeled plant). It is anticipated that vehicle movements between the Main Compound and the Part B Main Scheme Area would be to transport staff (including the workforce, contractor staff and client staff), traffic management operatives and equipment, contractor attendances (fuel bowser and welfare maintenance crew), contractor deliveries (including materials and plant) as well as road wagons.

2.8.55. The Compounds would be lit during hours of darkness for security and welfare use by directional lighting to avoid light spill and disturbance. This is further discussed in the **Statement Relating to Statutory Nuisance** (**Application Document Reference: TR010041/APP/6.15**).

CONSTRUCTION TRAFFIC AND ACCESS

2.8.56. As detailed in the **CTMP** (**Application Document Reference: TR010041/APP/7.4**), contractor's access during construction would generally be from the existing A1 carriageway. All access routes to the site would be clearly signposted and subject to consultation with the Applicant, NCC and the Police. Routine use of public side roads by construction traffic would be discouraged, but in some instances, such as access to remote bridge sites and diversion routes for the full A1 closures, it may be required.

2.8.57. Haul routes would be cleaned or swept regularly, with mud prevented from being carried on to public roads by use of wheel washers and mechanical sweepers where necessary.

2.8.58. Contractor's haul roads would be established within the Order Limits as follows:

a. **For Part A**, the main haul roads would be located to the west of the main alignment of Part A for the southbound online widening and to the east of the alignment for the northbound online widening.
b. **For Part B**, the main haul road would be located to the east of the main alignment for Part B for the online widening. However, short lengths of haul road would be required to the west of the existing A1 to construct Heckley Fence Accommodation Overbridge and the West Linkhall Access Road. In some areas, environmental constraints such as the Scheduled Monuments to the north of Part B require alternative haul roads to be provided (refer to **paragraph 2.8.65** for details of these routes).

2.8.59. The above haul roads would be moved as required for the preparation of the new road formation. In some areas where space is limited, particularly in the parallel widened sections of the Scheme, additional working areas have been included in the Order Limits.

2.8.60. Where possible, material would be transported throughout the construction areas by HGVs. The use of other vehicles would be avoided wherever possible. Bulk materials would be delivered using the existing A1 to distribute through the construction areas.

TRAFFIC MANAGEMENT AND TEMPORARY DIVERSIONS

2.8.61. A **CTMP** (**Application Document Reference: TR010041/APP/7.4**) has been prepared to outline measures to manage the effects of construction traffic upon the local road network resulting from the construction of the Scheme. The CTMP would be further developed by

the appointed main contractor in consultation with NCC and approved by the Secretary of State as set out in **Requirement 4, Schedule 2** of the **draft DCO** (**Application Document Reference: TR010041/APP/3.1**). Road space, road closures and temporary traffic signals would be authorised and confirmed in advance, to take into consideration any other works and planned events. Temporary traffic management measures are identified in the CTMP and would be designed to ensure that the works operate safely and delays to both the works and the road users are kept to a minimum. Temporary closure of side-roads would be kept to a minimum, and existing private accesses would be maintained with the exception of those identified in this document. All temporary diversions would be signed and / or otherwise publicised in advance of implementation to give advance notice to road users.

2.8.62. To safeguard the workforce and the travelling public, the online widening sections would be protected by a TVCB or steel barrier with traffic running in narrow lanes in these locations. The speed limit through the roadworks would also be reduced to 40 mph for reasons of safety. For the construction of the structures and junctions, controlled plant crossings at side roads would also be implemented.

2.8.63. The proposed high-level traffic management strategy comprises the following:

a. Mainline: Construct offline and switch to new carriageway once complete. Works to de-trunked A1 (**Part A**).
b. Offline (**Part A**): Temporary road closures and diversions of side roads.
c. Any overnight full closures of the A1 would be carried out overnight between 8:00 pm and 6:00 am. The proposed diversion routes for the A1 are those shown in the **CTMP** (**Application Document Reference: TR010041/APP/7.4**). These diversion routes are currently used by the Applicant when maintenance and improvement works are undertaken on the network.
d. Side road closures (**Part A**): Diversions would be local on parallel roads via the A697 (and to the east of the existing A1 in some cases) due to limited traffic. The Applicant would not close all the side roads simultaneously to ensure that some access can be maintained during construction of Part A. Access to residential properties would be maintained for the entirety of the construction period.
e. Side road closures (**Part B**): Diversions would be local on parallel roads via the B6341 and B6347. The Applicant would not close all the side roads simultaneously to ensure that some access can be maintained during construction of Part B. Access to residential properties would be maintained for the entirety of the construction period.
f. There are no current plans to divert the A1 through Felton as a result of the Scheme.

2.8.64. As indicated in the above bullet points, some temporary road closures and diversions would be required for traffic management installation (especially the removal of road markings and application of temporary markings), bridge beam installation, surfacing at tie-ins and other key tasks. These closures are required to ensure that specific tasks are carried out safely and efficiently to minimise the risk to road users and the construction workforce. In addition,

closures of a number of side roads would be required for the purposes of structures and junction construction, and construction of the new offline section of Part A.

2.8.65. Temporary road traffic diversions are identified in the **CTMP** (**Application Document Reference: TR010041/APP/7.4**) and would be limited to nighttime and weekend periods. The length of the proposed diversions are as follows:

a. For Part A, northbound traffic would be diverted via the A1 north, Morpeth Bypass, A197, A189, A1068 Coast Road, Alnwick A1 north for all traffic types. The diversion would be approximately 45 km in length. The southbound diversion for cars and local traffic would be via the A1 south Alnwick, B6346, B6341 and A697 (which would be approximately 35 km in length) while the southbound diversion would be via the A698 and A697 for HGV and long-distance traffic. It is anticipated that there would be 23 nights of southbound diversions and 23 nights of northbound diversions required during the construction of Part A. The diversion routes would be between approximately 35 km - 45 km.

b. In relation to Part B, the A1 southbound traffic diversion route would be between Morpeth and south of Belford and would follow the A697 and B6348. The diversion would be approximately 63 km in length and be located to the west of the existing A1. The A1 northbound traffic diversion route would be between Denwick and north of Brownieside and would follow the B1340 and an unnamed road to the east of the A1. The diversion would be approximately 25 km in length and extend east towards the coast. It is anticipated that there would be 17 nights of southbound diversions and 17 nights of northbound diversions required during the construction of Part B. The diversion routes would be between approximately 25 km – 63 km.

TEMPORARY PROW DIVERSIONS

2.8.66. If a PRoW is being permanently closed, it is assumed that this would occur during construction and continue throughout the operation period. It would be necessary to temporarily close some PRoW during construction and these closures would be communicated in an appropriate manner with alternatives identified, where possible.

2.8.67. For Part A, where a permanent diversion is to be provided, it is assumed that this would be undertaken early on in the construction period wherever possible in order to maintain public use.

2.8.68. For Part B, during construction, safe crossing points across the A1 for pedestrians and agricultural vehicles would be provided at Charlton Mires. Safe crossing points across the A1 would be provided for pedestrians, cyclists, equestrians and agricultural vehicles at Broxfield or Heckley Fence depending of the phase of the construction works. The exact type and location of crossing points would be developed at detailed design.

2.8.69. **Table 4** of the **CTMP** (**Application Document Reference: TR010041/APP/7.4**) includes a summary of the management of PRoWs during the construction phase.

2.8.70. Regular cleaning and maintenance of footways would help to ensure the safety of the public during the construction phase.

DEMOLITION

Part A

2.8.71. Part A would require some demolition works as follows:

a. Demolition of the residential property North Gate House (opposite Northgate Farm, on the western side of the A1 approximately 100 m north of the A697 Junction).
b. Small sections of some existing culverts in order to extend the structures.
c. Demolition of two existing culverts, which would be replaced with new culverts.

2.8.72. These proposed demolition works are described in more detail below.

2.8.73. Opportunities for recycling of materials including slate tiling, stone walling, and metals would be explored.

North Gate House

2.8.74. North Gate House is a two-storey stone built residence with a single storey detached garage/ outbuilding. It would be demolished in Phase 1 of the construction of Part A so widening works can proceed in this area. The property would be demolished by an accredited demolition contractor following an approved method of works. Pre-demolition works such as services isolation, asbestos inspection, and protected species inspection would be carried out.

2.8.75. Demolition would be carried out using a track mounted demolition excavator and the demolition arisings removed for recycling or transported to an off-site waste disposal facility.

Culverts

2.8.76. The proposed Glenshotton culvert and the proposed Parkwood Culvert extensions would require partial demolition. This would comprise the demolition of the existing concrete wing walls and headwalls prior to the extensions being constructed. These works would be carried out within Phase 1 of the construction of Part A.

2.8.77. The existing Paradise culvert would be demolished and replaced with a new precast concrete pipe. The first demolition section would be carried out in Phase 1 and the second section in Phase 2.

2.8.78. The existing Shieldhill culvert would be demolished and replaced with a new precast concrete pipe.

2.8.79. Protection measures to avoid contamination to the watercourses during demolition, as specified in the **Outline CEMP** (**Application Document Reference: TR010041/APP/7.3**), would be implemented. The demolition works may require localised diversions of the watercourse.

2.8.80. Demolition would be carried out using a track mounted excavator with pneumatic breaker attachment with arising's removed to an off-site recycling facility.

Part B

2.8.81. Part B would require some demolition works as follows:

a. Demolition of the 2 residential properties comprising Charlton Mires Farm and East Cottage, and several associated farm outbuildings and sheds. The properties are located to the north east of the of the existing at-grade junction between the A1 and B6347, at approximately chainage 58,900.
b. Small sections of some existing culverts to extend the structures.
c. Demolition of an existing culvert, which would be replaced with a new culvert

2.8.82. These proposed demolition works are described in more detail below.

2.8.83. Opportunities for recycling of materials including slate tiling, stone walling, and metals would be explored.

Charlton Mires Farm and East Cottage

2.8.84. Charlton Mires Farm (two storeys) and East Cottage (one storey) are stone built residences with slate roofs. The properties would be demolished in Phase 1 of the construction works so widening works and bridge works may proceed in this area. The properties would be demolished by an accredited demolition contractor following an approved method of works. Pre-demolition works such as services isolation, asbestos inspection, and protected species inspection and mitigation would be carried out prior to the demolition of the properties.

2.8.85. Demolition would be carried out using a track mounted demolition excavator and the demolition arisings removed for recycling or transported to an off-site waste disposal facility.

Outbuildings and Sheds

2.8.86. Several outbuildings and sheds to the rear of the dwellings would also be demolished. The outbuildings and sheds are a mixture of timber, masonry and steelwork with slated or asbestos roofing. They would be demolished by an accredited demolition contractor following an approved method of works. Pre-demolition works such as services isolation, asbestos inspection, and protected species inspection and mitigation would be carried out prior to demolition. As the outbuildings and sheds may have asbestos roofing sheets, an accredited asbestos removal contractor may need to be engaged to carry out to demolish or remove the roofs. The demolition works would be carried out in conjunction with the demolition of Charlton Mires Farm and East Cottages.

2.8.87. Demolition would be carried out using a track mounted demolition excavator and the demolition arisings removed for recycling or transported to an off-site waste disposal facility.

Culverts

2.8.88. There is a requirement to carry out some culvert demolition works as a result of Part B. The proposed White House Burn Culvert (Reference 23.1), Linkhall Culvert (Reference 26.1)

and Shipperton Burn Culvert (Reference 27.1) extensions would require partial demolition. Rock Culvert (Reference 28.1) would be demolished and replaced with a new culvert on the existing watercourse alignment and bed slope. The culverts that would require extending or replacing would require demolition of existing wingwalls, headwalls culverts and other minor demolition to facilitate the connection between existing and new works.

2.8.89. Protection measures to avoid contamination to the watercourses during demolition, as specified in the **Outline CEMP** (**Application Document Reference: TR010041/APP/7.3**) would be implemented. The demolition works may require localised diversions of the watercourse, temporary pumping arrangements, or both.

Culvert Extensions

2.8.90. Culvert extensions would be carried out in a number of locations, some of which entails partial demolition of the existing structure as described in **paragraph 2.8.88**. This would necessitate the demolition of the existing concrete wing walls and headwalls prior to the extensions being constructed. Demolition would be carried out using a track mounted excavator with pneumatic breaker attachment with arising's removed to an offsite recycling facility. The demolition works would be carried out within the first phase of the widening works to the carriageway.

Culvert Replacement

2.8.91. Rock Culvert would need to be replaced with a new precast piped structure. The demolition of the existing structure would be carried out during Phase 3 of the construction period when traffic has been diverted onto the new southbound carriageway. It would be removed using excavator mounted pneumatic breakers and demolition arising's removed to an offsite recycling facility. The excavated trench would then be backfilled and compacted with granular material up to road formation level, allowing roadworks to proceed.

WASTE GENERATION DURING CONSTRUCTION

2.8.92. Demolition works, together with other elements such as site remediation and preparation and construction activities, are likely to produce waste, including broken out concrete, cut steel, road surface planings, hazardous or contaminated material found on or beneath the Scheme, vegetation, surplus topsoil or subsoil materials, timber formwork, bricks and aggregate.

2.8.93. In addition, the demolition of the properties, outbuildings and sheds could lead to the production of waste including asbestos cement sheets, roof tiles, timber joists and general household waste.

2.8.94. The following paragraphs provide an overall summary of the likely waste to be generated during the construction of the Scheme. Refer to **Chapter 13: Material Resources, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for further details of the assessment of waste as a result of Part A, and **Chapter 13: Material Resources, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for Part B.

2.8.95. A segregated waste regime would be set up whereby all construction waste would be taken for recycling where practicable. As detailed in the **Outline CEMP** (**Application Document Reference: TR010041/APP/7.3**), a detailed Site Waste Management Plan (SWMP) would be implemented to ensure appropriate waste management and compliance with legislative requirements.

Part A

Demolition

2.8.96. Refer to **paragraphs 2.8.71** to **2.8.80** on the likely demolition waste as a result of Part A.

Site Clearance

2.8.97. Site clearance works would be required to create construction working areas and enable construction activities to take place and would involve the removal of objects or areas which cannot be re-used on the Scheme and would pose an obstacle or obstruction to works. Items to be cleared would vary depending on site conditions, use and location but are anticipated to include:

a. Approximately 65 hectares of general site clearance comprising of open fields, woodland, which would be recycled and mulched as far as possible for re-use elsewhere on the Scheme or use off-site on other schemes and by other uses.
b. Approximately 6000 m of existing fencing. The timber elements would be reused on site where possible. Any timber that could not be reused on site would be taken off-site for recycling and the metal elements disposed to a metals recycling facility.
c. Approximately 11,600 m of existing kerbing. Where possible material would be crushed for re-use elsewhere on the Scheme although elements would be disposed of off-site.
d. Other miscellaneous items such as existing safety fencing and signage. Metal wastes would be recycled, and concrete wastes would be crushed for re-use elsewhere on the Scheme.

Drainage

2.8.98. The installation of drainage throughout Part A would generate approximately 25,000 m^3 of arisings from the excavation of land for new components, particularly from the filter drainage sections. These would be retained on the Scheme if possible and placed in landscape bunds within the Order Limits.

Structures Excavation

2.8.99. Excavation for structural foundation to bridges and culverts would generate approximately 5,000 m^3 of arisings. These would be used within proposed environmental bunds, as discussed in **Section 2.6.**

Planings

2.8.100. Approximately 10,000 m^3 of planing (pavement surfacing) would be generated by cold milling (i.e. removing part of the pavement surface) of the existing pavement. Where

possible, these planings would be used for haul road construction, compound laydown areas, crane pads and capping layer.

General Construction Waste

2.8.101. There would be a percentage of waste generated from construction methods across Part A. This would be likely to include in-situ concrete, precast concrete products including kerbs and manholes, timber from formwork etc, and plastic waste from pipes and packaging. As detailed in the **Outline CEMP** (**Application Document Reference TR010041/APP/7.3**), a SWMP and CL:AIRE compliant Materials Management Plan would be implemented by the main contractor. The SWMP would ensure that construction waste would be segregated as appropriate and (where practicable) arisings taken for recycling to a facility. Any general construction waste that cannot be recycled or reused would be disposed of to landfill.

Part B

Demolition

2.8.102. Refer to **paragraphs 2.8.81** to **2.8.91** on the likely demolition waste as a result of Part B.

Site Clearance

2.8.103. Site clearance works would be required to create construction working areas and enable construction activities to take place and would involve the removal of objects or areas which cannot be re-used on the Scheme and would pose an obstacle or obstruction to works. Items to be cleared would vary depending on site conditions, use and location but are anticipated to include:

a. Approximately 30 ha of general site clearance comprising of open field, woodland, which would be recycled and mulched as far as possible for re-use elsewhere on the Scheme or use off-site on other schemes and by other uses.
b. Approximately 7,800 m of existing fencing. The timber elements would be reused on site where possible. Any timber that could not be reused on site would be taken off-site for recycling and the metal elements disposed to a metals recycling facility.
c. Approximately 15,700 m of existing kerbing. Where possible material would be crushed for re-use elsewhere on the Scheme although elements would be disposed of off-site.
d. Other miscellaneous items such as existing safety fencing and signage. Metal wastes would be recycled, and concrete wastes would be crushed for re-use elsewhere on the Scheme.

Drainage

2.8.104. The installation of drainage throughout Part B would generate approximately 14,200 m3 of drainage arisings from the excavation of land for new components, particularly from the filter drainage sections. Where possible, these would be re-used on the Scheme, within the Order Limits.

Structures Excavation

2.8.105. Excavation for structural foundation to bridges and culverts would generate approximately 900 m^3 of arisings. These would be re-used elsewhere on the Scheme where possible.

Planings

2.8.106. Approximately 10,000 m^3 of planing (pavement surfacing) would be generated by cold milling (i.e. removing part of the pavement surface) of the existing pavement. Where possible, these planings would be used for haul road construction, compound laydown areas, crane pads and capping layer.

General Construction Waste

2.8.107. There would be a percentage of waste generated from construction methods across Part B. This would be likely to include in-situ concrete, precast concrete products including kerbs and manholes, timber from formwork etc, and plastic waste from pipes and packaging. As detailed in the **Outline CEMP** (**Application Document Reference TR010041/APP/7.3**), a SWMP and CL:AIRE compliant Materials Management Plan would be implemented by the main contractor. The SWMP would ensure that construction waste would be segregated as appropriate and (where practicable) arisings taken for recycling to a facility. Any general construction waste that cannot be recycled or reused would be disposed of to landfill.

PROPOSED CONSTRUCTION METHODOLOGY

Part A

Road Base and Compacting

2.8.108. The foundation to the road pavement would comprise a granular layer of capping and sub-base, over which the bituminous and cementitious layers would be placed. There would be approximately 47,000 m^3 of capping material and 50,000 m^3 of sub-base material to be imported and placed. The likely source of these materials would be a quarried source in Northumberland, potentially Barrasford or Howick quarries. The material would be transported to site via road wagons. The method of placing and compaction would comprise a dozer and a compaction roller.

Pavement Laying

2.8.109. The pavement to Part A would generally comprise of a cementitious base, bituminous binder and surface courses. There are also areas of cold milling, regulating and potentially areas of in-situ recycled pavement.

2.8.110. The estimated required bituminous pavement volume for Part A is 95,000 m^3 and would be sourced from a suitable Asphalt plant in (or where not available as near as possible to) Northumberland. Material would be imported to the site in insulated road wagons.

2.8.111. The method of placing and compacting the road pavement would involve an asphalt paver, vibratory rollers, tractairs, and spray units.

2.8.112. Cold milling on Part A would comprise approximately 64,000 m^2 of depth 100 mm, and 65,000 m^2 of depth 50 mm.

Drainage

2.8.113. Drainage installation on Part A would comprise approximately 6,000 m of carrier drainage (including kerb and gully pipework) and 22,500 m of filter drainage. Pipework would range in diameter from 225 mm to 600 mm and would generally range in depth from 1.5 m to 4 m. This would require importing 3,000 m3 pipe bedding and 33,600 m3 of filter media sourced from operational quarries in Northumberland. Additional drainage items are limited areas of surface water channels in the central reservation and combined kerb drainage. They would be constructed directly on the capping layer.

2.8.114. The method of installation for drainage works would require a tracked excavator, a dumper and a compactor plate.

Structures

2.8.115. There could be a requirement to import and place structural backfill to bridge abutments and construction of reinforced earth abutments on Part A. This material would be sourced from an operational quarry in Northumberland. The quantities involved would be approximately 16,000 m^3 of imported materials. The material would be placed with a dozer or similar, and a compacting roller.

2.8.116. It is assumed that piling works would go down to a maximum depth of 15 m, for all proposed overbridges and underbridges.

Highlaws Junction, Fenrother Junction, Causey Park Overbridge and West Moor Junction

2.8.117. The proposed Highlaws Junction, Fenrother Junction, Causey Park Overbridge and West Moor Junction would be single span integral bridges with a prestressed precast concrete beam deck.

2.8.118. The precast elements would be constructed off-site in a controlled environment and then installed directly on temporary bearings. The precast beams would be lifted into position by heavy lifting equipment.

Burgham Park Underbridge

2.8.119. The proposed Burgham Park Underbridge would be an integral single span bridge with a prestressed precast beam deck.

2.8.120. The concrete deck would be cast in-situ, spanning over the concrete beams. The precast units would be constructed in a controlled environment off-site minimising risk to the environment and transported to the construction site. The beams would be integrally connected to the abutments at each end, resting on mortar pads. The abutments would be cast in-situ and seated on piled foundations. Parapets could also be precast.

2.8.121. The absence of both construction and expansion joints would entail minimal maintenance and no need for bearing replacement.

2.8.122. Wing walls would be constructed at the east and west end of the structure to retain the road embankments. A sloped earth embankment would extend from the edge of the verge to the base of the wing wall.

River Coquet Bridge

2.8.123. The following paragraphs present the overall methodology for the construction of the proposed bridge and associated abutments and piers.

Access and Establishment

2.8.124. Access would be established to the work sites from the north and south of the river valley with haul roads down to the sites of the abutments and pier foundations and laydown areas prepared adjacent to each work area. It is likely that tower cranes would be used for the purposes of pier base and stem construction and for servicing the deck construction. It is proposed to site a tower crane on each of north and south embankments, at a suitable location where a temporary foundation may be established. In addition, permanent widening earthworks to the north and south of the river valley would be carried out to construct the bridge.

Temporary Works

2.8.125. Sheet piles would be installed to construct the southern pier base, which would avoid entering the watercourse under normal flow conditions. This would be installed using a tracked piling rig to a depth of approximately 8 m below ground level and some pre-augering may be required to drive the piles to the required level, depending on the quality of the underlying rock. The bore piled rig wall would be installed to bedrock level. These sheet piles, located outside of assumed bankfull channel, would then serve two functions: firstly, as a cofferdam to create a dry working area for construction; and, secondly, would form part of the permanent framework for the new pile cap. Once constructed, the sheet piles would be cut off to the pile cap level.

2.8.126. As discussed in **paragraph 2.5.100**, the proposed southern pier would move up to 2 m to the north from the current proposed location. Refer to assessment parameter 10 in **Section 2.11** for further details on how this potential change has been assessed in this ES.

2.8.127. Prior to excavating for both the north and south abutments, a sheet piled retaining wall would be installed to retain the existing carriageway. This would be installed with a tracked piling rig and piles installed to a depth of approximately 8 m below ground level. The level of rock head at these locations would need to be predetermined to ascertain the feasibility of this proposal. If rock head is outcropping at ground level, then temporary retaining measures may not be required as the rock face would retain the carriageway.

2.8.128. Temporary works would comprise the installation of sheet piled retaining walls prior to excavating the north and south abutments, to retain the existing carriageway. These would be installed with a tracked piling rig and piles installed to a depth of approximately 8 m below ground level.

Abutments

2.8.129. On completion of the temporary works to retain the existing carriageway, the southern abutment footprint would be excavated down to formation level. The southern abutment would then be constructed and would comprise foundation slab, base reinforcement, scaffolding, proprietary formwork by a crane and the placing of concrete using a concrete pump. Once installed, formwork would be stripped, scaffolding removed, and the abutment backfilled with a tracked excavator and dumper and compacted in layers. Bearings would then be installed on the bearing shelves and grouted into their final positions.

2.8.130. On completion of the temporary works to retain the existing carriageway, the northern abutment footprint would be excavated down to formation level and a granular piling platform installed. A specialist main contractor would then mobilise to install the pair of caisson foundations by progressively excavating and jacking the precast circular caisson sections down to bedrock level, extending the sections as the caisson sinks. Following this, any remaining internal material would be excavated down to bedrock, and the void in-filled with structural concrete. The abutment would then be constructed as per the southern abutment.

Piers

2.8.131. Following installation of the cofferdam, the southern pier works would proceed. A bored piling rig would install the piles to bedrock, working from a level at the top of the cofferdam. On completion of the piling, excavation down to foundation level would be carried out, followed by breaking down of the piles to their finished level using a pneumatic pile breaking attachment. The base would be constructed with steel fixing, followed by base formwork and then concreted with a concrete pump. Once cured, the base would be stripped and backfilled, allowing installation of access scaffolding to the full pier height. Steel fixing would then proceed to ensure sufficient temporary bracing to the pier steel is in place. Proprietary formwork would then be craned into position, with the pier likely to be poured in two lifts. Concrete would be placed using a 40 m concrete pump located on the southern bank. Once complete, the formwork would be removed and then the bearings would be installed and grouted into position at the pier heads.

2.8.132. The north pier would be founded on a single caisson foundation and installed by a specialist contractor. This would be installed by progressively excavating and jacking the caisson sections down to bedrock level, following which any internal material excavated down to bedrock, and the void infilled with concrete. The base and stem would then be constructed as described for the south pier.

Deck Works

2.8.133. The steel deck would comprise braced pairs of girders of up to a depth 4 m supported on bearings at the abutment and pier positions. The girders and bracing would be prefabricated in lengths up to 40 m off-site before being transported to site in single sections for site assembly. They would be assembled on temporary trestles on the southern approach

embankment and site welded and bolted into their finished profile as a braced pair. Temporary works including cantilever soffit supports would be affixed to the deck, and some permanent deck formwork would be affixed prior to launching.

2.8.134. The deck would then be launched across the river valley before being lowered onto their permanent position onto the bearings. The launching process would be carried out by a specialist supplier and would require a series of jacks, pulleys and temporary supports to carry out the procedure.

2.8.135. On completion of the launching of the deck, the deck construction would proceed. The remainder of the permanent deck formwork would be craned into position and secured, allowing deck reinforcement to proceed. The deck sections would then be concreted in an agreed sequence of pouring, using a concrete pump. Concreting of the parapet edge beam would follow the deck concrete, ensuring adequate alignment is maintained. On curing, the deck would be waterproofed with a spray applied membrane, and deck parapets affixed to the deck edge. The temporary soffit support system panels would then be removed using a proprietary cradle supported from the tower crane. Deck finishes including kerbing, ducting, footways and surfacing would then follow.

2.8.136. Refer to **Appendix 2.4: River Coquet Bridge Construction Methodology Sequence** of this ES. It should be noted that since the production of this appendix, the design has been developed so that a reinforced concrete abutment is proposed (rather than a piled abutment) for the southern abutment of the proposed bridge. The ES has considered this updated approach.

South Embankment Haul Road

2.8.137. The proposed method for construction of the haul road has taken into account the following considerations:

a. The haul road would not interfere with the ground anchors of the existing south abutment and the bedrock.
b. The haul road would be suitably separated from the construction zone for the new proposed south abutment.
c. The haul road would be constructed within the Order Limits, to ensure disturbance to the River Coquet and Coquet Valley Woodlands SSSI is minimised.
d. The geology of the embankment comprises largely of bedrock of variable hardness which needs consideration in the method of working.
e. Safe method of construction and operation would be considered due to the steep nature of the embankment.
f. The ground level at the top of the southern embankment is approximately 63 m AOD, with river level at approximately 32 m AOD.

2.8.138. The haul road construction method would comprise the following activities:

a. Suitable safety zones would be established around the working area and a laydown/stockpile area within the Order Limits of Part A to the south east of the working area.
b. Excavation would commence with a tracked excavator, ripping/breaking and loading rock for stockpiling in an adjacent laydown area. A suitable ramped access from the laydown area to the first bench (i.e. flat turning area) would be constructed with a maximum 1 in 4 gradient. Breaking the haul road would then commence, working progressively down with a pneumatic tracked excavator breaker and ripping bucket. Materials would then be loaded into a tracked dumper for local stockpile deposition.
c. Depending upon the competency of rock (i.e. strength / integrity of rock), vertical rock drilling may be required to establish the line of the haul road from the crest. This would be carried out with a tracked rock drill, prior to the tracked excavator and pneumatic breaker breaking/ripping the rock.
d. Once the cutting of the haul road has reached 52 AOD, the platform would be widened to accommodate a turning area.
e. The cutting of the haul road would then continue from 52AOD down to the second bench at 44 AOD. Again, once this level is reached, the platform would be widened to accommodate a turning area.
f. The final length of the haul road to 36 AOD would then be cut. At this level, the platform would be widened, and the haul road completed by removal of any uneven surfaces and loose debris.
g. Edge protection would be established, potentially in the form of balk timbers or a rock bund. Surface water runoff would be managed to ensure contaminants do not enter the River Coquet (to be finalised at detailed design).
h. Regular inspection and maintenance would be established to ensure the safe operation of the haul road during the construction phase. A gated entry point to the haul road could potentially be established to ensure security.
i. An engineering geologist would be present full time during rock cuttings to ensure the stability of the rockface.

2.8.139. Refer to **Appendix 2.5: South Embankment Haul Road Construction Methodology** of this ES for further details.

Parkwood Subway

2.8.140. An independent new structure would be constructed next to the existing subway structure. The new subway would comprise an integral single span bridge with a prestressed precast concrete beam deck.

2.8.141. The concrete deck would be cast in-situ over the concrete beams. Precast prestressed beams would be constructed off-site and transported to the site. The beams would be integrally connected to the abutments at each end, resting on mortar pads.

2.8.142. The abutments would be cast in-situ and are assumed to be seated on piled foundations to minimise differential settlement. Reinforced concrete wing walls would be constructed at the east end of the structure.

2.8.143. Due to the difference in the span between the new and the existing structure, retaining walls would be constructed to prevent soil getting into the space between the two structures.

2.8.144. The underpass is required to remain open at all times to enable access to the dwelling, Felton Demesne Farm. However, the access would be closed temporarily at times during construction, with an emergency access procedure in place.

Culverts

2.8.145. It is envisaged that culvert works would be carried out while the flows through existing culverts are diverted to an alternative route (e.g. an adjacent culvert, pipe or drainage channel). If this is not possible, a temporary sump would be excavated on the upstream end of the existing culvert, and with the culvert dammed, a pump would divert the flow through a pipe suspended above the culvert floor. In times of flood, the temporary pumping arrangement may need to be suspended and flows allowed to flow through the culvert, suspending construction works for this period.

2.8.146. For new culverts, the flow of the open channel would be diverted to an alignment approximately 10 m north or south from the route of the proposed culvert construction into a preformed open channel to allow the works to be carried out free of flowing water.

2.8.147. Pipe sections would be lifted into place with a large tracked excavator. Culvert or arch sections would be lifted into place with a large tracked excavator or mobile crane. Refer to **Appendix 2.2: Technical Drawings** of this ES for further details.

2.8.148. The construction method for each culvert within Part A is as follows:

a. Paradise Culvert (Reference 3). For the construction of the replacement Paradise Culvert, scour protection to stream banks and slopes, river training and lining construction works would be ensured. Box gabion walls would be constructed alongside the Floodgate Burn on both upstream and downstream ends. The precast pipes would be constructed off-site and comprise off the shelf precast pipes, wing walls and headwalls. The design of the culvert will ensure that installation and connection of pipe units mitigates any potential for leakages.

b. Priest's Bridge Culvert (Reference 4). The precast elements of the structure would be constructed off-site in a controlled environment and transported to site on an articulated flatbed lorry. The precast units would be lifted into position by heavy lifting equipment.

c. Causey Park Culvert (Reference 6.2). The precast elements of the structure would be constructed off-site in a controlled environment and transported to site. Two double-drum cranes (or one double-drum crane and displaceable scaffolding) are required for the installation of the box elements.

d. Burgham Culvert (Reference 10). The existing culvert would remain in place. Following inspection and assessment, it would be possible to determine if any remedial works are required to prolong the design life of the structure. The construction of wing walls at the end of the structure would be cast in-situ reinforced concrete. Waterproofing would be applied to the top of the wing wall.

e. Bockenfield Culvert (Reference 12). The precast elements would be constructed off-site. The joint between the existing structure and new precast arch sections will be designed to ensure the potential for leakage is mitigated. The construction of spread concrete footing foundations would be required at the springing points of the arch. In the event that weak ground conditions are confirmed, piled foundations may be necessary.

f. Glenshotton Culvert (Reference 14). The precast pipes would be constructed off-site and comprise off the shelf precast pipes, wing walls and headwalls. These would be delivered to site in sections and joined on-site. There would be no requirement for in-situ foundations. The precast units would be lifted into position by heavy lifting equipment. Design of the installation and connection of pipes units will ensure that potential for leakage or differential settlement is mitigated.

g. Parkwood Culvert (Reference 16). The pipe extension would be constructed off-site with no requirement for in situ foundations. Design of the installation and connection of pipes units will ensure that potential for leakage or differential settlement is mitigated. A new (deep) manhole is also to be constructed on this culvert where the proposed highway embankment extends over a change in diameter of the existing culvert pipes.

2.8.149. Refer to **Appendix 2.3: Culvert Construction Methodology** of this ES for further details.

Part B

Road Base and Compacting

2.8.150. The foundation to the road pavement would comprise a granular layer of capping and sub-base, over which the bituminous and cementitious layers would be placed. There would be approximately 54,000 m^3 of capping material and 27,000 m^3 of sub-base material to be imported and placed. The likely source of these materials would be a quarried source in Northumberland, potentially Barrasford or Howick quarries. The material would be transported to site via road wagons. The method of placing and compaction would comprise a dozer and a compaction roller.

Pavement Laying

2.8.151. The pavement to Part B would generally comprise of a cementitious base, bituminous binder and surface courses. There are also areas of cold milling, regulating and potentially areas of in-situ recycled pavement.

2.8.152. The estimated required bituminous pavement volume for Part B is 54,000 m^3 and would be sourced from an accredited Asphalt plant in, or where not available as near as possible to, Northumberland. Materials would be imported to the site in insulated road wagons.

2.8.153. The method of placing and compacting the road pavement would involve an asphalt paver, vibratory rollers, tractairs, and spray units.

2.8.154. Cold milling on Part B would comprise approximately 104,000 m^2 of depth 100 mm, and 14,000 m^2 of depth 50 mm.

Drainage

2.8.155. Drainage installation on Part B would comprise approximately 1,800 m of carrier drainage (including kerb and gully pipework) and 14,000 m of filter drainage. Pipework would range in diameter from 225 mm to 600 mm and would generally range in depth from 1.5 m to 4 m. This would require importing 6,000 m^3 pipe bedding and 13,000 m^3 of filter media sourced from operational quarries in Northumberland. Additional drainage items are limited areas of surface water channels in the central reservation and combined kerb drainage. They would be constructed directly on the capping layer.

2.8.156. The method of installation for drainage works would require a tracked excavator, a dumper and a compactor plate.

Structures

2.8.157. There would be a requirement to import and place structural backfill to bridge abutments and construction of reinforced earth abutments on Part B. This material would be sourced from an operational quarry in Northumberland. The quantities involved would be approximately 1,900 m^3 of imported materials. The material would be placed with a dozer or similar, and a compacting roller.

2.8.158. It is assumed that piling works would go down to a maximum depth of 15 m for both Charlton Mires Junction and Heckley Fence Accommodation Overbridge.

Charlton Mires Junction

2.8.159. The proposed junction would include an integral single span bridge comprising a deck formed with pre-stressed precast concrete beams and in-situ reinforced concrete slab.

2.8.160. The concrete deck would be cast in-situ, spanning over the concrete beams and overhanging the edge beams. The precast units would be constructed in a controlled off-site environment, minimising risk to the environment and transported to the construction site or construction compound (most likely Charlton Mires Site Compound). The beams would be integrally connected to the abutments at each end, resting on mortar pads during previous initial construction stages. The abutments would be cast in-situ and would comprise end screen walls seated on sleeved piles down to below the road level. Pile sleeves would not be present at lower levels. Stringcourses for parapets could also be precast.

2.8.161. The absence of both construction and expansion joints would entail minimal maintenance and no need for bearing replacement.

2.8.162. Wing walls would be constructed at the east and west end of the structure to retain the road embankments. A sloped earth embankment would extend from the edge of the verge to the base of the wing wall.

Heckley Fence Accommodation Overbridge

2.8.163. The same structural typology and construction methodology descriptions as for Charlton Mires are applicable to Heckley Fence Accommodation Overbridge. The main difference between the structures would be the narrower deck of this structure.

Culverts

2.8.164. As for Part A, it is envisaged that culvert works for Part B would be carried out while the flows through existing culverts are diverted to an alternative route (e.g. an adjacent culvert, pipe or drainage channel). If this is not possible, a temporary sump would be excavated on the upstream end of the existing culvert, and with the culvert dammed, a pump would divert the flow through a pipe suspended above the culvert floor. In times of flood, the temporary pumping arrangement may need to be suspended and flows allowed to flow through the culvert, suspending construction works for this period.

2.8.165. For new culverts, the flow of the open channel would be diverted to an alignment approximately 10 m north or south from the route of the proposed culvert construction into a preformed open channel to allow the works to be carried out free of flowing water.

2.8.166. Pipe sections would be lifted into place with a large tracked excavator. Culvert or arch sections would be lifted into place with a large tracked excavator or mobile crane. Refer to **Appendix 2.2: Technical Drawings** of this ES for further details.

2.8.167. The construction method for each culvert within Part B is as follows:

a. Denwick Burn (Reference 21.1). The existing culvert would remain. The precast elements of the structure would be constructed off-site in a controlled environment and transported on an articulated flatbed lorry. The precast units would be lifted into position by heavy lifting equipment. Design of the installation and connection of pipes units will ensure that potential leakage or differential settlement are mitigated. To ensure a good connection between retained and new structure, an in-situ concrete stich would be required.

b. White House Burn Culvert (Reference 23.1). Description for Denwick Burn Culvert is also applicable for this structure.

c. Linkhall Culvert (Reference 26.1). Description for Denwick Burn Culvert is also applicable for this structure.

d. Shipperton Burn Culvert (Reference 27.1). Description for Denwick Burn Culvert is also applicable for this structure. However, a flatbed lorry may not be required for transportation of precast elements.

e. Rock Culvert (Reference 28.1). The precast pipes, wing walls and headwalls would be constructed off-site and would be delivered in sections. There would be no requirement for in-situ foundations. The precast pipes would be lifted into position by heavy lifting

equipment. Design of the installation and connection of pipes units will ensure that potential leakage or differential settlement are mitigated.

2.8.168. Refer to **Appendix 2.3: Culvert Construction Methodology** of this ES for further details.

2.9. OPERATIONAL MAINTENANCE AND MANAGEMENT

2.9.1. Following completion of construction, the main contractor would be responsible for defects over a set period (generally 12 months). After this period has lapsed, all roads, bridges, footways and other infrastructure associated with the Scheme would be adopted by the Applicant or NCC (as detailed below) and fall within their routine schedule of maintenance and inspections. Towards the end of the construction period the CEMP would be developed as a Handover Environmental Management Plan (HEMP) which would include the monitoring and management arrangements going forward during future maintenance and operation.

2.9.2. Maintenance of the A1 is the responsibility of the Applicant, whilst maintenance of the local road network is the responsibility of NCC as the local highway authority. Therefore, the main Scheme alignment and its proposed junctions would be maintained by the Applicant. Side roads, link roads and the de-trunked A1 would be adopted by NCC.

2.9.3. Short-term maintenance and repair activities are likely to comprise inspections on the new works and installed assets and any unplanned works due to damage to assets in events such as road traffic incidents.

2.9.4. Long-term maintenance and repair works are likely to be required for the following Scheme assets, such as:

a. Road restraint systems (verge and central reserve)
b. Traffic signs and road markings
c. Concrete surface water channels
d. Catchpits, gullies, combined kerb drainage units, pipework and filter media within filter drains.
e. Flow control devices (vortex control devices)
f. Detention Basins (and storage swales and a storage tank for Part A)
g. Soft estate
h. Pavement and paved areas
i. Structures
j. Off-network access points
k. Roadside technology equipment / cabinets
l. Fences, gates, maintenance access tracks, paths, hardstandings and noise barriers (for Part A).

2.9.5. There would also be on-going (annual) inspections and general routine maintenance works such as debris removal, sweeping, litter picking and weed killing.

2.9.6. In the long-term, expected planned maintenance would include activities such as resurfacing the road and replacement of assets when they become life expired.

2.9.7. For Part A, maintenance of the footways at the new junctions and in the A1 highway verge between Warreners House and the Highlaws junction would be the responsibility of the Applicant. For Part B, maintenance of the footways at Charlton Mires Junction would be the responsibility of the Applicant. All other footpaths, cycle paths and bridleways would be handed over to NCC as the Local Highway Authority and the responsible authority for the maintenance of PRoW (including the proposed shared footway / cycleway on the parallel link road between the A1 to be de-trunked and the West Moor junction for Part A).

2.9.8. Maintenance of the proposed detention basins would be the responsibility of the Applicant. However, the exception to this is (for Part A) detention basin DB20 located where the proposed Fenrother Lane free-flow link road would merge with the de-trunked A1, and detention basins DB15a, DB17a and DB17b which would all be maintained by NCC.

2.9.9. For Part A, hedgerows and fencing constituting the permanent boundary would be maintained by the landowner, and the Applicant would remain responsible for badger fencing, anti-glare fencing and other environmental mitigation.

2.9.10. All culverts below 1200 mm in diameter would not be man-entry for maintenance purposes. Measures to prevent man entry to the sections of culvert <1200 mm diameter are to be implemented at detailed design.

2.9.11. Maintenance of diverted power lines and other statutory utilities would remain the responsibility of the relevant statutory undertakers.

2.9.12. Refer to **Technical Chapters 5** to **15, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for Part A and **Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for Part B, for details of the maintenance of environmental mitigation (including the Woodland Creation Area for Part A).

2.9.13. All existing maintenance procedures relevant to the Scheme would be reviewed by the Applicant and updated as necessary to incorporate the changes needed to support the Scheme. There would also be a number of new assets introduced by the Scheme, and the maintenance and access to these new assets have been detailed by the Applicant as part of the assets' maintenance arrangements.

2.9.14. For Part A, a number of the proposed PMA's would be maintained by the respective landowner:

a. Warreners House
b. Hebron Hill Farm
c. New Houses Farm
d. Strafford House
e. Hebron West Farm (Bywell Road)
f. Fenrother Lane – North

g. Fenrother Lane – South

2.9.15. For Part B, no proposed PMA's would be maintained by landowners.

2.9.16. For Part A, easements are proposed over several existing and proposed private access tracks to give the Applicant rights to access detention basins DB7, DB9 and DB12. The proposed access track at Low Espley would remain within the Applicant's ownership. This is intended to provide access to landowners and also allow the Applicant to access DB4. For Part B, easements are proposed over several existing and proposed private access tracks to give the Applicant rights to access detention basins DB22, DB23 and DB24.

2.10. DEMOLITION (PHASE)

2.10.1. Details of demolition associated with construction of the Scheme are set out in **Section 2.8** above. This section related to the demolition associated with end of design life.

2.10.2. The Scheme would have a pavement design life of 40 years and a standard bridge design life of 120 years (some structural elements require replacement in shorter periods, for example expansion joints (every 15-25 years), bearings (every 25 years), waterproofing (every 30-50 years). As such it is highly unlikely that the Scheme would be demolished before the end of its design life as the road is likely to have become an integral part of the infrastructure in the area. Demolition would not be either feasible or desirable and is therefore not considered further within this ES.

2.11. OFF-SITE WORKS

2.11.1. For Part A, the Northumberland Coast Area of Outstanding Natural Beauty (AONB) Partnership has aided with locating suitable receptor sites for barn owl mitigation boxes (through discussions with landowners) and facilitating agreements with landowners to accept mitigation features and provide future access for monitoring and management. The AONB Partnership also confirmed that they may be able to undertake future monitoring following agreement with the Applicant. Barn owl mitigation boxes were installed at suitable receptor sites as identified by the Applicant and the AONB Partnership, which are outside of the Order Limits of Part A. Refer to **Chapter 9: Biodiversity, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for further details.

2.11.2. As part of the Ancient Woodland Strategy, material from the wider SSSI woodland outside of the Order Limits of Part A may be used to establish the Woodland Creation Area. This is discussed further in **Chapter 9: Biodiversity, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) and **Appendix 9.21: Ancient Woodland Strategy, Volume 7** of this ES (**Application Document Reference: TR010041/APP/6.7**).

2.11.3. For Part A, on the A697 at Espley, a bus stop on both the northbound and southbound carriageways would be formalised including the provision of new bus stop signs (with further detail to be confirmed at the detailed design stage) (refer to **paragraph 2.5.32**).

Signage would be provided on the approaches to Part A and Part B, including replacement of existing directional signs as required.

2.12. ASSUMED LIMITS

2.12.1. The design has been developed to a level of detail that is sufficient to provide confidence during the DCO examination and to enable EIA to take place. As expected for a nationally significant infrastructure project (NSIP), there are aspects of the design that have not yet been fixed. These aspects have been considered within the EIA in accordance with Planning Inspectorate Advice Note 9 'Using the Rochdale Envelope' (**Ref. 2.10**).

2.12.2. For these design aspects, the detailed design will continue to be developed. Assessment Parameters have been adopted to enable assumptions to be made for these aspects, to ensure that they are appropriately assessed within the EIA. The assessments therefore take into account a realistic "worst case" assessment of the Scheme.

2.12.3. The Assessment Parameters have been considered as part of the EIA and their findings, as reported within the relevant environmental topic chapters (refer to **Technical Chapters 5** to **14, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) for Part A and **Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) for Part B). The assessments contained in this ES have had regard to the ability to deviate and the options contained within the Scheme.

PART A

2.12.4. The particular assumptions made for Part A, and that have been considered in each of the **Technical Chapters 5** to **14** of **Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**), comprise the following:

a. **Parameter 1:** Assessors considered a 1 m horizontal increase of the permanent highway boundary either side of the main alignment of Part A between Warreners House and Highlaws Junction to accommodate the uncertainty of statutory undertakers' underground apparatus. In addition, a 3 m horizontal increase of the permanent highway boundary either side of the main alignment of Part A between Highlaws Junction and Priest's Bridge was assessed, to accommodate the uncertainty of statutory undertakers underground apparatus and the removal of hedgerow, and reinstatement of 2 m wide hedgerow and replacement of Coronation Avenue trees set within replacement hedgerow or grass verge, as appropriate and if required.

b. **Parameter 2:** Relocation of the proposed Highlaws Junction to a location approximately 47 m to the north of current location has been considered in order to avoid an existing foot and mouth burial pit at approximate Grid Reference NZ 18293 89738. As part of this assessment, the proposed field access at Highlaws Junction would move to the north to follow the field boundary. This flexibility is provided for by a specific limit of deviation shown within the Order Limits. Refer to the Highlaws Realignment Sketch **Appendix 2.2: Technical Drawings** of this ES (this drawing does not present a separate option but illustrates how the foot and mouth burial area can be accommodated).

c. **Parameter 3:** A specific increase in height of the proposed Fenrother Junction by an additional 1 m and increased in width of the junction by 4 m (and to the mainline carriageway to the south and north), has been considered in order to accommodate the potential need to move proposed culvert arrangements within this location at detailed design.

d. **Parameter 4:** Proposed slackening of cutting and embankment slopes to reduce the amount of excavated material disposed of off-site. The proposed locations have been identified based on the likely beneficial impacts of the slackened slopes upon visual amenity, providing better landscape integration to the surrounding land forms (refer to **Figure 7.8: Landscape Mitigation Masterplan, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)). These can be accommodated within the permanent boundary for Part A and have been specifically considered at the following locations:

   i. To the south of the proposed Highlaws Junction between chainages11640 to 11900 to the west of the main alignment of Part A, from a gradient of 1:3 to 1:6.
   ii. At chainage 17700 at Causey Park Overbridge, from 1:3 to 1:6.
   iii. To the south of the proposed Burgham Park Underbridge, between chainages 19170 to 19500 to the west of the main alignment of Part A, from 1:3 to 1:4.
   iv. To the south of the proposed Burgham Park Underbridge, between chainages 19200 to 19500 to the east of the main alignment of Part A, from 1:3 to 1:4.
   v. At the proposed Burgham Park Underbridge, between chainage 19520 to 20050, to the west of the main alignment of Part A, from 1:3 to 1:4.
   vi. At the proposed Burgham Park Underbridge, between chainages 19520 to 19700, to the east of the main alignment of Part A, 1:3 to > 1:8.
   vii. At the proposed West Moor Junction, from 1:3 to 1:6.

e. **Parameter 5:** Provision has been assessed for 2 m maximum high earth bunds with 1:3 gradient for the purposes of using excess material likely to be generated as a result of Part, in addition to those considered essential mitigation as discussed in **Section 2.6**. These will be considered further at detailed design. The earth bunds are proposed within areas that are considered as being appropriate for the disposal of excess material, whilst not impacting on the landscape setting and visual amenity (references are illustrated on **Figure 7.8: Landscape Mitigation Masterplan, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)). These have been considered at the following locations:

   i. Proposed bund 3. To the east of Highlaws Junction.
   ii. Proposed bund 4. To the west of DB4.
   iii. Proposed bund 5. At Priest's Bridge between chainages 13680 and 14100. Increase in soil depth of 0.5 m across the indicated area.

iv. Proposed bund 6. To the west of the main alignment of Part A at chainage 14200.
v. Proposed bund 14. To the south-east of West Moor Junction.

f. **Parameter 6:** Assessors considered a 1.5 m horizontal increase of the permanent highway boundary to the north west of the proposed Priest's Bridge Culvert to accommodate drainage.
g. **Parameter 7:** A potential 20 m lateral relocation of the proposed DB9 is located at approximate chainage 16900, allowing for the detention basin to be moved to the north.
h. **Parameter 8:** Movement of underground gas pipe at approximate chainage 19100 slightly further south to approximate chainage 19080, to accommodate the proposed culvert for the overland flow path south of Burgham Park Underbridge (Reference 9.1).
i. **Parameter 9:** Proposed bund located at the western edge of the Main Compound at West Moor Junction, to temporarily stockpile surplus material to enable its use on Part B. The extent of the area will be determined by the amount of excess material produced during the construction of Part A, and what is left over for use on Part B and other scheme/schemes. An area directly west of the junction has also been identified for temporary storage of surplus material should this be needed.
j. **Parameter 10:** An ability to move the proposed River Coquet bridge northern pier by up to 6 m to the north, and the southern pier by up to 2 m to the north. An ability to further move the proposed piers by 2 m in any other direction, and with 5 m around the proposed northern abutment and with 2 m around the southern abutment. The currently proposed pier construction methodology would not alter with this potential movement of the piers. Refer to **Appendix 2.2: Technical Drawings** of this ES for an illustration.
k. **Parameter 11:** An ability to increase the parapet height on overbridges by 0.8 m above those shown on the **Structures Engineering Drawings and Sections** (**Application Document Reference: TR010041/APP/2.8**), to accommodate a potential change in WCH use.
l. **Parameter 12:** Assessors considered a 10 m increase of the permanent highway boundary at Parkwood embankment (approximate Ch 23000) to allow for a berm on the embankment should it be required.

PART B

2.12.5. The particular assumptions made for Part B, and that have been considered in each of the **Technical Chapters 5 to 14**, **Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**), comprise the following:

a. **Parameter 1:** Up to a 650 mm increase or 250 mm decrease in height for Heckley Fence Accommodation Overbridge has been considered in order to accommodate a 400 mm increase in the depth of the structural beam and a 250 mm increase or decrease in the finished road levels on the A1.
b. **Parameter 2:** Up to a 900 mm increase of 500 mm decrease in height of Charlton Mires Junction Overbridge has been considered in order to accommodate a 400 mm increase

in the depth of the structural beam and a 500 mm increase or decrease in the finished road levels on the A1.

c. **Parameter 3:** Realignment of the Northern Powergrid Circuit 7.5 km of 66 kV EHV transmission cable (as described in **paragraph 2.5.280**) may be provided within the new highway boundary, which would entail a greater amount of permanent land take but remove the need to interfere with private land after completion of the works as a result of the operation or maintenance of the cable. This option would mean a slightly different landscaping treatment within the wider highway boundary.

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Ref. 2.2 Government Office for the North East (May 2002) A1 Multi-Modal Study Options Appraisal Report.

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Ref. 2.4 Highways Agency. A1 North of Newcastle Feasibility Study. Stage 1 Report. Jacobs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/408812/a1-north-newcastle-stage-1.pdf

Ref. 2.5 Department for Transport (2015) Road Investment Strategy: for the 2015/16 – 2019/20 Road Period [online]. Available at: https://www.gov.uk/government/publications/road-investment-strategy-for-the-2015-to-2020-road-period (Accessed 15 August 2019)

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Ref. 2.7 IGEM/TD/1 Edition 5 – Steel Pipelines and Associated Installations for High Pressure Gas transmission.

Ref. 2.8 - Northumberland National Park and County Joint Local Access Forum meeting minutes, Thursday 18 October 2018 https://nnp-tacdesign.netdna-ssl.com/wp-content/uploads/2018/10/Agenda-18-October.pdf

Ref. 2.9 – Department for Environment, Food and Rural Affairs (2018) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites

Ref. 2.10 - Planning Inspectorate (2018) Advice Note 9 'Using the Rochdale Envelope'

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