A14 J55 Copdock Interchange

STAGED OVERVIEW OF ASSESSMENT REPORT

HE604639-JAC-GEN-SCHW_00-RP-Z-0017 | P03
05/07/21

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ

Highways England Company Limited registered in England and Wales number 09346363

Document Control

Project Manager:	Paul Manamike
Originator (Company):	Jacobs UK Ltd.
Document Number:	HE604639-JAC-GEN-SCHW_00-RP-Z-0017
Rev Number:	P03
Date:	05/07/21
Document Status:	**S4 - Suitable for Stage Approval**
Client Ref Number (PIN):	HE604639
PCF Stage:	PCF Stage 1

Document history and status

Revision	Date	Description	By	Check	Review	Approved
P03	05/07/21	AUTHORISED & ACCEPTED	RW	JW	JW	PM
P02	15/06/21	FOR REVIEW	RW	JW	NW	PM
P01	24/05/21	INTERIM DRAFT FOR COMMENT	RW	JW	NW	PM

The original format of this document is copyright to Highways England.

Contents

1. Introduction

1.1 Background

The A14 Junction 55 Copdock Interchange is the key Strategic Road Network (SRN) junction serving Ipswich. It is the junction between the A14, the A12 and the A1214. The A14 is a key strategic route connecting the Port of Felixstowe on the east coast with the Midlands and beyond via connections with the M6 and M1. The A14 has wider national and international importance as it is also part of the Trans-European Transport (TEN-T) Network. The A12 provides access to Colchester, Chelmsford, London, the M25 and Stansted Airport to the south and the Suffolk and Norfolk coast to the north-east. The A1214 is a key route for accessing Ipswich.

The general study area is shown in Figure 1-1 below.

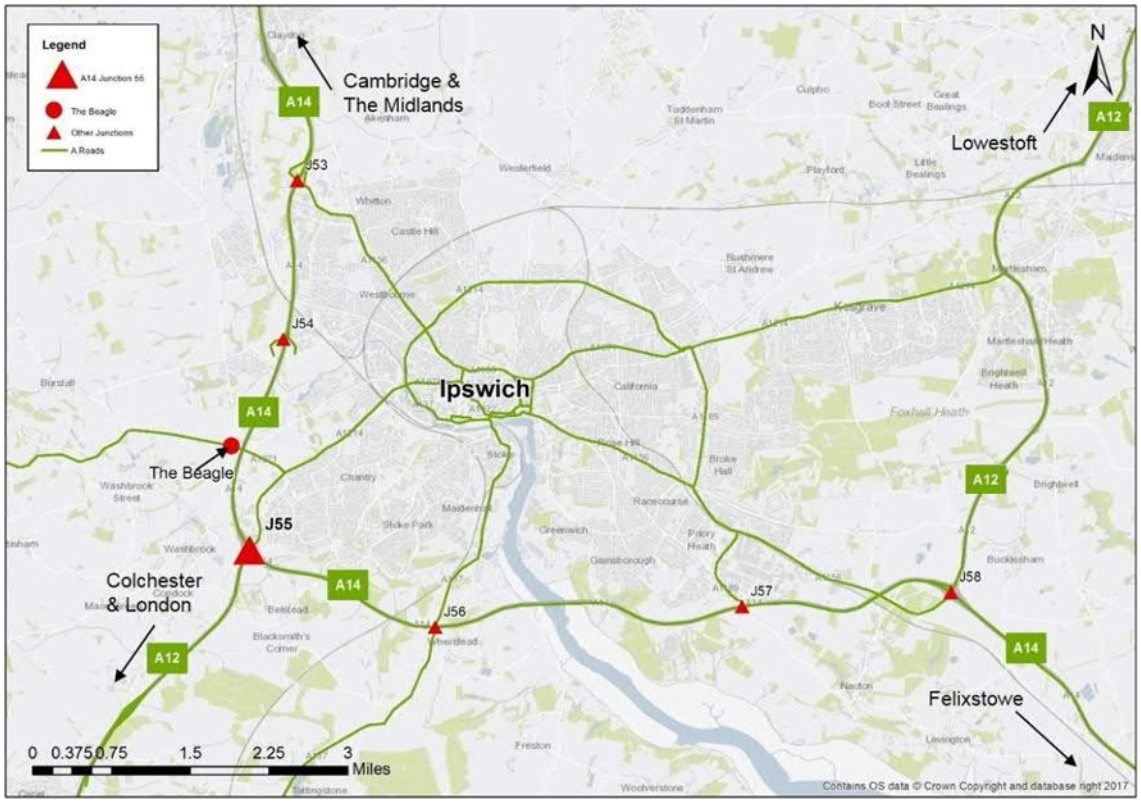


Figure 1-1: A14 J55 Copdock Interchange location

A14 Junction 55 is a grade-separated junction, with the A14 running underneath the junction and the A12 and A1214 connecting to the junction roundabout. The junction was constructed in the 1980s as part of the Ipswich Southern Bypass then classified the A45, subsequently reclassified to the A14 in 1992.

Small-scale localised improvements to the junction were undertaken in 2011 to support consented growth at the Port of Felixstowe. These included full signalisation of the roundabout, removal of segregated left turn lanes and additional lanes on the slip roads, widening from two lanes to three on the A14 east approach and to four lanes on the A14 west approach. The scheme was implemented by Highways England with developer funding.

In 2017, Highways England commissioned a series of Route Strategies to analyse the performance of the Strategic Road Network (SRN). Junction 55 of the A14 was identified in the ‘Felixstowe to the Midlands’ Route Strategy report (March 2017), as one of a number of junctions

on the A14 with congestion and safety issues. These findings confirm the earlier 'Felixstowe to the Midlands' Route Strategy study (April 2014) which identified A14 Junction 55 as being heavily trafficked especially during weekday peak periods. Furthermore, the junction was ranked 35th nationally on the SRN as a collision cluster site. Insufficient junction capacity was regarded by stakeholders as being a problem with congestion and capacity issues already apparent at A14 Junction 55, particularly in the extended AM and PM peaks, a consequence of high traffic flows using the junction, for both strategic and local movements, together with the capacity of the existing junction. Queuing on the A12 approach is regarded locally as 'severe' and queuing on the A14 westbound off slip is beginning to affect the free flow of westbound traffic on the A14 main line. These issues are seen to affect journey time reliability.

In 2018, initial work in the form of a Stage 0 study on A14 Junction 55 was undertaken, recommending options for improvements to the junction for further consideration.

Significant growth is anticipated at the Port of Felixstowe and in the Ipswich area. Recent EU Exit resilience work by the Department for Transport (DfT) has shown that maritime freight is highly vulnerable to disruption and that a connected, resilient port network is vital. To this end, the Government has therefore announced a £200m Ports Infrastructure Fund for improvements, including those at A14 Junction 55, to improve reliability and reduce delays, hence improving the efficiency of those UK businesses that import / export via the Port of Felixstowe and the logistics chain businesses that facilitate that trade.

Resulting from the above, the A14 Junction 55 Copdock Interchange scheme is being developed as a Road Investment Strategy 3 (RIS3) Pipeline Port Access scheme. DfT has highlighted this scheme as a priority to ensure that access to ports is not a constraint on growth in the economy and has requested Highways England to progress work as fast as possible.

The project is now in Stage 1 (Options Identification) of Highways England's Project Control Framework (PCF) process. The PCF is the manual for Major Projects (MP) directorate and sets out who needs to do what and when to deliver a successful road project in a consistent and controlled manner. Figure 1-2 shows the stages of project development.

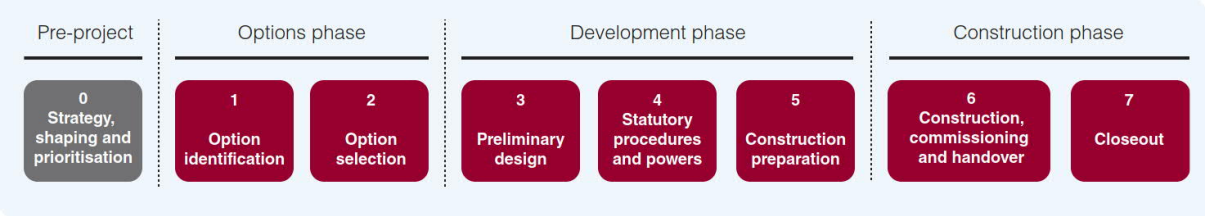


Figure 1-2: Major Projects' Life Cycle (PCF Process)

During PCF Stage 1 a number of possible solutions have been considered and assessed in order to identify the short list of best performing options to take forward to public consultation in PCF Stage 2 (Options Selection), after which a preferred route would be announced.

1.2 Purpose of the Staged Overview of Assessment Report

The purpose of the Staged Overview of Assessment Report (SOAR) is to give an overview of the development of a scheme through each of its earliest stages Highway England's Project Control Framework (PCF) Stages 0-2. In PCF Stage 1, it provides an overview of the technical and policy analysis (including traffic, economic, safety, operational, technology, maintenance and both

environmental assessment and appraisal) and provides the basis for deciding which options should be included in the non-statutory Public Consultation.

The stage 0 study was undertaken in 2018, this pre-dating the requirement to produce a SOAR, instead an Options Assessment Report (OAR) was produced as per the requirements at that time. In light of this, elements of the Stage 0 SOAR covering the current and future conditions in the study area have been developed in this report, along with details on the wider context. Details summarising the process of identification of the need for an intervention, the identification, selection and development of initial options are included in this SOAR.

2. Summary of the Current and Future Conditions

2.1 Overview of area

2.1.1 Description of Locality

A14 Junction 55 lies in Babergh District, within Suffolk, south-west of Ipswich. The villages of Belstead and Copdock are located to the south east and west of the Junction respectively. The parishes of Pinebrook and Pinewood are located to the north east and east of the Junction respectively. The suburban residential area of Chantry is also located to the north east of the junction.

Several individual properties and businesses are located within the general area including the Copdock Retail Park which is located immediately north of the junction.

The area near the junction is shown in Figure 2-1 below.

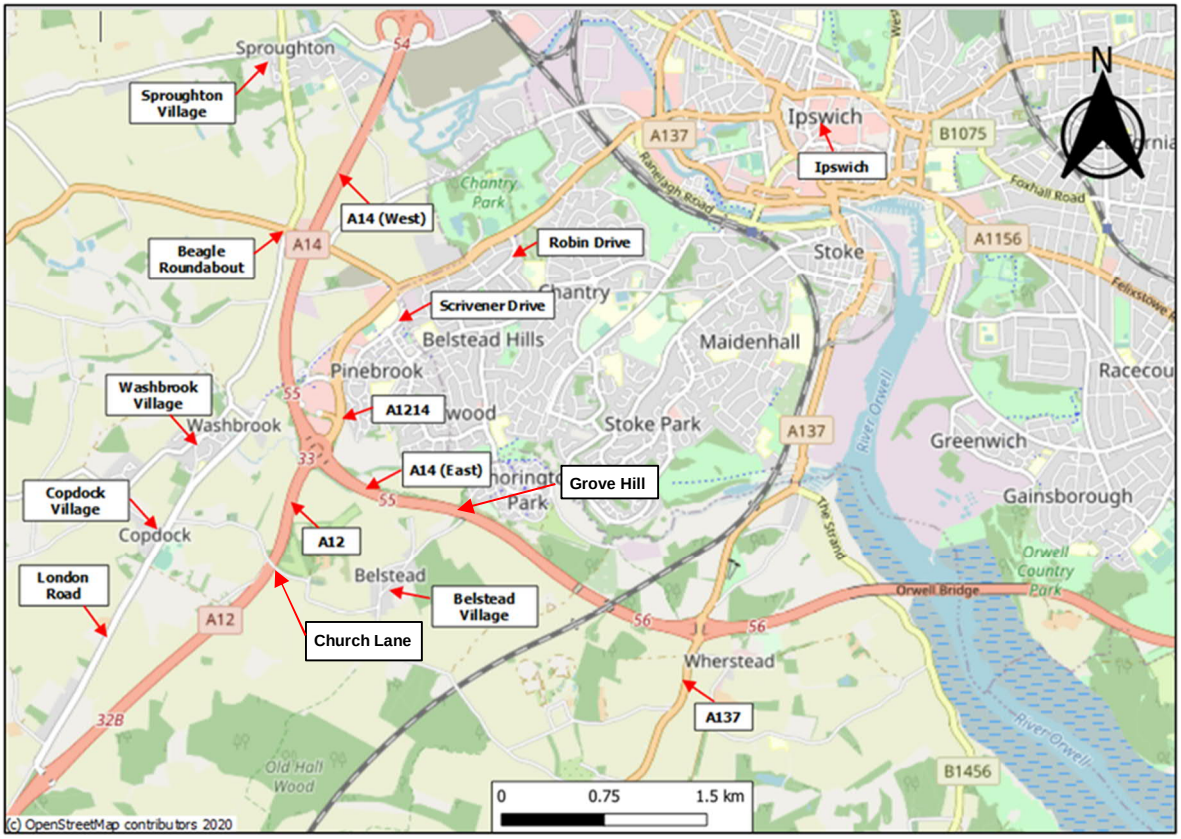


Figure 2-1: Surrounding area and road network in the vicinity of A14 J55

2.1.2 Existing Highway Network

The existing highway network in the vicinity of A14 Junction 55 is shown in Figure 2-1 above.

Strategic Roads

Strategic roads are those routes that uphold national transport objectives, link major urban centres of population, provide access to ports, airports and other countries. They facilitate inter-regional connectivity and support the national economy. They consist of motorways and core trunk roads and are the responsibility of the Secretary of State for Transport. They are managed, maintained and improved by the Highways England on behalf of the Secretary of State.

The SRN consists of the A12 north-south route and the A14 east-west route.

The A14 is a key strategic route connecting the Port of Felixstowe on the East coast with the Midlands and beyond via connections with the M6 and M1, the A11 and the A12. The existing A14 is dual all-purpose carriageway from its eastern end at Junction 62 Dock Gate No.1 Roundabout and from Junction 59 Trimley St Martin (north west of Felixstowe) until A14 Junction 55 Copdock Interchange and beyond toward the M1. Furthermore, the junctions are grade-separated junctions for the aforementioned road section.

The A12 joins the A14 at Junction 55 at Copdock and runs coincident with the A14 until A14 Junction 58 Seven Hills. The A12 is part of the SRN and runs from just north of the Blackwall Tunnel to the coast of East Anglia linking the key settlements of Brentwood, Chelmsford, Colchester, Ipswich, Lowestoft and Great Yarmouth. In the section approaching A14 Junction 55, the A12 is a dual two-lane all-purpose carriageway with grade-separated junctions.

Local Roads

The A1214 London Road, north of A14 Junction 55 is one of the main routes into and out of Ipswich. It links central Ipswich to the A12 and A14 and passes Ipswich Hospital. Its mid-section forms an outer ring road around the west and north of Ipswich. It starts at A14 Junction 55 as an all-purpose two-lane dual carriageway, initially subject to the national speed limit then reducing to a 40mph limit approximately 200m north of Junction 55. It continues as a dual carriageway until after the signalised junction at Robin Drive then becomes a wide single 2+1 carriageway (with one lane northbound, two southbound) as it heads towards central Ipswich.

There are residential areas to the east of the A1214. Access to these areas is provided by Scrivener Drive and Robin Drive, which join the A1214 at signalised junctions. The first junction with Scrivener Drive onto the A1214, just north of Junction 55, is a signalised roundabout which also provides access to the Copdock Retail Park.

To the south-west of A14 Junction 55, the former route of the A12, London Road, is a dual carriageway passing through the village of Copdock towards Washbrook. The original A12 was severed by the construction of the A14 but a route via Chapel Lane and Swan Hill leads to the A1071 at the Beagle Roundabout.

Approximately 1.2km east of A14 Junction 55 Grove Hill passes under the A14. Approximately 0.9km south of Junction 55, Church Lane crosses over the A12.

2.1.3 Topography

The topography in the vicinity of A14 Junction 55 is gently undulating in nature, with the land rising towards Copdock and Belstead and falling toward the Belstead Brook. The Belstead Brook is a designated main river, running adjacent to the junction and joins the Orwell Estuary which is located approximately 4km downstream.

The A14, A12 and the Junction 55 roundabout are raised in the vicinity of the junction with the partially wooded embankments clearly visible within the surrounding rural landscape in views from the west.

Beyond the A14 to the north, the land rises towards the urban edge of Ipswich. Belstead Meadows sits between the residential areas and the A14.

2.1.4 Land Use, Property and Industry

The land to the south and west of A14 Junction 55 is predominantly agricultural with a number of villages and small settlements. North of the junction there is a large retail park with access/ egress via the A1214. To the north-east of the junction are residential suburbs of Ipswich.

There are a group of residential properties close to the A14, south-west of Grove Hill bridge. There are also some residential properties close to the A12 south of Church Lane, around 1.4km south of Copdock Interchange.

There are no large industrial sites in the immediate vicinity of the junction.

2.2 Transport policy

2.2.1 Relevant Strategies – Overview

There is a hierarchy of national, sub-regional and local policies that are potentially relevant to the proposed A14 Junction 55 scheme. These are discussed in turn below.

2.2.2 Relevant strategies – National

As an island nation, the UK is dependent on international trade, both goods coming in and out of the country, and therefore the UK infrastructure that supports this trade is critical. Ports are therefore vital for the movement of international goods and the UK infrastructure that supports this trade, especially the SRN that provides access to those ports, is also critical, especially its reliability and resilience. This is examined in more detail in section 2.3 below, as is the crucial role that the Port of Felixstowe plays in the UK economy and its reliance on the A14 east-west route and the A12 route to the south via the M25, and hence the importance of A14 Junction 55 where the A14 and A12 meet. As noted in section 1.1, the Government has announced a £200m Ports Infrastructure Fund for improvements, including those at Copdock Interchange.

At a national level, the National Planning Policy Framework (NPPF) was first published in March 2012 and subsequently updated in July 2018 and February 2019. It sets out the government's planning policies for England and how these are expected to be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. However, the Framework does not contain specific policies for nationally significant infrastructure projects (NSIPs), as these are determined in accordance with the decision making framework in the Planning Act 2008 (as amended) and relevant National Policy Statements (NPSs) for major infrastructure, as well as any other matters that are relevant (which may include the NPPF).

NPSs form part of the overall framework of national planning policy and are produced by government. They give reasons for the policy set out in the NPS and must include an explanation of how the policy takes account of government policy relating to the mitigation of, and adaptation to, climate change. They comprise of the government's objectives for the development of nationally significant infrastructure in a particular sector and state.

There are currently three transport related NPSs, covering ports, national networks (road and rail) and airports. These were produced by the DfT and were designated (adopted) in January 2012, January 2015 and June 2018 respectively.

The NPS for National Networks (NN NPS) is relevant to any potential improvements to A14 Junction 55 as it would be an improvement to the Strategic Road Network. The NN NPS states that, "A well-functioning Strategic Road Network is critical in enabling safe and reliable journeys

and the movement of goods in support of the national and regional economies" and identifies the "need to improve the national networks to provide safe, expeditious and resilient networks that better support social and economic activity; and to provide a transport network that is capable of stimulating and supporting economic growth." It also states that "national networks should:

- Have the capacity, connectivity and resilience to support national and local economic activity, facilitate growth and create jobs.
- Support and improve journey quality, reliability and safety.
- Support the delivery of environmental goals and the move to a low carbon economy.
- Join up our communities and link effectively to each other."

The NN NPS also states that, "the need for development of the national networks, and the Government's policy for addressing that need, must be seen in the context of the Government's wider policies on economic performance, environment, safety, technology, sustainable transport and accessibility, as well as journey reliability and the experience of road/rail users"

The NPS for Ports is relevant to any potential improvements to A14 Junction 55 because the key objective of the proposed scheme is to improve reliability and access to the Port of Felixstowe. The NPS for Ports provides the framework for decisions on proposals for new port development and sets the thresholds that such development, in general, would constitute a nationally significant infrastructure project (NSIP). It also applies, where relevant, to associated development, such as road and rail links, for which consent is sought alongside that for the port development. It states that the government seeks to:

- "Encourage sustainable port development to cater for long-term forecast growth in volumes of imports and exports by sea with a competitive and efficient port industry capable of meeting the needs of importers and exporters cost effectively and in a timely manner, thus contributing to long-term economic growth and prosperity;
- Allow judgments about when and where new developments might be proposed to be made on the basis of commercial factors by the port industry or port developers operating within a free market environment; and
- Ensure all proposed developments satisfy the relevant legal, environmental and social constraints and objectives, including those in the relevant European Directives and corresponding national regulations."

It also states that in order to help meet the requirements of the Government's policies on sustainable development, new port infrastructure should "enhance access to ports …" alongside a number of other aims. It also states that the Government wishes to see port development wherever possible:

- "Being an engine for economic growth;
- Supporting sustainable transport by offering more efficient transport links with lower external costs; and
- Supporting sustainable development by providing additional capacity for the development of renewable energy."

The NPS for Ports concludes that, "the Government believes that there is a compelling need for substantial additional port capacity over the next 20–30 years".

Also at a national level, HM Treasury's National Infrastructure Strategy sets out the Government's plans to deliver on its ambition to deliver an infrastructure revolution: a radical improvement in the quality of the UK's infrastructure to help level up the country, strengthen the Union, and put the UK

on the path to net zero emissions by 2050. The National Infrastructure Strategy is a result of the National Infrastructure Commission's assessment of the country's infrastructure needs. The Strategy brings together the Government's long-term goals with the short-term goals to help support jobs and rebuild the economy following the COVID-19 pandemic. The National Infrastructure Strategy includes the Ports Infrastructure Fund.

Also at a national level, the DfT sets out their objectives and how they will achieve them in their Single Departmental Plan. Objectives relevant to improvements to Copdock Interchange and improving reliability and access to the Port of Felixstowe are as follows:

- "Support the creation of a stronger, cleaner, more productive economy through delivering infrastructure projects and transport elements of the cross-government industrial strategy
- Prepare the transport system for technological progress and a prosperous future outside the EU, ensuing the UK is a global leader for future mobility technology and services."

The DfT has also produced their second Road Investment Strategy (2020-2025), which sets a long-term strategic vision for the SRN in 2050. With that vision in mind, it then specifies the performance standards that Highways England must meet, lists planned enhancement schemes expected to be built and states the funding available for 2020/21 to 2024/25. It contains the following objectives that would be relevant to improvements to A14 Junction 55:

- "A network that supports the economy
- A safer and more reliable network."

Highways England's Business Plan (2020-2025) provides the approach and direction of Highways England for Road Period 2 (2020-2025). Those outcome goals relevant to improvements to Copdock Interchange are:

- "Improving safety for all
- Providing fast and reliable journeys
- Delivering better environmental outcomes
- Meeting the needs of all users."

2.2.3 Relevant Strategies – Sub-regional

At a sub-regional level, Highways England's Route Strategies provide a high-level view of the current performance of the SRN as well as issues perceived by stakeholders that affect the network. Route Strategies are one of the key components of research for developing the RIS. The relevant Route Strategy for the A14 is the Felixstowe to Midlands Route Strategy, and issues identified included lack of hard shoulders, limited layby and lorry parking facilities and congestion problems leading to blocking back at junctions with associated higher risk of collisions. Copdock Interchange was specifically mentioned in the Route Strategy; congestion issues were highlighted, and reference was made to any further traffic growth at the A14 Junction 55 leading to a subsequent decrease in air quality standards.

The New Anglia Local Enterprise Partnership (LEP) produced their Strategic Economic Plan (SEP) in 2014. Extracts relevant to improvements to A14 Junction 55 and improving reliability and access to the Port of Felixstowe are listed below. In addition, A14 Junction 55 is identified as a main junction in need of intervention to improve travel to, within and around Ipswich. The SEP states that the LEP would fund the scheme development so it can be included in Highways England's national road programme (RIS) as soon as possible.

- "Faster connections, through better strategic road and rail links, are vital to improve productivity and access to markets.

- As well as growing places, we need to connect them within each other and the rest of the country by the rail and strategic road networks.
- So important are these networks to our local growth, that there are also a number of junctions and bottlenecks where we would like to fund scheme development, helping support the case for their inclusion in Highways Agency or Network Rail capital programmes."

The New Anglia Local LEP has also produced their Integrated Transport Strategy (ITS) for Norfolk and Suffolk in 2018 which aims to provide the foundations for an integrated, total transport solution which serves the growing economy, links people and their activities with the developing Priority Places, and is fit for agile digital, socio-economic and transport developments. The ITS maps out five Economic Strategy Themes, of which relevant extracts for improvements to Copdock Interchange are listed below:

- "Quicker, more reliable and resilient strategic connections to boost contribution to UK
- Improving accessibility
- Improved digital and transport network across the East will link businesses and suppliers to markets."

2.2.4 Relevant Strategies – Local

At a local level, as improvements to A14 Junction 55 are not primarily focused on delivering local housing or employment aspirations, it is considered that Local Plans for those District Councils surrounding the Interchange are less significant (relative to the National and Sub-regional strategies) to the strategic objectives for the scheme.

2.3 Travel Demand and Levels of Service

2.3.1 Port of Felixstowe freight – existing volumes by Road and Rail

An analysis has been undertaken to understand rail and road freight volumes between the Port of Felixstowe and their destinations, namely the North, the Midlands and the South. The analysis utilised the following sources:

- Rail Magazine Article (Issue 903, 22/04/2020)
- Meeting with Paul Davey, Hutchison Ports (owner / operator of the Port of Felixstowe) (27/08/20)
- DfT article: 'England Port Connectivity: The Current Picture'
- University of Westminster: An analysis of rail freight operational efficiency and mode share in the British port-hinderland container market: Alan Woodburn (2017)
- DfT Maritime Statistics: Individual Major Ports Traffic by cargo type and international or domestic (12/08/20)

The volumes are shown comparatively in the form of a desire line diagram, in Figure 2-2. Different units are used for road and rail: tonnes and Twenty-foot Equivalent Units (TEU) respectively. In order to allow a comparison between the two, road freight tonnes have been converted into estimates of TEU.

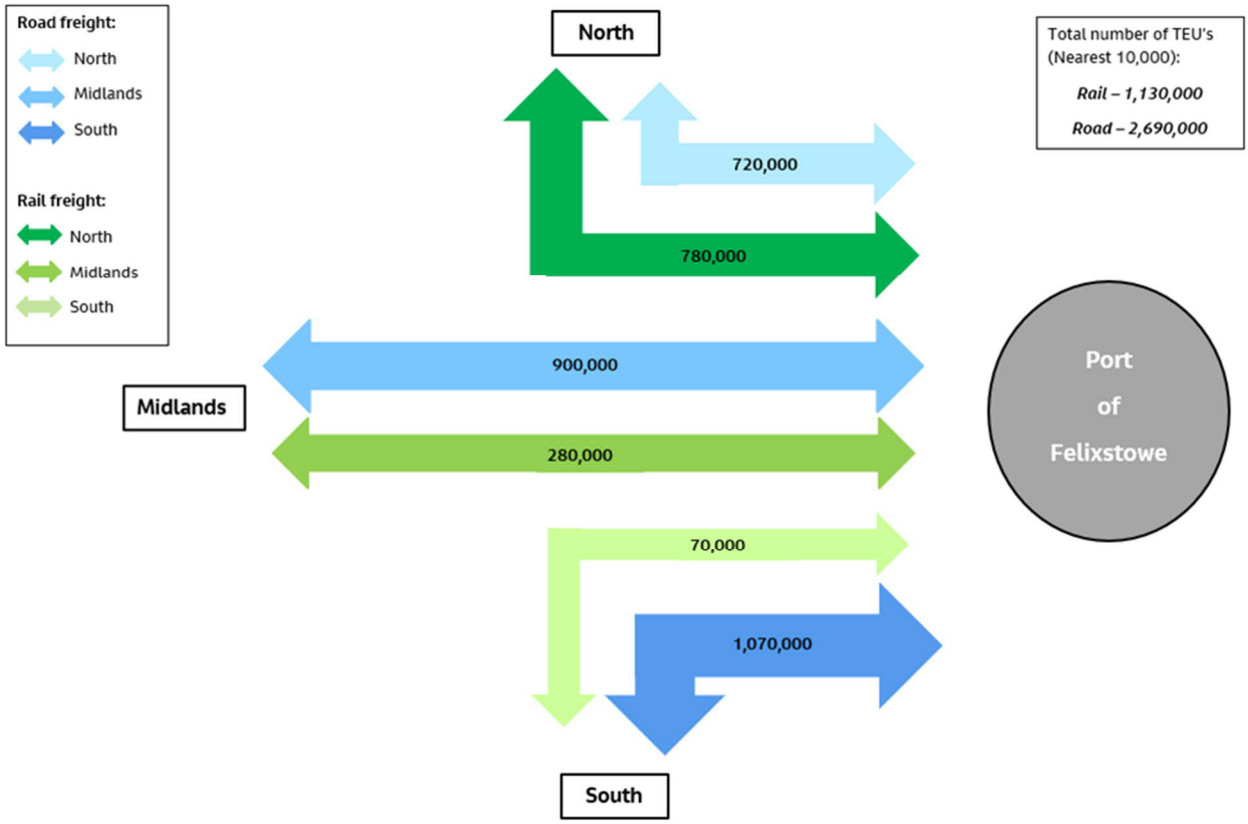


Figure 2-2: Desire lines for freight (road and rail) data to and from the Port of Felixstowe for 2019-2020

In 2019, the total number of TEU from the Port of Felixstowe was approximately 3,815,000. In terms of regional share, the greatest proportion of TEU was to/from the North (1,500,000 TEU which is split approximately 50% by rail, 50% by road) followed by the Midlands (1,170,000 TEU which is split approximately 25% by rail, 75% by road) and the South (1,144,500 TEU which is split approximately 5% by rail, 95% by road). These statistics indicate that freight from the Port of Felixstowe travels predominantly by road, with the total share for road market and rail market being approximately 70% and 30% respectively. Rail is very competitive over long distances such as to the North, but is less competitive over shorter distances to the Midlands and South. The Port of Felixstowe has an existing consent for expansion and is currently forecasting an increase in container traffic from 6 million TEU per annum in 2020 to 8 million by 2030, although a proportion of this will be taken up by an expansion in rail freight capacity.

2.3.2 Existing Traffic flows at Copdock Interchange

Figure 2-3, Figure 2-4, Figure 2-5 and Figure 2-6 show the volumes of traffic undertaking each movement at Copdock Interchange during the morning (0700-1000), Inter-peak (IP)(1000-1600), evening (1600-1900) and 12-hour (0700-1900) periods respectively. The figures are based on surveys undertaken in 2016, and represent a neutral month prior to the COVID 19 pandemic.

During all periods the largest volumes of traffic was on the south-east / east-south movement and the second largest volume was on the south-west / west-south movement. These same movements also saw the highest proportion of HGV movement with 16% and 15% respectively across the 12-hour period. During the Inter-Peak period, HGVs accounted for 21% of vehicles on the south-east / east-south movement.

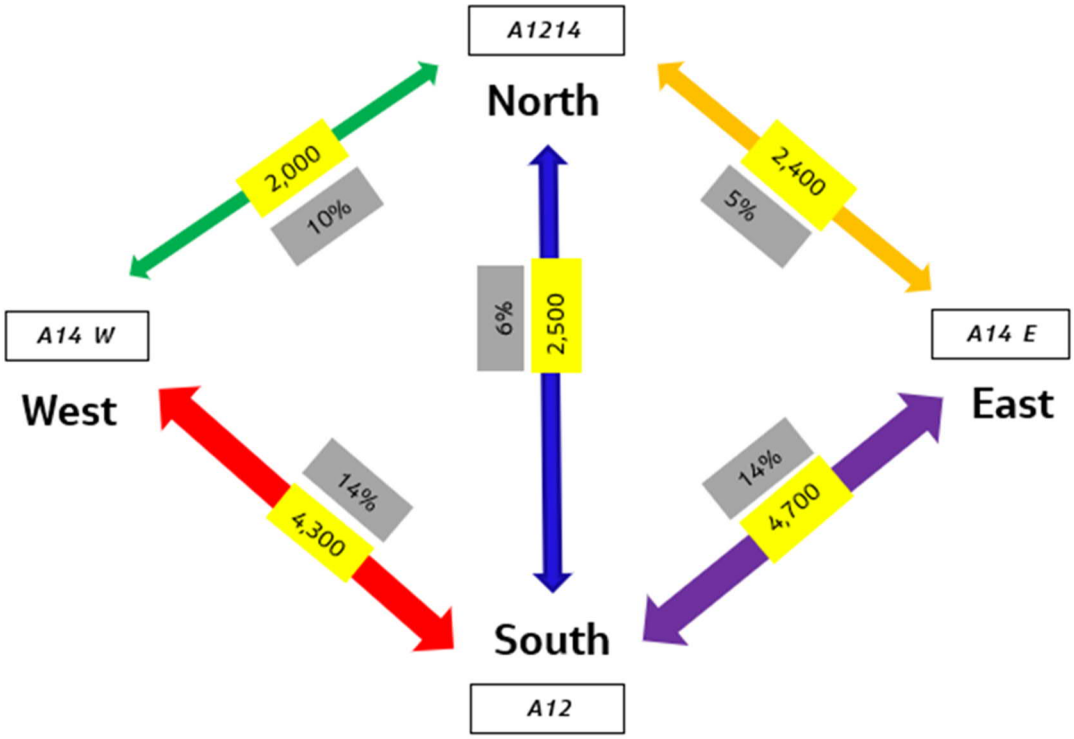


Figure 2-3: Copdock Interchange – existing traffic flows, AM 0700-1000

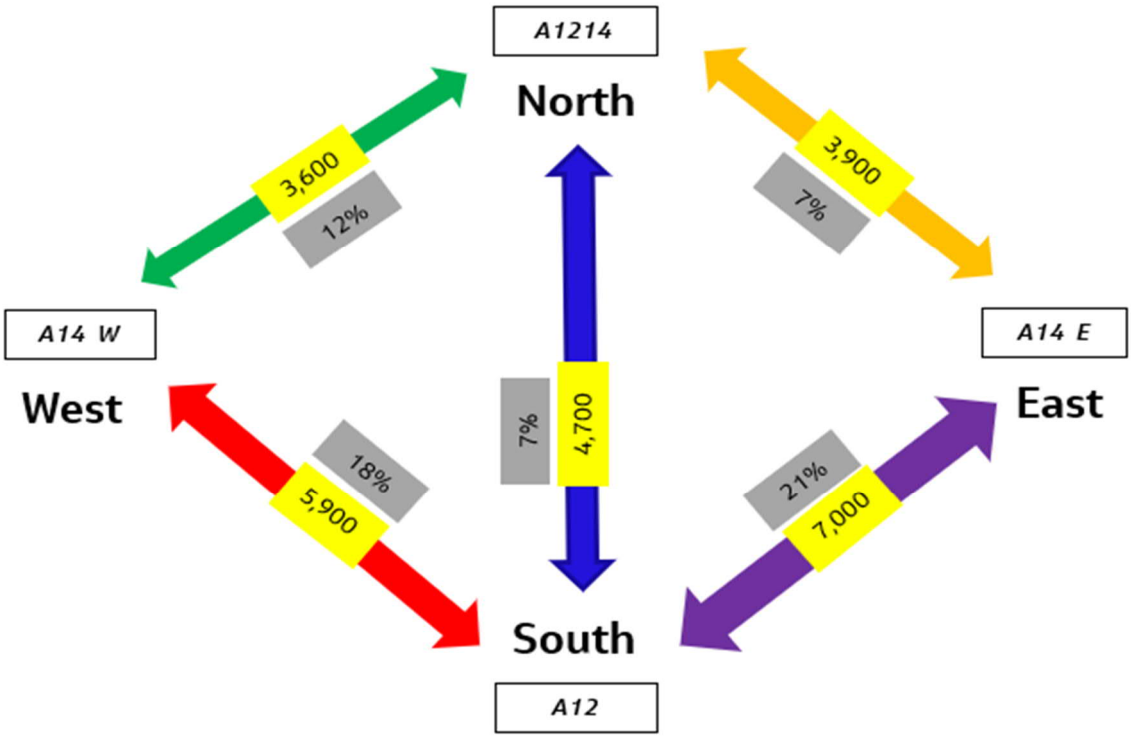


Figure 2-4: Copdock Interchange – existing traffic flows, IP 1000-1600

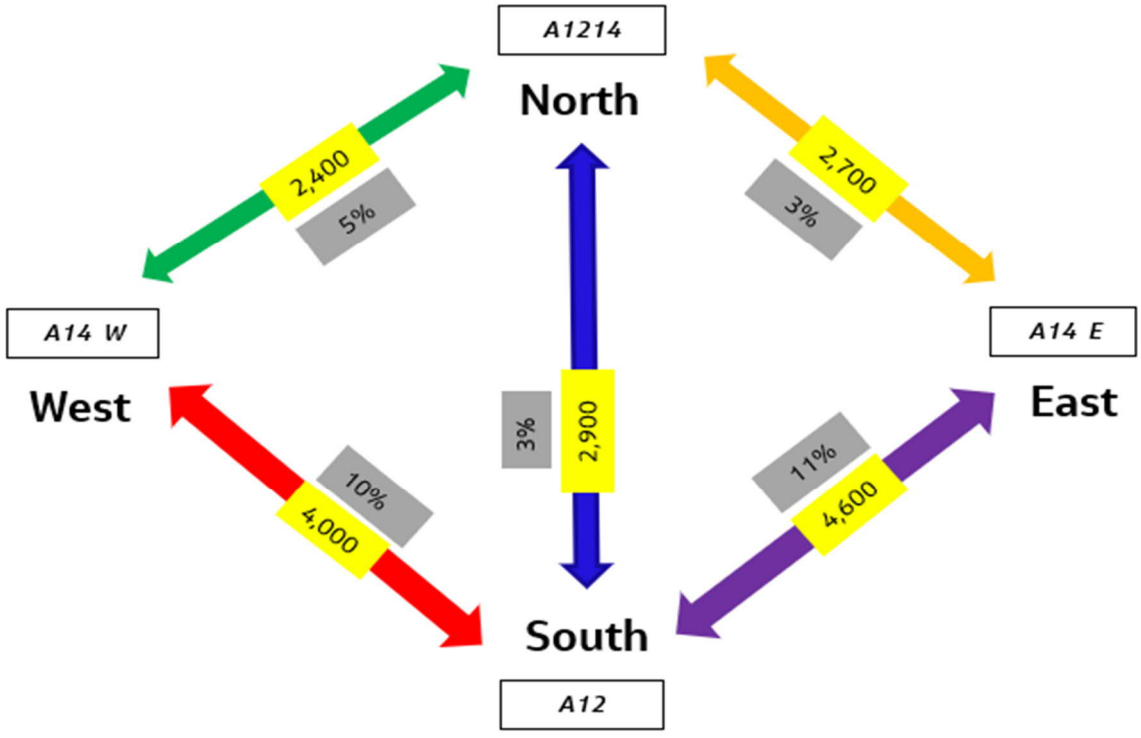


Figure 2-5: Copdock Interchange – existing traffic flows, PM 1600-1900

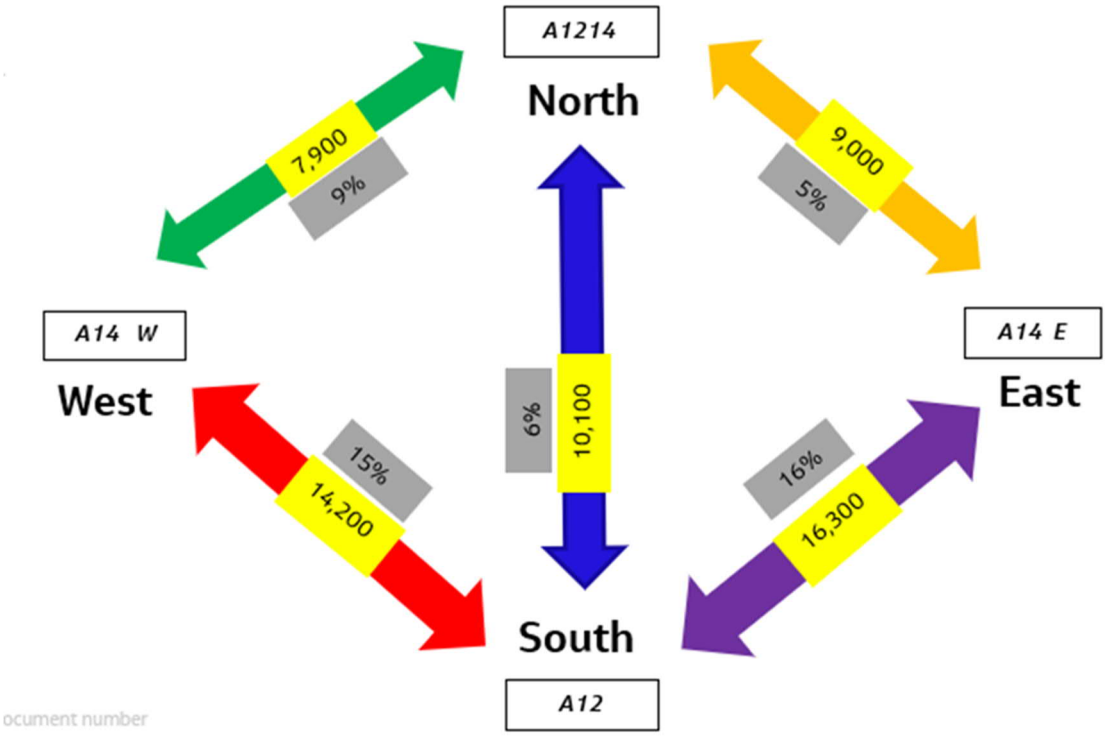


Figure 2-6: Copdock Interchange – existing traffic flows, 12-hour 0700-1900

2.3.3 Existing journey time reliability

Journey time reliability (variability) is a particular risk for time sensitive freight movements heading to or from the Port of Felixstowe. This has been confirmed by discussions with stakeholders as detailed in section 7 of this report.

Analysis has therefore been undertaken to assess the extent of journey time variability on the approach to A14 Junction 55 that has the greatest delays, which is the A12 northbound. As shown in Figure 2-4 and Figure 2-4, the weekday morning peak period has the greatest total flow volume but the weekday inter-peak (IP) period is when the greatest numbers of HGV movements are observed. Analysis has therefore been undertaken for both these time periods.

Journey time variability on the A12 northbound approach to A14 Junction 55 has been assessed for weekday morning and inter-peak periods by looking at the spread of northbound journey times, using Teletrac data, for weekdays in March 2019.

Figure 2-7 and Figure 2-8 show the proportions of journeys in 0.5 minute journey time intervals, for the link closest to the Interchange, for the morning and inter-peak periods respectively. The morning peak captures the time period where queuing on the A12 approach is more pronounced (and so the period when the public's perception of journey time variability at the junction is greatest) and the inter-peak period captures when HGV movements are greatest (and so most applicable to traffic to/from the Port of Felixstowe).

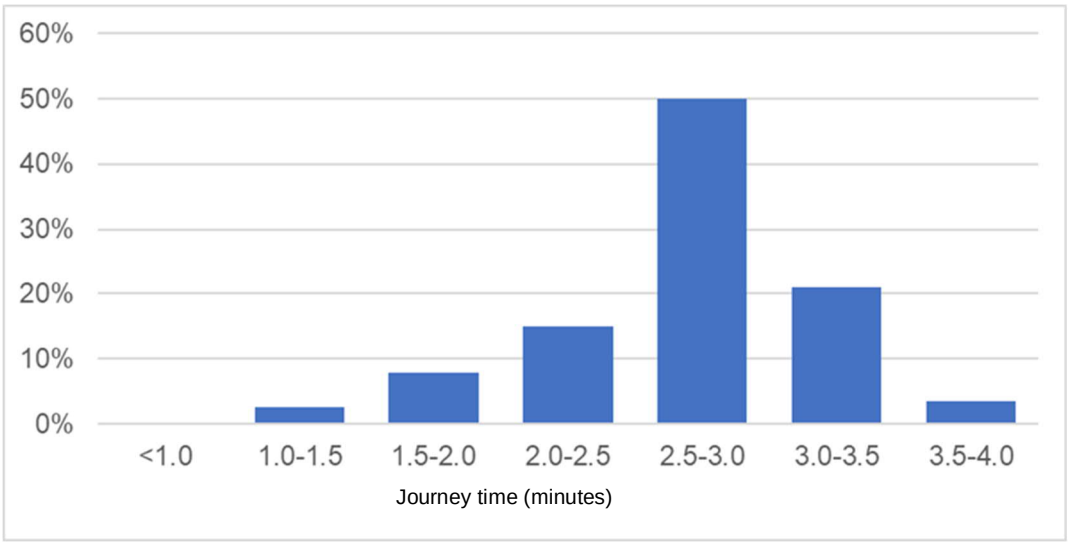


Figure 2-7: Journey Time Variability at A14 J55 in 2019 for AM peak for A12 northbound approach

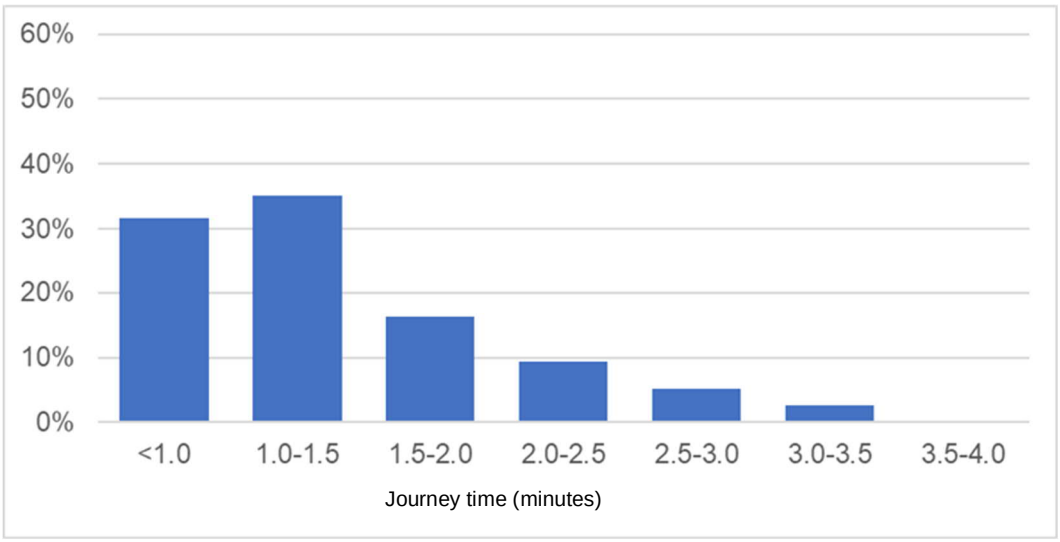


Figure 2-8: Journey Time Variability at A14 J55 in 2019 for weekday IP for A12 northbound

During the weekday morning period, journey times are fairly consistent, with 86% of journeys taking between 2 minutes and 3.5 minutes. However, during the weekday inter-peak period, although some 67% of journeys take less than 1.5 minutes, there is a greater spread of journey times (and those journey times are longer), with 33% of journeys taking between 1.5 and to 3.5 minutes longer than typical.

In summary, although journey times are typically longer during the weekday morning peak, the weekday inter-peak period shows more variability, which is when HGV volumes are greatest.

2.3.4 Existing journey time delays

Liaison with stakeholders has identified that there are significant delays on the A12 northbound approach to A14 Junction 55. There is also queuing on the A14 slip roads that blocks back onto the A14 mainline, which this impedes the A14 traffic passing underneath the junction, and which represents a significant accident risk of high speed collisions between fast moving A14 traffic

running into the back of stationary vehicles. An analysis has therefore been undertaken to identify where delays occur on the network, by showing how average speeds compare with the speed limit.

Figure 2-9, Figure 2-10 and Figure 2-11 present comparisons of average speeds against the speed limit for weekday morning 0700-1000, inter-peak (IP) 1000-1600 and evening 1600-1900 periods respectively, based on Teletrac data for March 2019 processed in 15-minute intervals.

Figure 2-9: Delays at A14 J55 in 2019 for AM peak

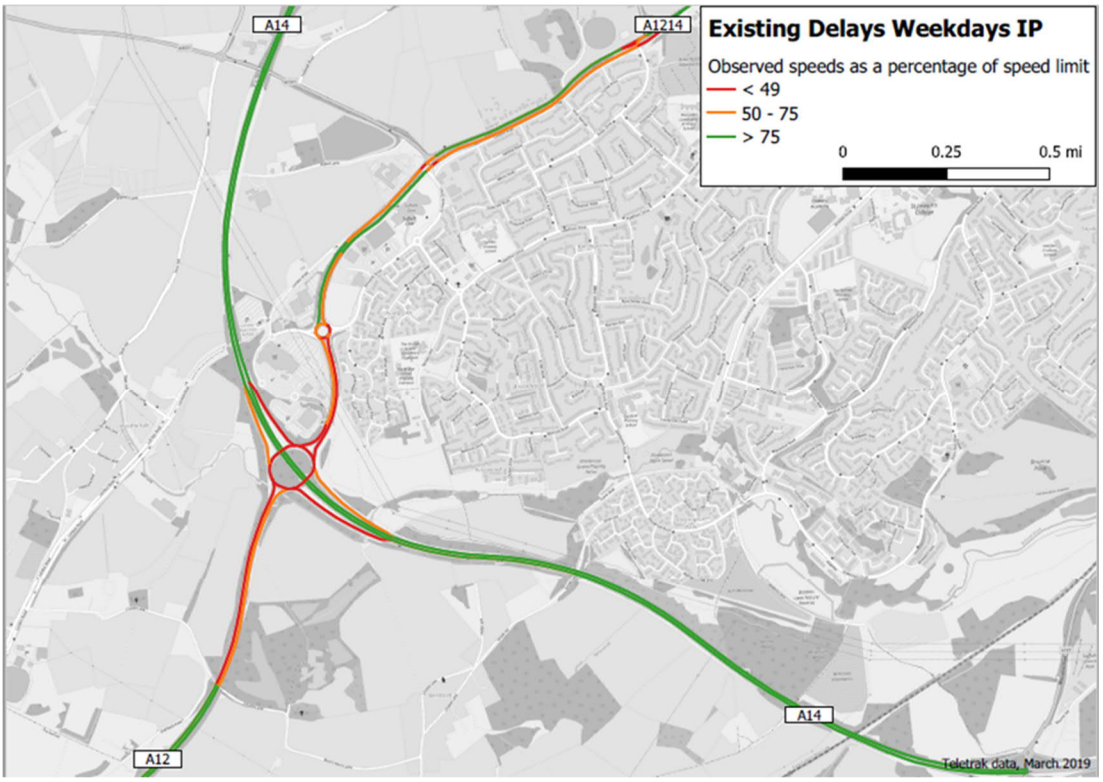


Figure 2-10: Delays at A14 J55 in 2019 for inter-peak

Figure 2-11: Delays at A14 J55 in 2019 for PM peak

During all periods, the average speeds on the approaches to A14 Junction 55 are less than half the posted speed limit, which is consistent with queueing on all approaches. The delays are greatest during the weekday morning period, when the slow-moving traffic on A12 northbound

extends back past Junction 32B (Capel St Mary), but is also present during the weekday inter-peak and evening periods. The analysis also shows that queuing on the A14 off-slips does indeed appear to impede A14 traffic on the mainline in the weekday morning and evening periods, but less so in the weekday inter-peak period.

The queueing observed on approaches to A14 Junction 55 during peak periods shows that the demand exceeds capacity of the junction at these times.

Significant weaving occurs on the A12 northbound approach, due to HGVs manoeuvring from Lane 1 to Lane 2 to turn right at Copdock Interchange and cars overtaking the HGVs manoeuvring from Lane 2 to Lane 1 to head into Ipswich. This weaving causes delays to traffic in advance of the actual junction.

2.3.5 Existing 'rat running'

From liaison with stakeholders, there is anecdotal evidence that 'rat running' (i.e. traffic using inappropriate routes to avoid congestion and delays at A14 Junction 55) may be occurring on three routes:

1) Northbound from A12 J32B via London Road (the old A12), Washbrook village, A1071 Beagle roundabout, B1113, Sproughton village and Sproughton Road to the B1067 into Ipswich, particularly in the weekday AM peak period

2) Southbound via residential areas parallel to the A1214 London Road, between Ipswich town centre and the Tesco roundabout near Copdock Interchange, particularly in the weekday PM peak period

3) Northbound from A12 J32b via London Road (the old A12), Church Lane, Belstead village, A167 and A14 Junction 56 into Ipswich, particularly in the weekday AM peak period.

Analysis has therefore been undertaken to investigate whether there is any evidence of rat running on the above local roads to avoid congestion at A14 Junction 55. Four locations had available count data for review and analysis: London Road (the old A12, northbound towards Ipswich) and residential roads parallel to the A1214, being Scrivener Drive (southbound towards A14 Junction 55), Scrivener Drive (westbound towards A14 Junction 55) and Robin Drive (southbound towards A14 Junction 55). There was no existing count data for the potential rat-run route via Belstead village.

Rolling hourly count flow profiles for Scrivener Drive (southbound / westbound) and Robin Drive (southbound) indicated a modest increase in traffic in the PM peak, but this is to be expected as that is likely to be commuters returning to their homes in these residential areas. So, as there was no evidence of a very significant increase in traffic, there does not appear to be any evidence of significant rat running.

The data for London Road northbound, the old A12, in both the weekday morning and evening peaks showed a very significant increase in traffic, with traffic flows approximately three times higher in these time periods than the IP (500-550 vs. 100-150). Indeed, there is also a very significant increase in traffic on London Road in the southbound direction in the weekday evening peak (300 vs 150).

In summary, there appears to be significant rat-running on London Road in both directions (northbound in morning peak, southbound in evening peak).

2.3.6 Existing resilience

Resilience is the ability of the road network to cope when incidents occur, such as accidents, weather, breakdowns and animals in the road and so on. From liaison with stakeholders, it is known that lack of resilience within the study area is a major concern, particularly the perceived frequent closure of the A14 at Orwell Bridge due to high winds. Analysis has therefore been undertaken to understand the extent to which the A14 and A12 within the study area are affected by delays caused by incidents, the locations where incidents occur and the nature of those incidents.

The analysis was undertaken using National Information Liaison Officer (NILO) reports covering the five-year period from 1 January 2015 to 31 December 2019. The study area included the A14 between J54 and J57 and A12 north of J32. NILO reports classify incidents as 'Major', 'Critical' or 'Other' based on criteria including severity of consequences, geographical extent of delays caused and timescale of disruption. For comparison, an incident causing delays of 20 minutes or more than 3 miles of congestion would be categorised as 'Other', whereas an incident causing delays of 60 minutes or more than 6 miles of congestion would be categorised as 'Critical'.

Figure 2-12 presents the numbers of incidents affecting key road sections over the above five-year period. There were no 'Major' incidents, 33 'Critical' incidents and 71 'Other' incidents recorded across the study area.

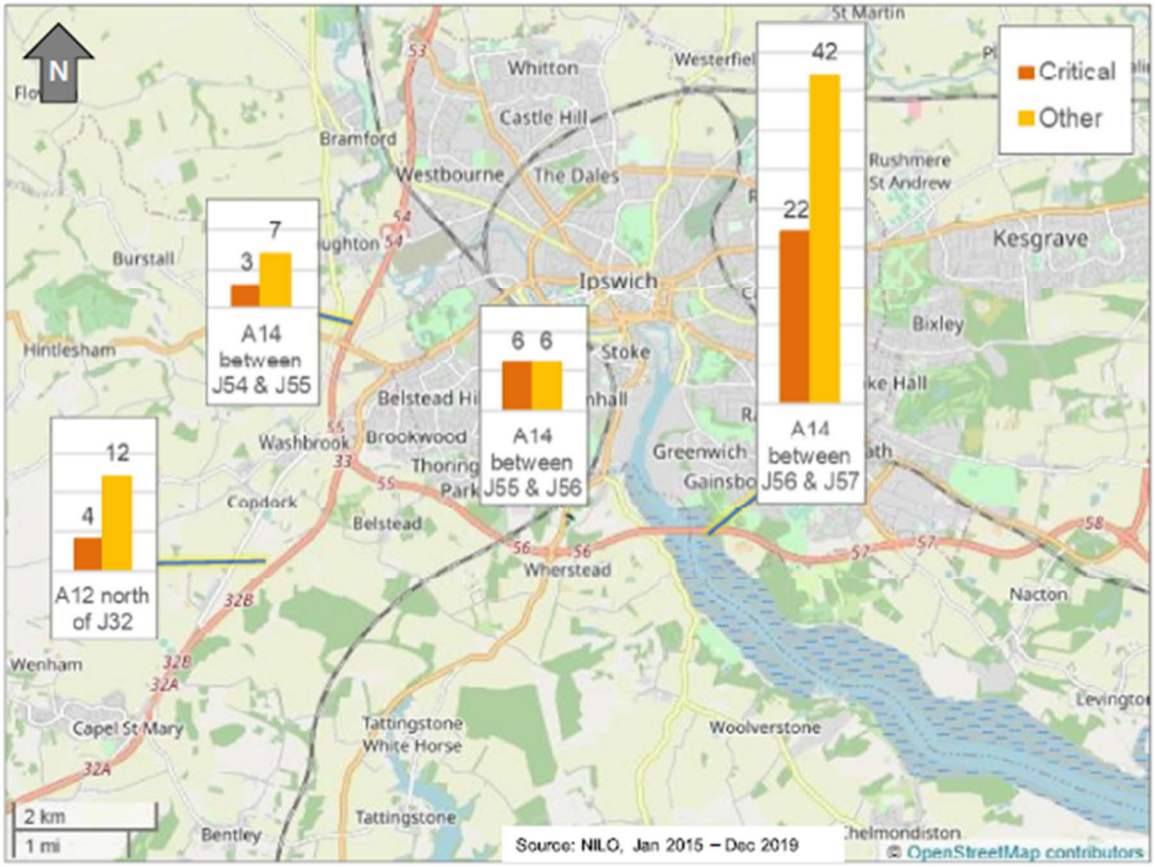


Figure 2-12: Incidents affecting key road sections for 2015-2019

Table 2-1 presents the number of incidents affecting key road sections over the five-year period, by severity and nature of incident. The most frequent cause of 'Critical' incident was road traffic collisions (14 records), followed by closure of Orwell Bridge due to strong winds (12 records).

Type	Nature of incident	Count of incidents
Critical	Road Traffic Collision	14
	Orwell Bridge closed due to strong winds	12
	Police led incident	5
	Vehicle Fire	2
Other	Road Traffic Collision	34
	Broken Down Vehicle	26
	Police led incident	5
	Spillage	2
	Debris in road	1
	Vehicle Fire	1
	Flooding from heavy rainfall	1
	Overturned vehicle	1
Grand Total		**104**

Table 2-1: Incidents in the study area for 2015-2019 by Type and Nature (Source: NILO)

Incidents may affect one or more sections of the network. The section of A14 between J56 and J57, which includes Orwell Bridge, was impacted by the highest number of incidents. This section was affected by 22 'Critical' and 42 'Other' incidents. Table 2-2 presents a breakdown of the types of incidents affecting the section of A14 between J56 and J57 over the five-year period.

Type	Nature of incident	Count of incidents
Critical	Orwell Bridge closed due to strong winds	12
	Road Traffic Collision	5
	Police led incident	3
	Vehicle Fire	2
Other	Broken Down Vehicle	18
	Road Traffic Collision	16
	Police led incident	4

Type	Nature of incident	Count of incidents
	Debris in road	1
	Vehicle Fire	1
	Flooding from heavy rainfall	1
	Overturned vehicle	1
Grand Total		**64**

Table 2-2: Existing incidents affecting A14 between J56 and J57 (including Orwell Bridge) (source: NILO)

The 12 incidents caused by the closure of Orwell Bridge due to high winds accounted for less than 20% of the incidents affecting this section of the route. The most frequent incident type here was broken down vehicles with 18 occurrences. The closure of this section of the A14 is especially important to users of the A14, and the users of the local road network in and around Ipswich, due to the lack of an appropriate alternative route i.e. when the section of the A14 that includes Orwell Bridge is closed, all traffic is diverted through Ipswich town centre, with anecdotal evidence suggesting that journey times can be extended by approximately two hours.

In order to understand whether the numbers of incidents were in proportion to how busy the network is, a comparison was made between the number of incidents and the annual vehicle-km for each section of the route, based on Annual Average Daily Traffic (AADT) data sourced from DfT traffic counts. The comparison is presented in Figure 2-12. This demonstrated that the proportion of incidents affecting the A14 between Junction 56 and Junction 57 (including Orwell Bridge) was disproportionately high.

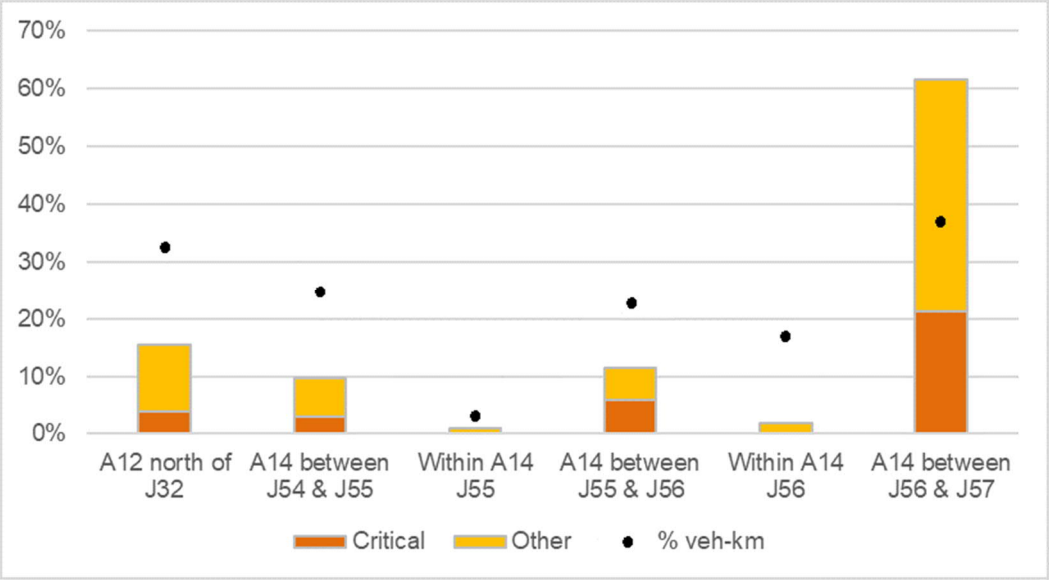


Figure 2-13: Comparison of proportion of incidents in 2019 and proportion of vehicle-km 2015-2019

It should be noted that Highways England have proposals to introduce a lower speed on the A14 Orwell Bridge during high winds such that, once implemented, there should be a reduction in the number of times that Orwell Bridge has to be closed in the future.

2.4 Environmental Opportunities and Constraints

2.4.1 Overview

This section summarises the key environmental constraints within the study area, based on the Environmental Constraints Plan that has been produced and can be found in **Error! Reference source not found.** of this report. Further details can be found in the Stage 1 Environmental Assessment Report (EAR) HE604639-JAC-EGN-SCHW_00-RP-LE-0005.

2.4.2 Noise

Two noise important areas have been identified:

- Defra Important Area, 4799, Highways England – located along the A14 approximately 800m to the north-east of the junction
- Defra Important Area, 4798, Suffolk County Council – located adjacent to the connecting A1214 approximately 380m from the centre of the junction

The existing noise climate surrounding the junction is likely to be dominated by road traffic noise from the existing A14, A12 and A1214. This is confirmed in the DEFRA Strategic Noise Maps.

Noise sensitive receptors include dwellings, hospitals, healthcare facilities, education facilities, community facilities, Environmental Noise Directive quiet areas or potential Environment Noise Directive quiet areas, international and national or statutorily designated sites, Public Rights of Way (PROWs) and cultural heritage assets.

2.4.3 Local air quality (including greenhouse gases)

There are no Air Quality Management Areas (AQMAs) in the vicinity of the proposed scheme (the nearest being 4km from the junction). It is therefore unlikely that air quality would represent a significant risk / constraint to the proposed scheme.

Twelve residential receptors have been identified within 200m of the Affected Road Network (ARN), which represent those likely to experience the greatest changes in air quality. However, this is not an exhaustive list and there will be other sensitive receptors that will experience air quality impacts as a result of the scheme.

In addition, there are five designated ecological receptors within 200m of the ARN: Bentley Long Wood (County Wildlife Site), Brockley Wood (County Wildlife Site), Stour and Orwell Estuaries (Ramsar, Special Protection Area and Site of Special Scientific Interest), Spring Wood and Millennium Wood (Local Nature Reserves), and Bourne Park Reed Beds (Local Nature Reserve).

2.4.4 Landscape (including townscape)

There are no national designations that fall within the study area. However, a small portion of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB) sits within the south east of the landscape study area, having recently been extended in July 2020. An ‘Additional Project Area’ associated with the AONB sits within the central and southern aspects of the study area. This area adds a degree of responsibility to Babergh District Council to ensure that the key

landscape features and characteristics (which are shared with the AONB) are protected and enhanced accordingly.

The study area lies at the intersection of two national character areas, Suffolk Coasts and Heaths (NCA 82) and South Suffolk and North Essex Claylands (NCA 86). There are six Local Landscape Characterisation Areas within the study area.

In terms of visual amenity, there are ten residential, five recreational and two commercial receptors identified.

2.4.5 Geology and Soils

Geology

The youngest superficial geology present on the site is Alluvium and it follows the original course of Belstead Brook and is therefore generally present beneath the central and western parts of Copdock interchange. Head Deposits are present along the western side of the interchange, both beneath and slightly to the west of the Alluvium. Older superficial deposits of Lowestoft Formation - Diamicton (glacial till) are present locally near the start of the westbound off-slip embankment. Deposits of Lowestoft Formation - Sand and Gravel are also present near the start of the westbound off-slip embankment and beneath the upper part of the eastbound on-slip embankment. There are no superficial deposits mapped beneath the eastbound off-slip embankment.

Bedrock deposits from both the Red Crag Formation and the Thames Group are present on higher ground remote from Belstead Brook. However, on lower ground where the interchange is located the superficial deposits sit directly on bedrock deposits from the Thanet Formation and Lambeth Group (Undifferentiated). The entire site is underlain by the Upper Cretaceous Chalk.

Man-made deposits are not mapped in the vicinity of Copdock interchange. However, engineered embankment fill is present as part of the current grade separated interchange.

There are no geological SSSIs or geological designated sites located within 1km of the junction. The nearest SSSI designated for geological importance is the Bobbits Hole Belstead SSSI located approximately 1.9km south east of the junction.

Soil

In the absence of site-specific ALC data, it is conservatively assumed that Subgrade 3a land is present where Grade 3 is mapped. Soil quality impacts are likely to result from removal of agricultural land and potential degradation of soil quality during construction.

Minerals

The scheme is not within a minerals safeguarded site as per the adopted Suffolk Minerals Plan.

Hydrogeology

Superficial deposits of Secondary A Aquifer and Secondary B Aquifer are present at the junction (associated with the Belstead Brook) and have medium to high groundwater vulnerability.

The site is located within a nitrate vulnerable zone and a Groundwater Source Protection Zone 3 (SPZ 3). Additionally, drinking water protection zones are located approximately 900m north and 1km south of the interchange.

Land contamination

Only one area of artificial made ground is located within 1km of the junction.

No historical landfill sites have been identified within 1km of the junction. A small disused sewage works is located adjacent to the highway boundary, approximately 20m west of the A14 north bound. Potential sources of contamination include the sewage works and a petrol station associated with the retail park north of the interchange.

2.4.6 Heritage and historic resources

No World Heritage Sites, Registered Parks and Gardens, Registered Battlefields, Scheduled Monuments or Conservation Areas are located within the study area.

A total of 43 listed buildings are located within the study area.

Twelve non-designated sites of archaeological activity are recorded within the development boundary by the Historic Environment Record, while a further 85 sites are recorded within the wider study area.

No non-designated built heritage assets or non-designated designed landscapes are recorded within the development boundary, while six Historic Landscape Characterisation data areas partially extend within the development boundary. Four non-designated historic farmsteads which include combinations of built heritage, designed landscapes and archaeological remains are recorded within 500m of the development boundary. A total of 39 Historic Landscape Characterisation data areas are recorded within the wider study area.

2.4.7 Biodiversity

The Stour and Orwell Estuaries Ramsar wetland, Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) is located within less than 3km of the Proposed Scheme. This statutory designated site of international importance is hydrologically connected to the A14 Junction 55 area via the Belstead Brook. No Special Areas of Conservation (SAC) primarily designated for bats were identified within 30km.

Five Local Nature Reserves are present within 2km of the Proposed Scheme and four non-statutory County Wildlife Sites are present within 1km.

Within the anticipated scheme boundary, habitats generally comprised broadleaved plantation woodland within the soft estate bordering the A14, A12 and Junction 55 roundabout.

Ancient woodland is present immediately adjacent to the scheme, including within Spring Wood LNR (along the A14) and along the A12 south of junction 55. A number of Habitats of Principal Importance (HoPI) were identified within the study area: lowland mixed deciduous woodland, wet woodland, grassland (non-confirmed HoPI status), hedgerow (non-confirmed HoPI status), water bodies and watercourses. Further assessment is required to determine the ecological value and HoPI status of habitats within the study area.

A number of species are assumed to be present due to the abundance of species records and presence of suitable habitat within and adjacent to the Proposed Scheme. Species assumed present include; bats, otter and water vole, hazel dormouse, badger, freshwater fish, reptiles, great crested newts, breeding and wintering birds, aquatic and terrestrial invertebrates. Other Species of Principal Importance that are likely to be present are hedgehog, harvest mouse and brown hare.

Habitats within the study area are suitable to support invasive non-native plant species and therefore there is potential that more may exist within and adjacent to the Proposed Scheme extents.

Rare and notable plant species are likely to be present within the study area.

2.4.8 Climate

The scheme will involve the generation of Greenhouse Gas (GHG) emissions through:

- Carbon embodied within materials;
- Transport of materials to site and waste from site;
- Transport of construction workforce;
- Use of construction equipment and machinery
- Maintenance, refurbishment and replacement during operational phase; and
- End of life.

The scheme may require construction within a flood zone and will therefore need to consider resilience to flood events under climate change scenarios.

2.4.9 Water environment

The Proposed Scheme interacts with a statutory main river (Belstead Brook). Under the Water Framework Directive (WFD) the Belstead Brook has an overall classification of 'Poor' and is not designated artificial or heavily modified. Belstead Brook is classified as supporting good hydrological regime and morphology under the WFD. Reasons for not achieving good status include high sediment loads due to agriculture and rural land management and ecological discontinuity due to the proximity of urban areas and transport infrastructure.

The Environment Agency Flood Map for Planning indicates that there are areas of Flood Zone 3 and Flood Zone 2 within the study area.

The area lies within a groundwater WFD waterbody, Waveney and East Suffolk Chalk & Crag which has Poor Quantitative and Chemical status. The Proposed Scheme lies within a groundwater Source Protection Zone (SPZ) 3 associated with a groundwater abstraction situated approximately 2 km to the east of the existing junction 55 roundabout.

Groundwater dependent terrestrial ecosystems (GWDTE) may be present within 1 km of the Proposed Scheme. Although no GWDTEs are shown on the Environment Agency database, these relate only to SSSIs which may have a degree of groundwater dependency. Other non-statutory or non-designated sites may also have vegetation dependent on groundwater and would be assessed as GWDTEs. Bobbits Lane LNR, which contains wet meadows and woodland, and Bourne Park Reed Beds LNR may have a degree of groundwater dependency.

Surveys and consultation with nature conservation organisations will be undertaken during later PCF stages to establish the status and groundwater dependency of LNRs.

2.5 Engineering Opportunities and Constraints

2.5.1 Road Layout

The traffic flows are a key consideration for developing the new road layout. Another significant consideration is proximity of adjacent junctions. A14 Junction 56 (Wherstead) lies approximately 3km north east of Junction 55. A minimum weaving distance of 1km is required by Design Manual for Roads and Bridges (DMRB) standards for rural all-purpose roads between the slip roads at adjacent junctions. This is a potential constraint to be borne in mind when developing the option layouts. The flows between adjacent junctions, where traffic streams cross also need consideration to check sufficient lane capacity is provided in this "weaving" section.

There are existing laybys present on the A12 between A12 Junction 32B and A14 Junction 55, and on the A14 between Junction 55 and Junction 56 which may also be non-compliant in form and spacing. Noting the DMRB's guidance on siting and special requirements of laybys, this is a potential constraint that will need to be borne in mind when developing the option layouts. Any existing laybys that would need to be closed may require provision of other laybys elsewhere in line with DMRB requirements.

2.5.2 Public utilities

Preliminary C2 Statutory Undertakers Inquiry (New Roads & Street Works Act 1991) were carried out to identify the extent of existing public utilities that would be affected by all options. The C2 inquiries were sent out to all the Statutory Undertakers in the region, who have responded with the location of their plant, which has enabled potential clashes at this initial stage to be identified.

The principal utility constraints identified are the two lines of 132kV overhead cables and associated pylons which run north of the A14. They are particularly close to the existing A14 in the area adjacent to Grove Hill underbridge. These would need to be considered when developing options and their diversion may be required. There are also 11kV cables that cross over the A14 to the east of the Belstead Brook culvert under the A14 that may require diversion.

The other significant utilities constraints are two water mains that cross the A14 to the east of the Belstead Brook culvert under the A14: a large (40" diameter) raw water main that crosses under the A14 in a service culvert and a small diameter foul rising main. If these mains cannot be avoided, they would need to be diverted.

There is an abandoned sewage works adjacent to the A14 westbound on slip.

2.5.3 Operational Safety

An initial review on the existing safety performance of A14 Junction 55 was undertaken to establish the potential constraints with developing the option layouts, as such collision and incident analysis has been carried out within the anticipated scheme boundaries.

Table *2-3* show analysis of collisions in the vicinity of A14 Junction 55. A total of 94 collisions were identified in the period (2015-2019) within the anticipated scheme boundaries. Nose to tail collision was identified as the most common type of accounting for 52% of the total collisions recorded. No WCH collisions were recorded associated to the scheme extents, however there was a fatality in the wider collision search area which occurred in 2016 on the A14 involving a pedestrian. No information is readily available to understand why a pedestrian was on the carriageway at this location.

Severity	Year					
	2015	2016	2017	2018	2019	Total
Fatal	0	1	0	0	1	**2**
Serious	0	1	2	2	1	**6**
Slight	16	21	13	20	16	**86**
Total	**16**	**23**	**15**	**22**	**18**	**94**

Table 2-3: A14 Copdock collision analysis

Out of a total of 499 incidents identified in the period (2015-2019), only 154 had lane closure information provided. The existing data for lane impact duration suggests that the majority of lane closures are classified as 'Minor' 81 (53%), with 'Moderate' and 'Severe' impacts recorded as 58 (38%) and 15 (10%) respectively.

It has also been noted, see section 2.3.4, that weaving occurs on the A12 northbound approach to the junction, however the analysis suggests that this does not appear to cause collisions.

2.5.4 Walking Cycling and Horse-riding

The condition and usage of Walking Cycling and Horse-riding (WCH) routes have not been assessed due to the ongoing COVID19 pandemic. Such assessment will take place as part of the WCH assessment report, which is scheduled for PCF Stage 2, at which time survey counts will also occur.

The impacts to existing WCH routes connecting the A14 Copdock Interchange scheme are limited, with only three Public Rights of Way being of particular interest i.e. Washbrook BR53, Belstead BR39 and Belstead FP4/5, as shown in Figure 2-14.

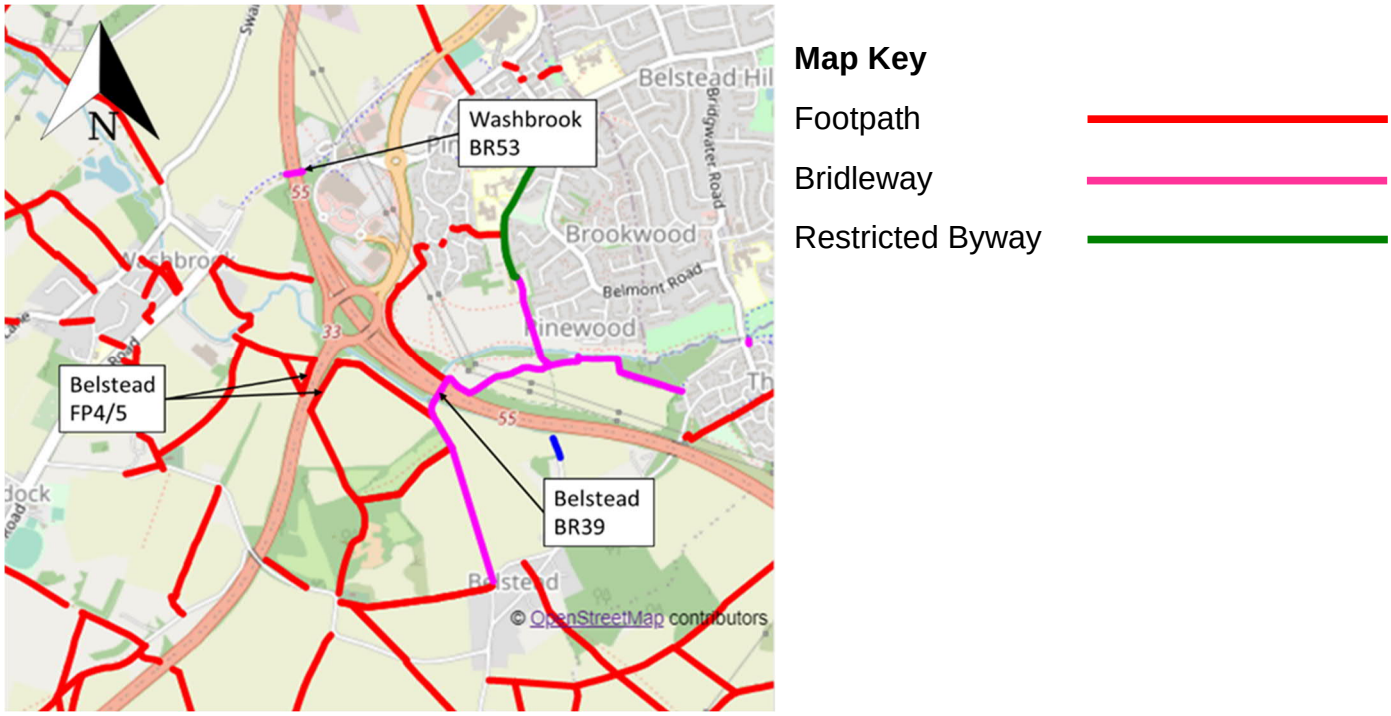


Figure 2-14: Public Right of Ways (PRoW) of interest

Belstead footpaths 4/5 are severed by the existing A12 and as such are just circular routes. The main desire lines though are anticipated to be across the A14 and not the A12. Bridleway 39 runs under the A14, there-by affording grade separated access. Bridleway 53 also runs under the A14 in a WCH subway some 500m to the north-west of Junction 55 and is of particular interest following early stakeholder engagement. The junction itself has no WCH routes and whilst no surveys have been undertaken there is no evidence of regular usage; for WCH users from the south, the route via London Road (the old A12) and BR53 being more appropriate.

2.5.5 Drainage

The Belstead Brook runs from west to east, passing under the A12 in a culvert then runs next to the A14 westbound off slip before passing under the A14 in another culvert. The Belstead Brook was realigned when the A12 and A14 were constructed. The flood zone of the brook is a key

constraint: development in the flood zone, in particular Flood Zone 3b, the functional floodplain, is not normally allowed and development in the flood zone could pose a risk to the future consent for the scheme. Typically, options would either need to avoid the flood zone or cross it on viaduct structures, minimising interference with the flow.

The proximity of the east end of the Belstead Brook culvert under the A12 and the brook running next to the A14 westbound off slip road are significant constraints to altering the existing junction.

2.5.6 Existing Structures

There are two existing bridges spanning 27m over the A14 at Junction 55; Copdock Mill Interchange North Bridge and Copdock Mill Interchange South bridge. It is envisaged that any improvement that involves widening the existing gyratory would also require widening the existing bridges.

The existing Belstead Brook culverts under the A12 and A14 are of corrugated steel construction with concrete collar headwalls following the embankment profile. Each comprises 3 bores of large (4760mm) diameter. The culvert under the A12 is immediately adjacent to the junction roundabout.

The existing Church Lane bridge (perpendicular to Oakfield Road) over the A12 is around 1km south of the junction. The abutment walls for this bridge are close to the edge of the A12 on either side of the carriageway.

The existing bridge carrying the A14 over the Grove Hill side road lies around 1.2km east of Junction 55. There is also a reinforced concrete retaining wall at this location which will require demolition or modification for options incorporating new bridge structure adjacent to Grove Hill Bridge. Grove Hill climbs steeply to the south and so headroom constraints mean that widening this structure on the south side would be difficult.

The Great Eastern Main Line railway crosses over the A14 2.4km east of Junction 55. The Washbrook Underpass is approximately 0.5km north of the junction, providing a WCH route under the A14.

2.5.7 Maintenance Access

There are existing maintenance laybys on the roundabout between the A12 entry and exit and between the A1214 entry and exit onto the circulatory junction, next to the control cabinets for the traffic signals. There are no other formal maintenance access facilities at the junction. Refer to section 2.5.1 for further detail. There are maintenance laybys for access to technology equipment on the A14 westbound and eastbound to the east of the Grove Hill underbridge. Any existing laybys that would need to be closed (due to DMRB siting requirements) would require provision of other laybys elsewhere in line with DMRB requirements. Refer to 6.6 for the maintenance assessment.

2.5.8 Street Lighting

The existing Junction 55 is lit, with lighting on the junction gyratory. The street lighting on the A12 approach and exit extends around 170m away from the roundabout; on the westbound off slip around 150m from the roundabout; on the westbound on slip around 90m from the roundabout; on the eastbound off slip around 150m and on the eastbound on slip around 120m from the roundabout. The A1214 is lit from the Junction 55 roundabout to the Scrivener Drive roundabout and beyond.

There is street lighting on Grove Hill north of the A14, from around 60m north of the bridge under the A14.

Church Lane and Oakfield road have no street lighting.

2.5.9 Technology

There is technology on the A14 with a duct network, traffic detection loops and MS3 and MS4 signs. The technology also extends on the A12 south to around 2km from Junction 55 with two MS3 signs.

There is no CCTV coverage of the existing Junction 55 nor the A12 and A14 in this area.

In early 2021 the A14 Orwell Bridge speed limit scheme was implemented. This scheme introduces a section of Variable Mandatory Speed Limit with new electronic signage to display speed limits which can be changed depending on the wind speed, down to a minimum of 40mph, with the aim of reducing the number of instances that the bridge has to be closed during high winds.

2.6 Business Need – Summary

2.6.1 Key drivers for the scheme

The key external drivers can be summarised as follows:

- Most international non-bulk trade is transported in ISO containers (otherwise known as Lift on Lift off (LoLo)) to and from deep-sea ports. The Port of Felixstowe is the UK's largest and busiest port for Lo-Lo containers. It moved approximately 4million Twenty-foot Equivalent Unit (TEUs) containers, equating to around 25million tonnes of goods, approximately 75% of which is non-European Union.
- Copdock Interchange is located 14 miles from the Port of Felixstowe. The Port handles nearly 9,000 HGVs per weekday 24-hour period and is dependent upon the A14 East-West route to / from the Midlands and the North, and the A12 route to / from the South and further afield via the M25. As Copdock Interchange is the junction between the A14 and the A12, it is especially critical to the delivery of freight to / from the Port of Felixstowe, particularly as it is a known congestion hotspot.
- Reliability is more important to logistics chain users of the SRN than speed or journey time. Lack of resilience on the SRN is also a major concern – closures of Orwell Bridge can add 1.5 to 2 hours onto journey times due to the diversion through Ipswich town centre.
- Consequences of delays for freight via the SRN include missing the booked slot for collection of inbound goods at the Port, missing the booked slot for inbound goods at the customer’s depot or missing the sailing for outbound goods. These cost businesses directly through rising fuel costs, driver costs, goods having to be redelivered, financial penalties affecting profitability, rejected goods (especially perishable goods) and dockside congestion as containers are left uncollected.
- Evidence suggests that logistics operators are absorbing additional incremental costs / inefficiencies which, over time, will increase freight movement costs, to the detriment of the UK national economy.
- Regarding the future, it has been announced that the Orwell Estuary would be dredged to allow the Port of Felixstowe to accommodate the world’s largest ships. There are also longer-term aspirations for the Port of Felixstowe to grow from 4m to 8m TEUs. With the UK

leaving the European Union, new trade deals are likely to increase imports / exports through ports other than Dover. The Port of Felixstowe is also applying for Freeport status.

Key internal drivers are the six Outcomes and associated KPI metrics within Highways England's Strategic Business Plan, for which improvements to Copdock Interchange have the potential to contribute towards four of them.

In the future, without any improvement, existing problems are likely to get worse in the future and without intervention, there will be more pressure on junction capacity resulting in:

- increased journey times / delays;
- decreased journey time reliability;
- increased rat-running; and
- increased risk of accidents (due to increased weaving on A12 northbound and, in particular, increased risk of high-speed collisions caused by longer queues on the A14 slip roads) and
- an increase in incidents (causing even more delays on the network).

Doing nothing will therefore make a negative contribution to Highways England KPIs in the future.

2.6.2 Summary of the Issues the Scheme needs to resolve

The proposed scheme should seek to solve the problems summarised below:

- Significant weaving occurs on the A12 northbound approach, due to HGVs manoeuvring from Lane 1 to Lane 2 to turn right at Copdock Interchange to head towards the Port of Felixstowe, and cars overtaking such HGVs have to manoeuvre from Lane 2 to Lane 1 in order to head into Ipswich. This weaving causes delays to traffic significantly in advance of the actual junction.
- There are general delays on all arms of the junction, especially at peak hours. The root cause of this is the restricted capacity of the junction, which is insufficient to cope with the current traffic demand.
- One knock-on effect caused by the restricted capacity of the junction is that queues on the A14 slip roads can extend back onto the A14 mainline, especially at peak hours, resulting in the risk of high-speed collisions, as well as delaying the A14 traffic passing underneath Copdock Interchange.
- Another knock-on effect caused by the weaving problem on the A12 northbound is that some of that traffic "rat-runs" via inappropriate routes through villages and suburbs to avoid the congestion at the Interchange.

3. Scheme Objectives

A Value Management (VM) Workshop was held on 13th August 2020. A key outcome from the workshop was agreement that the traffic movement between the A12 south and the A14 east (and the reverse movement) were the most strategically important flows through the junction and should be the movement prioritised by the Scheme noting the remit to improve access to the Port of Felixstowe.

The objectives as agreed after the VM workshop are in below.

	Objective	Further detail
1	Making the network safer	There is an opportunity to reduce the number of collisions at the A14 Junction 55 roundabout and its approaches through segregation of specific movements and reduced queuing. Reduced weaving manoeuvres and alleviating potential mainline queuing from exit slips will further deliver safety benefits. Better network resilience through improved capacity will reduce driver frustration and rat running through inappropriate routes.
2	Keeping the network in good condition	Any new scheme would be delivered in accordance with the latest design standards with consideration of long-term maintenance best practice. New asset would benefit from reduced maintenance requirements during early lifecycle.
3	Delivery of better environmental outcomes	There are two Noise Important Areas within the study area – whilst a constraint on potential options there are opportunities to reduce the impact on the surrounding community. Reduced vehicle queuing is likely to make a positive contribution to air quality
4	Improving user satisfaction	The percentage of National Road Users' Satisfaction Survey respondents who are 'very' or 'fairly satisfied' is likely to increase given the forecast reductions in queueing and delay associated with all scheme options. The scheme will make a positive contribution to the relationship with Felixstowe Port, associated business users and local stakeholders.
5	Supporting the smooth flow of traffic	A scheme would help to maintain the smooth flow of traffic through the junction and, potentially, along the main line of the A12 and A14 by providing additional capacity and journey time reliability. Increased capacity will provide a more resilient network when incidents or planned works occur.
6	Encouraging economic growth	The junction is a key location on the route serving the key international gateway of Felixstowe Port and the Ipswich A14 Economic Opportunity Area. These are

	Objective	Further detail
		key employment growth areas with significant economic importance. The scheme would provide additional highway capacity to support this growth
7	Helping cyclists, walkers, and other vulnerable users of the network	There is no evidence of regular use of the junction by walkers, cyclists or equestrians. There is an NMU subway under the A14 some 500m to the north-west of A14 Junction 55, on the line of the former A12, which provides a direct traffic-free link into the Ipswich urban area for residents of the villages of Copdock, Washbrook and the rural hinterland. As such, the options may not directly improve conditions for cyclists, walkers and other vulnerable road users in the immediate vicinity of A14 J55, but the options should reduce rat-running at Beagle roundabout and surrounding local road network, thereby improving conditions for such road users in that vicinity.
8	Customer	Throughout the design and delivery stages, the scheme should ensure that customers and communities are fully considered. Specifically, this should include: • Understanding the needs of all segments of customers (including vulnerable users), stakeholders and partners • Responding to those needs such that the end product delivers an improved customer experience • Assessing the impact of works on road users and communities, minimising disruption and delivering appropriate mitigation measure. The assessment should look at issues through customers eyes.

Table 3-1: Scheme Objectives

Of the objectives listed above, Supporting the Smooth Flow of traffic, in particular reducing journey times and increasing resilience are considered particularly of relevance in relation to the Scheme's remit to improve access to the Port of Felixstowe.

4. Geographic, Demographic, Planning and Policy Contexts

4.1 Geographic context

The study area as shown in Figure 4-1 is located in Suffolk. A14 Junction 55 lies in Babergh District, south-west of Ipswich. Babergh District covers an area of 600km^2 and is bordered by the district of Mid Suffolk District and West Suffolk to north, Braintree District to the west and Colchester District and Tendering District to the south.

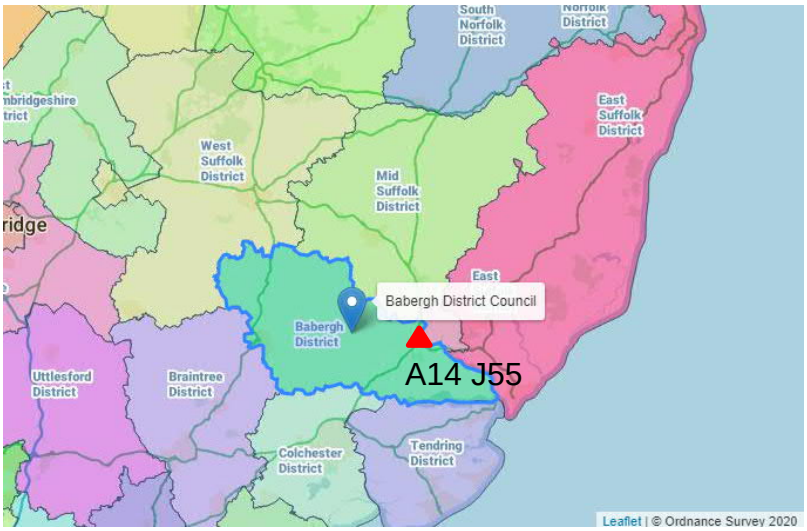


Figure 4-1: Nearby districts to the scheme

4.2 Demographic context

As of 2019, the Office of National Statistics (ONS) estimates that the County of Suffolk has a total population of 761,350. Ipswich is the main town of Suffolk with a population of 136,913 and the study area encompasses the south western corner of the settlement. The scheme itself is located within the district of Babergh, which has a population of 92,039. Babergh and Ipswich encompasses most of the study area, with a small part encroaching into Mid-Suffolk to the north, which has a population of 103,895. Outside the main centre of Ipswich, the population is relatively dispersed, with the main centres being the villages of Capel St Mary, Copdock, Washbrook, Belstead, Wherstead, Bramford, Hintlesham (Babergh) and Bramford (Mid Suffolk).

Based on data from the ONS, the median weekly nominal pay for full-time workers in Suffolk is £538, £523 in Ipswich, £577.10 in Babergh and £540.90 in Mid-Suffolk respectively. Compared to the UK median of £567, only Babergh is above the national average. The percentage of the population of Ipswich that are unemployed is 4%, which is 0.2% lower than the national average, while the figure is substantially lower for Babergh at 2.8% and Mid-Suffolk at 2.1%. However, although Babergh and Mid Suffolk also have lower rates of jobseeker claims than the 6.2% national average, at 4.6% and 3.5% respectively, Ipswich does however have a slightly higher jobseeker claimant figure than the national average, at 7.3%.

In line with general trends both within the UK and globally, the proportion of older people in Suffolk is forecast to increase from 23.6% in 2018 to 31.2% by 2041, while the working age (16 – 64) population is forecast to decrease from 58.4% in 2018 to 52.7% by 2041 (a decrease of 6,166 people in absolute terms).

In terms of house affordability, the UK average house price to income ratio is 8.35 i.e. the median house price is 8.35 times the median income). In Ipswich, the ratio is lower than the UK average at

7.44, whereas Babergh and Mid Suffolk are both higher than average, at 10.95 and 8.99 respectively. However, Suffolk has the highest estimated number and proportion of households in fuel poverty of all counties in the east of England, and Ipswich's percentage of households in fuel poverty is 8.9% while in Babergh and in Mid Suffolk this percentage stands at 9.6% and 10.2% respectively. In terms of car use, 28% of households had no cars at the time of the last census in 2011, while in Babergh Mid Suffolk, this figure was substantially lower at 13%.

Principal employers in the study area are in the service industry, including insurance providers such as Axa and Churchill, and the freight transport sector is also prominent owing to the proximity to the Port of Felixstowe, as well as a number of smaller employers located in the urban area of Ipswich and the surrounding smaller settlements . Specific to the locality of the A14 Junction 55, there is a concentration of home shopping and retail businesses directly adjacent to the roundabout to the north, while further north west, there is the Eastern Gateway industrial and logistics Park in Sproughton, which is notably the location for a large Amazon delivery centre, acting as an important distribution hub for the region.

4.3 Planning and Policy context

The Planning Act 2008 (hereafter referred to as the '2008 Act') was introduced in November 2008. It makes provisions about, and addresses matters ancillary to, the authorisation of development for any Nationally Significant Infrastructure Project (NSIP) prescribed by the Act. It also relates to any other development that the Secretary of State may direct to be of National Significance and should be dealt with by a Development Consent Order (DCO) under the 2008 Act.

As the preferred option for scheme is currently unknown, so too is the consenting regime for the scheme; this will be confirmed at the end of PCF Stage 2. It is, however, considered likely that the scheme will meet the criteria as a NSIP and will require a DCO in accordance with the 2008 Act. In accordance with Section 104 of the 2008 Act, DCO applications for highway schemes are to be determined in line with the National Networks National Policy Statement (NN NPS).

If the A14 Junction 55 improvement scheme meets the qualifying thresholds set out in Section 22 of the 2008 Act, the proposal will be considered as a NSIP.

Proposed Schemes which require a DCO under the 2008 Act must undertake statutory public consultation before any application is submitted to the Planning Inspectorate. Statutory public consultation has yet to be carried out for the Proposed Scheme and will be conducted during PCF Stage 3.

The relevant national and local policies have been summarised below.

4.3.1 National Planning Policy

Planning National Planning Policy Framework

The revised National Planning Policy Framework (NPPF) (2019) sets out Government planning policies and how these should be applied. The need to ensure sustainable development is at the heart of the NPPF, with paragraph 8 setting out the three objectives for achieving sustainable development, including economic, social, and environmental objectives. This means balancing the need for economic growth with social and environmental requirements, with a presumption in favour of sustainable development.

In paragraph 5, the NPPF states that the framework does not contain specific policies for NSIPs, which are determined in accordance with the decision-making framework in the 2008 Act and the relevant national policy statements for major infrastructure, in this case the NN NPS. The key

policy drivers set out in the National Policy Statements flow from and are consistent with those in the NPPF.

National Policy Statement for National Networks (NN NPS)

The NN NPS is the primary basis for the Secretary of State to make decisions on development consent applications for NSIPs in England. The NN NPS is consistent with the NPPF, habitats and sustainability considerations, and provides guidance and imposes requirements on matters such as good scheme design, safety, community severance, and in particular, in considerations relating to the potential environmental impact. Key policy elements of NN NPS were described in section 2.2.2 of this report.

Conformity of the options for the A14 Junction 55 improvement with NN NPS are discussed in section 6.16.1 of this document.

4.3.2 Local Planning Policy

The study area for the Proposed Scheme falls within the Ipswich, Babergh and Mid Suffolk local planning authority areas. As such, local planning decisions should be made in accordance with the Development Plan and there are several Local Plans of relevance. As this is a two-tier local authority area the development plan is made up of adopted plans produced by the County Council and District Councils. The County Council being responsible for policy relating to mineral and waste activities and District Councils responsible for planning policy for all other types of development. However, whilst the proposed scheme is anticipated to be a DCO project, the content of local plans may be a material consideration but are subsidiary to policies in the NN NPS.

Key local planning policies are:

- Suffolk Minerals & Waste Local Plan (SMWLP) - Adopted 9 July 2020
- Ipswich Adopted Local Plan 2011-2031
- Emerging Ipswich Local Plan 2018-2036
- Babergh Adopted Local Plan (2006)
- Mid Suffolk's Adopted Core Strategy (2008)
- Babergh and Mid-Suffolk New Joint Local Plan (Emerging)

Conformity of the options for the A14 Junction 55 improvement with plan objectives relating to the improvement of the Strategic Roads Network are presented in Section 6.16.2.

4.3.2.1 Local Plan Allocations and Planning Applications in close proximity to the scheme

There are several plan allocations, as well as current and future planning applications of relevance to the Proposed Scheme, outlined in Table 4-1 below:

Location	Type	Description
Directly adjacent to Option 1/1B	Adopted Plan Allocation	Approximately 26 hectares of land around the fringe of Ipswich are allocated for mixed use development, including 350 dwellings.
370m north of Option 1/1B	Adopted Plan Allocation	8.9ha allocated for prestigious business / high technology development within Class B1
300m North East of Option 1/1B	Emerging Plan Allocation	Approximately 475 dwellings and 4ha of employment land (and associated infrastructure)

Location	Type	Description
150m south of Option 4	Adopted Local Plan	Approximately 11.2 hectares of land at Mill Farm and Grove Hill, Belstead, are allocated for a Local Nature Reserve
400m north of Option 1/1B	Planning Application	B/15/00993: Hybrid planning application in relation to: Outline planning consent (all matters reserved) for 29.7ha of mixed use development, comprising: - the erection of up to 475 dwellings (10.74ha); - 4ha of employment land, to include A3, A4, A5, D1, D2 and Sui Generis use classes; - 1.2ha of land for primary education use; - public open space, including childrens' play areas; and, - associated landscaping, sustainable urban drainage systems and highway improvements. Full planning consent for residential development of 11.83ha of the outline application site, comprising: - the erection of 145 dwellings; - public open space and children's play areas (LEAP+); - green infrastructure, hard and soft landscaping, and boundary treatments; - sustainable urban drainage systems and pumping station; - highway improvements; and, - an electricity substation.
450m east of Option 1/1B 400m north of option 4	Planning Application	DC/19/01666 (Babergh and Mid-Suffolk: reserved matters approved for 135 no. dwellings, 65 no. bedroom care home and café
400m north of Option 4	Planning Application	B/16/00658 (Babergh and Mid-Suffolk) temporary classrooms- 27,325 sqm
150m south of Option 1/1B	Planning Application	DC/18/04329 (Babergh and Mid-Suffolk) 14 Dwellings
100m east of Option 4	Planning Application	DC/19/04308 (Babergh and Mid-Suffolk) 14 Dwellings

Table 4-1: Local plan allocations and planning applications in close proximity to the scheme

4.3.3 Environmental Policy

A detailed summary of the Environmental Policy can be found in the Stage 1 Environmental Assessment Report (EAR) HE604639-JAC-EGN-SCHW_00-RP-LE-0005. It details the various environmental aspects described in section 2.4 and the associated legislative and policy frameworks for each aspect respectively.

5. Summary of Options

5.1 Alternative Mode Assessment

An assessment of alternative transport modes was made in the Stage 0 Options Assessment Report (OAR). It found that:

- Rail could not provide an attractive alternative to private car for the majority of journeys travelling through A14 Junction 55. Rail is only a suitable alternative for a limited proportion of total trips, mainly for commuters into Ipswich, Colchester and London and longer distances where people are travelling between locations that are close to railway stations. For journeys into central London, the majority of trips would likely already be using rail. For cross-country journeys, with more origins and destinations and where interchange would be required rail may not be a viable alternative in terms of journey time.

- Buses cannot provide an attractive or viable alternative for the majority of trips travelling through A14 Junction 55. Reasonably good services exist between Ipswich and Colchester but beyond this journey times become excessive other than express coaches to the airports. The journey time, frequency and number of route options offered by bus services in the area is poor compared to private car travel, and the percentage of people travelling by bus to work is slightly lower than the national average.

- Improvements to the rail freight capacity in the area are scheduled to increase the capacity on the Felixstowe branch line along with other improvements on the route to the midlands. Increasing the volume of rail freight handled at Felixstowe port could help to reduce the number of HGVs travelling through A14 Junction 55. However, whilst this represents a significant increase in rail freight capacity, it would be unlikely to do more than keep pace with the anticipated growth of Felixstowe Port, leaving a similar proportion of freight to be handled by road. There would still also be a need to distribute freight via road to local destinations not served by rail.

As a result of this assessment, the Stage 0 study concluded that a highways intervention would be required at A14 Junction 55 to facilitate economic growth by accommodating additional vehicle trips, whilst at the same time maintaining the safe and efficient operation of the junction.

5.2 Stage 0 options

As part of the Stage 0 work, options were identified by AECOM and described in the Options Assessment Report (OAR), dated October 2018.

5.2.1 Options recommended for progression

The following options were recommended for progression as a result of the Stage 0 studies.

Name
Option 1: A14 Junction 55 – increase the capacity of the existing junction
Option 2: A14 Junction 55 – free flow A12S – A14E & A14E – A12S link roads
Option 3: A14 Junction 55 – free flow A12S – A42E link road and free- flow A14E – A12S left turn lane

Table 5-1: Stage 0 Options

5.2.1.1 Option 1 (Option 1: A14 Junction 55 – increase the capacity of the existing junction)

Option 1 as shown in Figure 5-1 increases the capacity of the existing junction through widening the circulatory carriageway, including the bridges, and the provision of free flow segregated left turn lanes on three of the four approaches.

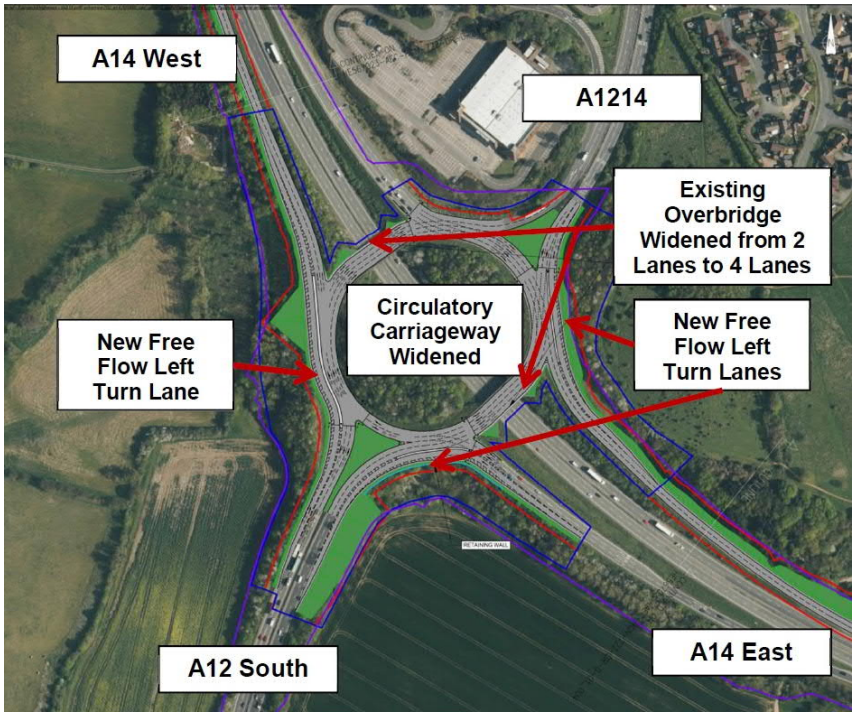


Figure 5-1 - Stage 0 Option 1

5.2.1.2 Option 2 (A14 Junction 55 – free flow A12S – A14E & A14E – A12S link roads)

Option 2 as shown in Figure 5-2 provides new free flow slip roads between A12 south and A14 east in both directions to remove some of the heaviest traffic movements, in particular those associated with flows to/from the Port of Felixstowe, from the junction roundabout.

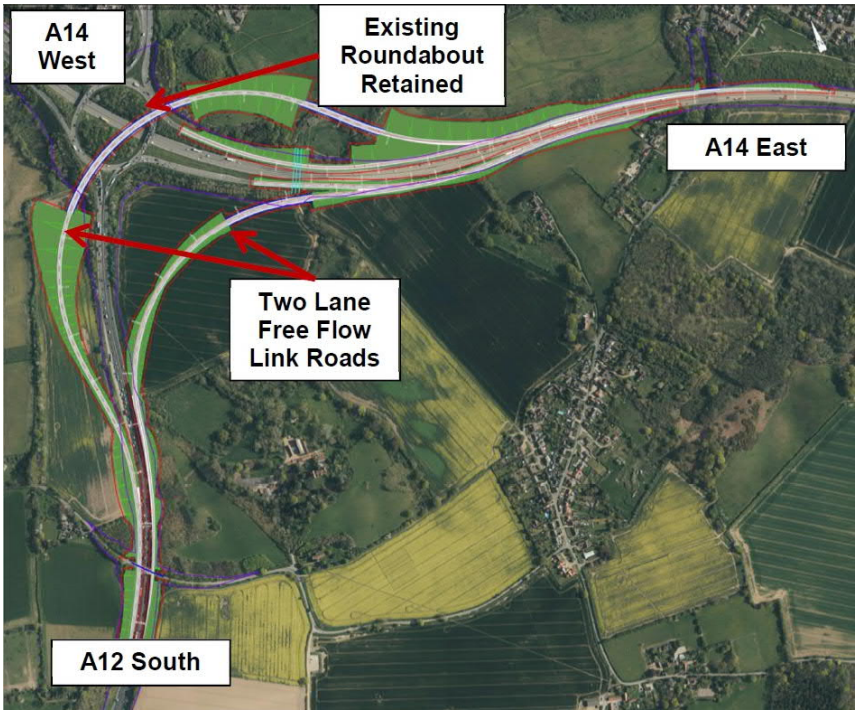


Figure 5-2 - Stage 0 Option 2

5.2.1.3 Option 3 (A14 Junction 55 – free flow A12S – A14E link road and free- flow A14E – A12S left turn lane)

Option 3 as shown in Figure 5-3 is similar in concept to Option 2, providing a new free flow slip road between A12 south and A14 east but for the A14 east to A12 south movement a free flow segregated left turn lane is provided next to the existing junction roundabout rather than it being on a separate alignment.

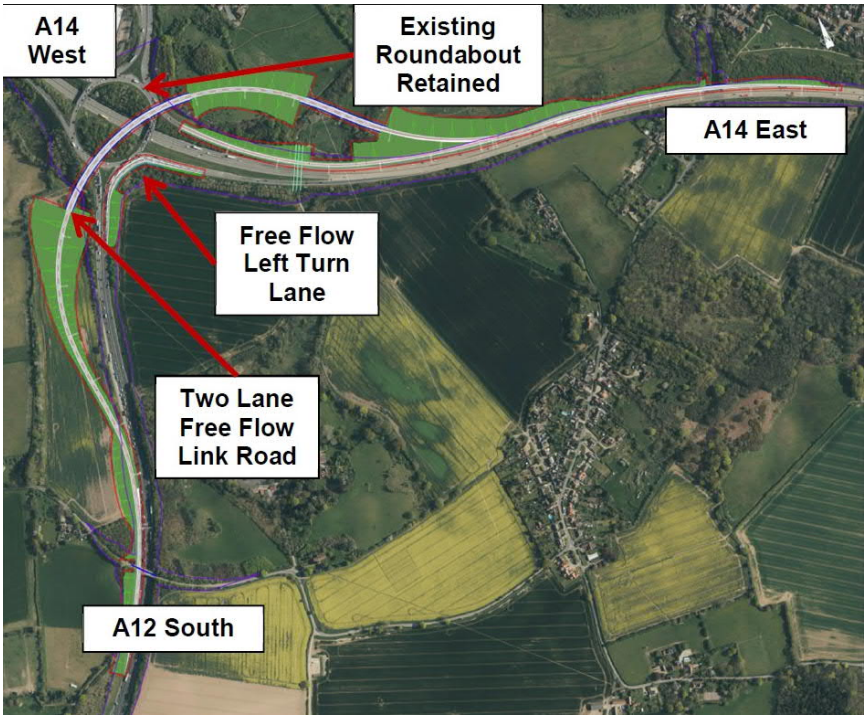


Figure 5-3 - Stage 0 Option 3

5.2.2 Options considered and discarded

During Stage 0 there were some options, developed during previous studies, that were considered and rejected. The Stage 0 Options Assessment Report (OAR) outlined the following options and justification for their rejection.

The Stage 1 objectives for the A14 Junction 55 scheme as covered in section 3 of this report relate to the strategic movement of traffic accessing the Port of Felixstowe. Furthermore, the Value Management Workshop held on 13 August 2020 identified that the focus should be on the traffic movement A12 south to A14 east. These both reinforce the decisions made in Stage 0 to reject these options.

5.2.2.1 Grade separation of A12 South to A1214

This option was rejected because it was seen as promoting car commuting from the A12 into central Ipswich over traffic movements on and off the A14 and there was a risk of community severance, noise and air quality issues in the vicinity of the retail park on the Ipswich side of the A14.

5.2.2.2 Hamburger type junction bridging the A14

A “hamburger” (throughabout) type layout bridging the A14 at the same level as the current roundabout, so providing a shortcut avoiding part of the roundabout, reducing the sets of traffic signals to pass through had been considered. It was rejected because it did not remove traffic from the roundabout and was therefore thought unlikely to achieve sufficient benefits over and above those of increasing the capacity of the existing roundabout in situ to justify the additional cost of a new bridge across the A14.

5.2.2.3 Ipswich Northern Bypass (INB)

A potential Ipswich Northern Bypass (INB) was also considered as part of the A14 Junction 55 study. It was assumed that the INB would run from the A14 to the west of Ipswich to A12 to the north east of Ipswich. It could remove traffic from the A14 around the south of Ipswich but, as such traffic travels underneath A14 Junction 55 on the main carriageways of the A14, it would not remove traffic from the A14 Junction 55 roundabout itself to any significant extent.

It was acknowledged in the Stage 0 work that an INB would significantly improve resilience in and around Ipswich. This is because whenever the A14 is closed, such as when Orwell Bridge is closed due to high winds, traffic diverts through Ipswich due to the lack of suitable diversion routes. An INB would provide such a suitable diversion route and hence significantly improve resilience. However, this benefit would only occur for a limited number of days/ hours per year. In light of the above, it was considered that an Ipswich Northern Bypass should not be considered as an alternative to an improvement at A14 Junction 55.

5.3 Stage 1 options

The three options described in section 5.2.1 were all carried forward into Stage 1 for further development and assessment. A fourth option was developed during Stage 1 as described in section 6.1.4.

6. Summary of Design and Analysis

6.1 Initial Stage 1 Option Development (Design Fix A)

The three options listed in section 5.3 were further developed during PCF Stage 1. An additional option, Option 4 was also added as described in the following sections.

At this stage in design (Options Identification), the detail shown in the figures in section 6 is only indicative and is subject to further design development and refinement. It is envisaged that in the next stages of design, the detail will be further developed to refine the envisaged land take and inform the scheme boundary.

As the scheme specific traffic model was in development at the time of this initial option development, to inform the design and subsequent option sifting a readily available version of Highways England's South East Regional Traffic Model (SERTM) which had been validated in 2015 with updated growth factors was used. This was used as the Do Minimum and the comparator for the proposed options and was based on a design year (15 years post opening) of 2042. Further detail on the traffic modelling can be found in section 6.10.

6.1.1 Option 1 development

The basic layout of Option 1 from Stage 0 was retained. The preliminary traffic information indicated that the A14 westbound on slip, A14 eastbound on slip and A14 westbound off slip would require two lanes and as such require ghost island type merges/diverges onto/off the A14.

Where adjacent to the Belstead Brook, steepened earthworks slopes were used to avoid the earthworks impinging into the flood zone. Locally on the south corner of the roundabout, adjacent to the end of the Belstead Brook culvert under the A12, where there is reduced space, it is envisaged that a vertical retaining wall would be needed to avoid extension of the existing culvert and slopes extending into the flood zone. The layout for Option 1 at Design Fix A is shown in Figure 6-1.

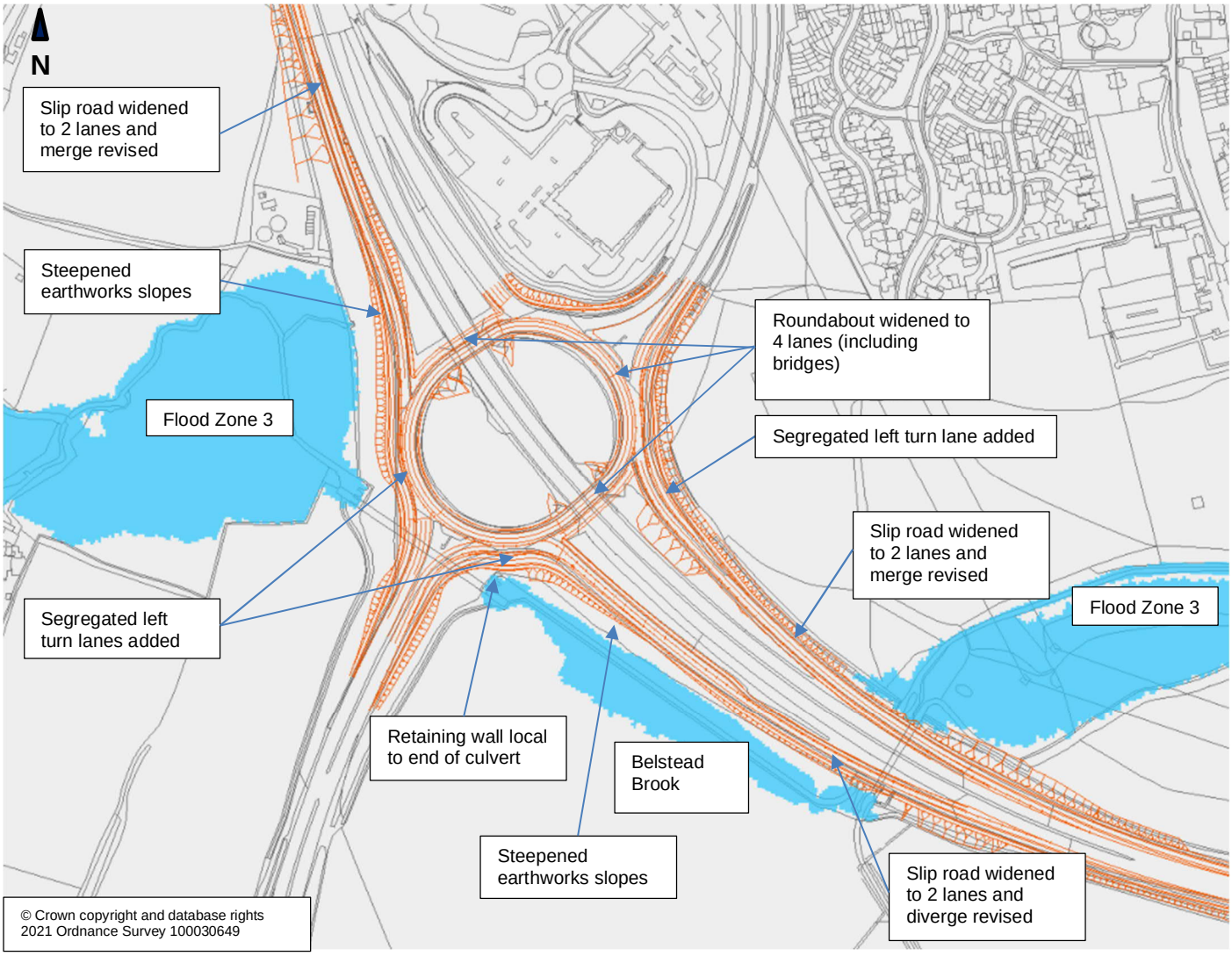


Figure 6-1: Stage 1 Option 1 – Design Fix A

6.1.2 Option 2 development

The basic layout of Option 2 from stage 0 was updated. The alignment of the new free-flowing slip roads was revised, increasing their radius. This was due to changes to Design Manual for Roads and Bridges (DMRB) design standards (CD 122 Layout of Grade Separated Junctions) which would have meant the radii used previously would now constitute departures from standards.

The revised layout rather than having the new free-flowing eastbound slip passing over the junction roundabout had it passing over the A12 then over the slip roads and A14 just east of the junction roundabout. This was considered to be marginally preferable from a buildability point of view and also moved the elevated new slip road slightly further away from the housing north of the A14. A viaduct would be required where the new eastbound slip road passes over the Belstead Brook and flood zone, junction slip roads and the A14. A second viaduct would be required north of the A14 where the new eastbound slip road passes over the Belstead Brook and flood zone again.

Due to the location where the new free-flowing slip roads diverge from and merge onto the A12, the existing Church Road bridge would need to be demolished and replaced on a new alignment

with a longer structure. A length of Oakfield Road would also need to be realigned to accommodate the new eastbound slip road.

In the eastbound direction it was considered preferrable to combine the existing slip road from the Junction 55 roundabout and the new link road before merging onto the A14 to reduce the number of merges onto the A14. Providing at least a 1km minimum weaving distance to A14 Junction 56 as required by standards was an important consideration in developing the layout.

In the westbound direction the existing Grove Hill bridge is a constraint, headroom constraints preventing its widening. Commencing the new link road further east and providing a new bridge over Grove Hill was considered but this would mean that the minimum weaving distance of 1km from A14 Junction 56 would not be provided and such an arrangement with the slip road on a separate alignment would increase impacts on nearby properties. Therefore, the layout was developed with the new slip road commencing immediately west of Grove Hill bridge. The slip roads would then bifurcate with the right fork joining the existing slip to the Junction 55 roundabout and the left fork heading toward the A12.

The layout for Option 2 at Design Fix A is shown in Figure 6-2.

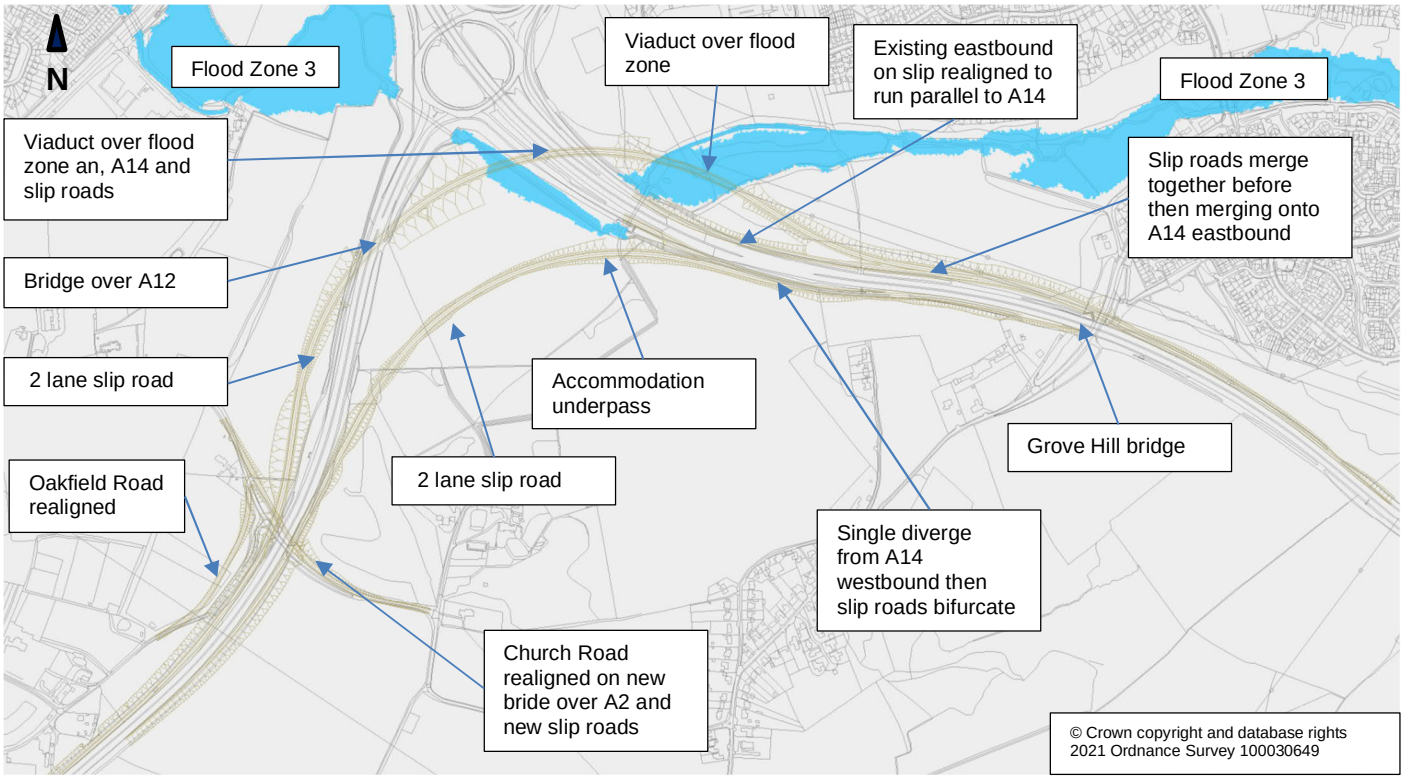


Figure 6-2: Stage 1 Option 2 – Design Fix A

6.1.3 Option 3 development

The basic layout of Option 3 from stage 0 was updated. Similar to Option 2, the design of the A12 (South) to A14 (East) free flowing slip road was revised. The A14 westbound off slip and A12 (East) to A12 (South) segregated left turn lane was updated, similar to Option 1.

The layout for Option 2 at Design Fix A is shown in Figure 6-3.

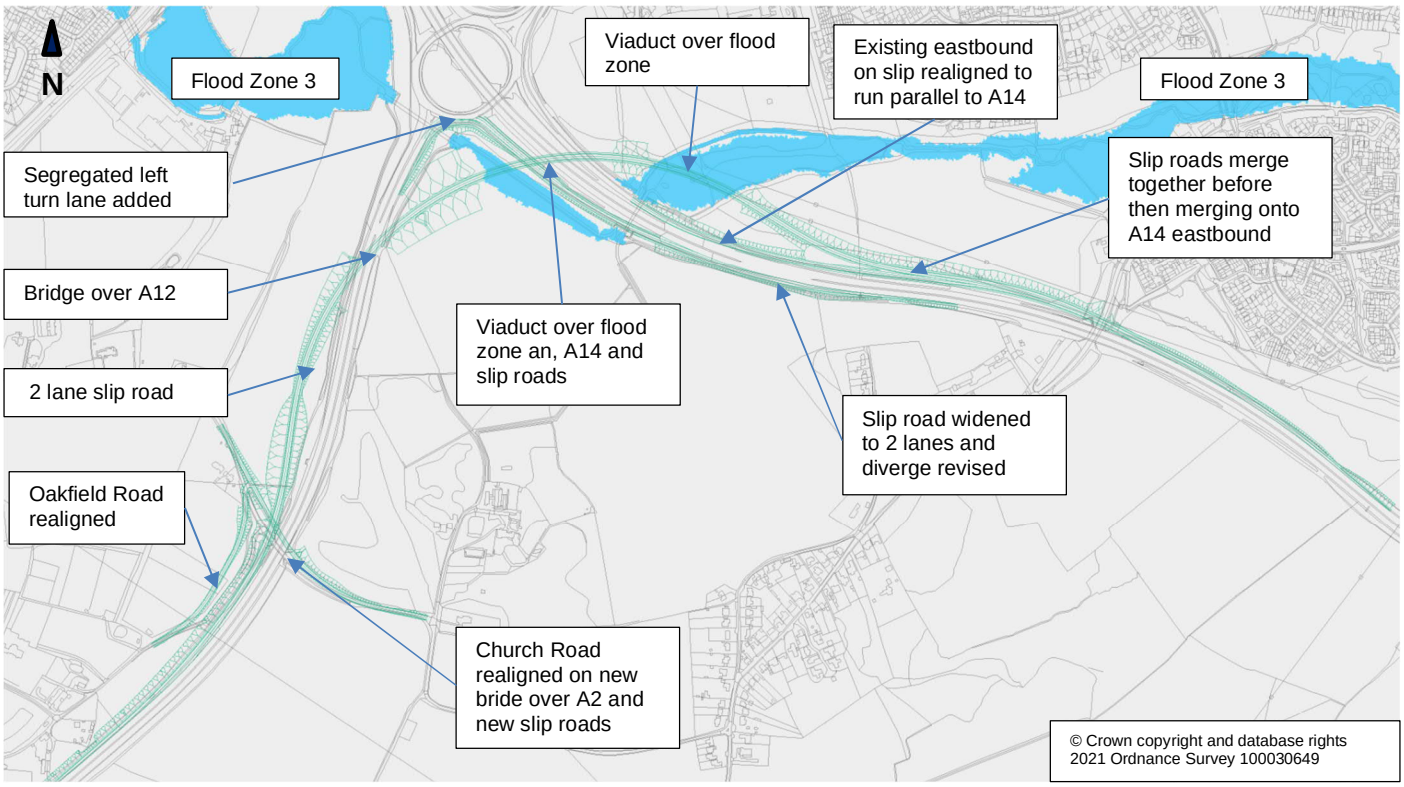


Figure 6-3: Stage 1 Option 3 – Design Fix A

6.1.4 Option 4

As noted for the options above, the Belstead Brook and its flood zone is a key constraint. In Options 2 and 3 there were long viaducts required for the new free-flowing slip roads to cross the flood zone.

Option 4 was developed following similar principles as Option 2, but with the new free-flowing slip roads realigned south-eastward so as to avoid crossing the Belstead Brook flood zone. Rather than requiring viaducts, the new slip road from the A12 south to the A14 east, crosses over the A12 and A14 on bridges.

In the eastbound direction, similar to Option 2 and 3, the slip roads combine before merging onto the A14. In the westbound direction, however, because of the location of the new bridge over the A14, two separate diverges off the A14 are provided, the first for the new slip to the A12, the second the existing diverge to the existing Junction 55 roundabout.

The layout for Option 4 at Design Fix A is shown in Figure 6-4.

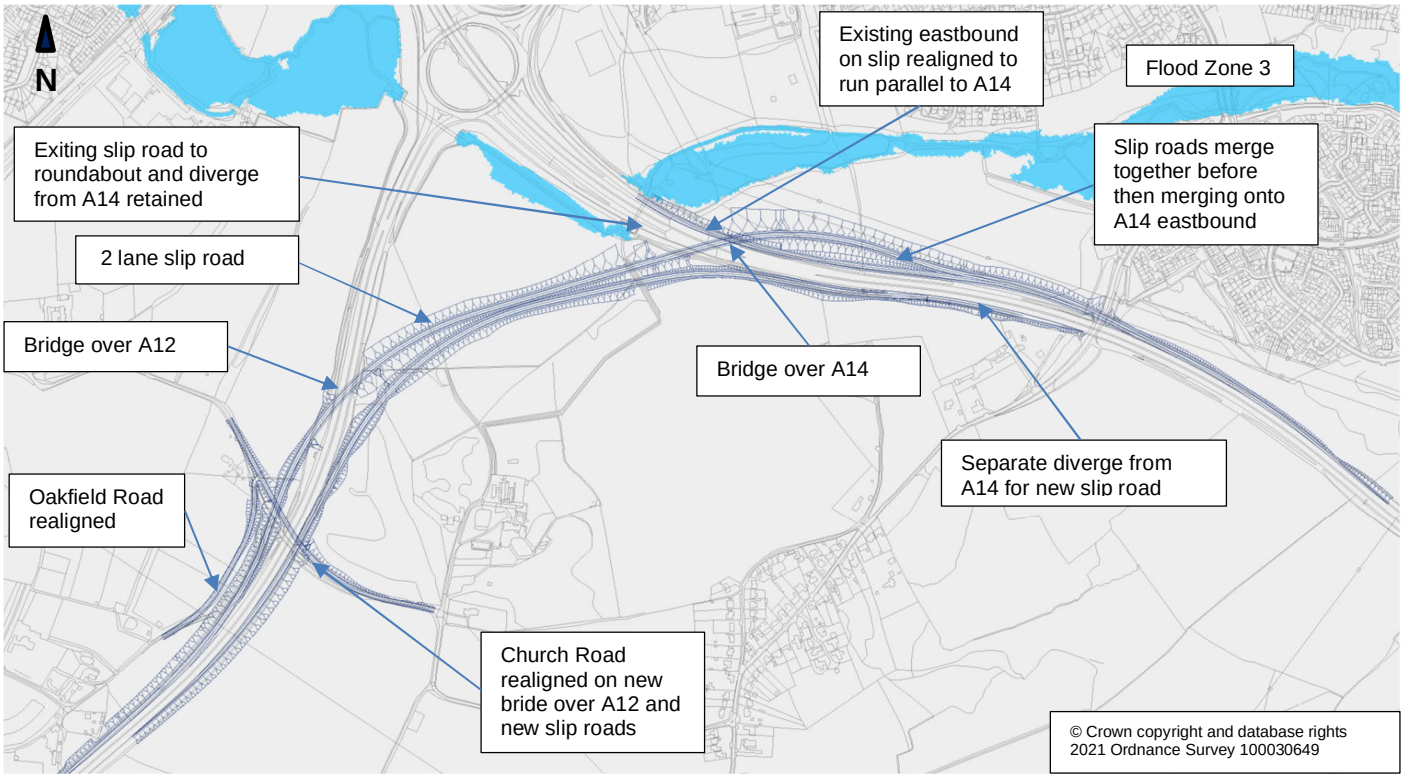


Figure 6-4: Stage 1 Option 4 – Design Fix A

6.2 Sifting

The four options were then sifted with a sifting workshop held on 18th August 2020. The workshop was attended by representatives from Highways England's Project Management team, Operations Directorate, Transport Planning Group, along with the design team.

6.2.1 Sifting Methodology

The Transport Appraisal Process is described in the Department for Transport (DfT) Transport Analysis Guidance. Figure 6-5 shows the overall process.

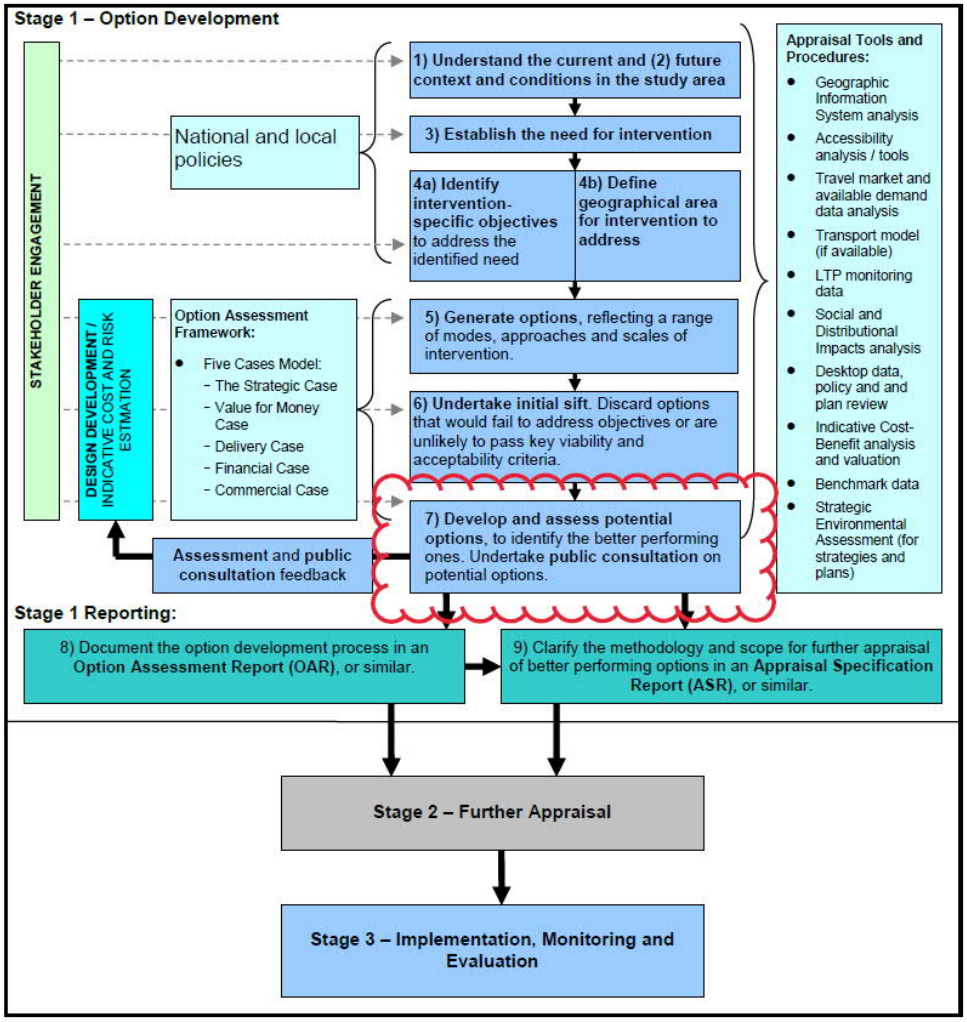


Figure 6-5: Steps in the Stage 1 Process (from DfT Transport Analysis Guidance)

The A14 Junction 55 Copdock Interchange scheme is at stage 7 in the process.

The evidence used for the shortlisting workshop consists of criteria outlined in the Department for Transport's Early Assessment and Sifting Tool (EAST). This in line with the 'Five Case Model' and is typically used in the sifting of transport options, the five cases considered being:

- Strategic
- Economic
- Managerial
- Financial
- Commercial

These EAST criteria were reviewed and tailored to the project requirements by introducing project-specific sub-criteria. Additional criteria were introduced to better capture the planning considerations impacting the project. These are located under Strategic Case.

The list of criteria forming the evidence base for the shortlisting workshop are summarised in Table 6-1. Detailed definitions of the EAST criteria (including extracts from the DfT EAST guidance) and the sub-criteria and the measurement methodology are in Appendix A. Some criteria were not considered because either they were not relevant to the A14 Junction 55 scheme or information was not available at the time of the sifting to inform the scoring.

Cases (Level 1)	Criteria (Level 2)	Comments
Strategic Case	i. Identify problems and objectives of the option	
	ii. Scale of Impact	
	iii. Fit with Wider transport & Government objectives	
	iv. Fit with other objectives	This reflects the intervention objectives
	v. Planning and Land with Implications for Compulsory Acquisition - Fit & Risks'	Added by the Project team
	vi. Key uncertainties	
	vii. Degree of consensus over outcomes	
Economic Case	i. Economic Growth	
	ii. Carbon emissions	Not considered
	iii. Socio-distributional Impacts and the Regions	
	iv. Local environment	
	v. Well-being	
	vi. Expected Value for Money Category	
Managerial Case	i. Implementation timetable from inception to delivery	
	ii. Public acceptability	
	iii. Practical feasibility	

Cases (Level 1)	Criteria (Level 2)	Comments
	iv. Quality of the supporting evidence	
	v. Key risks	
Financial Case	i. Affordability	Not considered
	ii. Capital costs	Not considered
	iii. Revenue costs	
	iv. Cost profile	Not considered
	v. Overall cost risk	
Commercial Case	i. Flexibility of options	
	ii. Source of funding	Not considered
	iii. Generation of income	Not considered

Table 6-1- EAST criteria

6.2.2 Sifting Workshop

The purpose of the workshop was to apply the 35 criteria identified to the four options that were being considered, following Design Fix A. The intention was to agree two preferred options that would be developed in more detail ahead of Design Fix B in October 2020.

The workshop worked through each of the criteria in the 5 cases listed in Table 6-1 and provided a ranking against each of the criteria. The section below does not describe all scores, but for each case describes where there were differences in how the options scored. Full details of the scoring can be found in Appendix B.

Strategic Case

For Fit with Other Objectives: Making the network safer - Options 2-4 scored green, being anticipated to bring a reduction in the Fatal Weighted Index (FWI) measure. Option 1 has changes to the northbound on slip, the one area in the vicinity of the junction where there had been a recent fatality, so this option was scored dark green.

For Fit with Other Objectives: Keeping the network in good condition – designing health and safety into maintenance - Options 2-4 scored green as they had the potential to add off network access, whereas Option 1 would keep existing arrangements and so was scored grey.

For Fit with Other Objectives: Delivery of better environmental outcomes – Option 1 scored grey as the layout largely is restricted within the highway boundary and was considered neutral

whereas Options 2-4 scored amber with Option 4 considered to have a slight disadvantageous impact and Options 2 and 3 a moderate disadvantageous impact.

For Fit with Other Objectives: Improving user satisfaction – based on feedback received in Stakeholder Reference Groups it was considered that an offline approach for the improvement would be more advantageous for the area and potentially offer betterment (linking up severed PROWs) so Options 2-4 were scored green, whereas the online Option 1 was scored grey. The same rationale was applied to the other stakeholder criteria in this and other cases.

For Fit with Other Objectives: Improving WCH links between communities and core traffic generators – Option 1 scored grey as in essence it is the same road layout as existing there is no scope for improvements. Options 2-4 provide scope for improving the network, with Option 2 and 3 scoring dark green as being considered to have greater potential due to larger scheme footprint than option 4 which scored green.

Economic Case

For Economic Growth: Connectivity – Options 2, 3 and 4 scored dark green as they offered larger anticipated journey time savings than Option 1 which scored green.

For Economic Growth: Reliability – Options 2,3 and 4 scored dark green as they provided additional grade separation of movements, as opposed to option 1 which scored green due to an increase in capacity but without additional grade separation.

For Economic Growth: Resilience – Options 2 and 4 scored better, scoring green, due to the free flow links in both directions whilst Options 1 and 3 in not providing an alternative route in both directions scored grey.

For Local Environment: Improve the net environmental impact on communities – whilst options 2-4 take additional traffic away from population areas to the north-east of the junction, in option 2 and 3 there are viaducts across open land, whereas in option 4 with less structures and more earthworks there would be greater potential for screening than the other options. Hence Option 4 was scored as green, the other options grey.

For Local Environment: Reduce the impact of new infrastructure on the natural and historic environment by design – Option 1 keeping broadly the existing layout scored green. The other options scored amber, although Option 4 which avoids flood zone crossings was considered a Slight disadvantageous impact as opposed to Option 2 and 3 which were considered to have a Moderate disadvantageous impact.

For Well-being: Safety – it was considered that as Options 2-4 have a wider safety benefit and scored green, whereas in Option 1 the existing weaving issues on the A12 approach would remain and so was scored grey.

For Well-being: WCH – Options 2-4 scored better, dark green, as they offer the potential to improve the situation, whereas Option 1 scored green.

Managerial Case

For Implementation Timetable from Inception to Delivery – Options 2 and 3 scored grey due to the increased works content in these options, for instance structures, whereas options 1 and 4 scored green.

For Practical Feasibility – Option 1 was assessed as amber due to traffic management considerations, including the widening of the existing junction bridges. Option 2 whilst offline had the largest structural content and so scored grey and Option 3 which was a mixture of online and offline works with high structures content also scored grey. Option 4 scored best, green, due to the works being predominantly offline and with a reduced structures content compared with Options 2 and 3.

Financial Case

For Revenue (operating) Costs – the scores varied depending on how the total length of carriageway and structures fell into pre-defined bands. Option 1 with the shortest total length fell into the dark green band, Option 2 with the longest total length falling into the grey band and Options 3 and 4 falling into the green band.

For Cost Risk – Option 1 was scored amber, it being considered that there was a higher risk of significant cost overruns with online working and widening of existing structures. The other options were scored grey, it being considered there was a moderate risk of cost overruns, but in proportion to the overall size of the option.

Commercial Case

For Flexibility of Options – Option 1 was scored amber as the option is online there is limited flexibility and there are constraints such as the existing junction bridges and the Belstead Brook running close to the existing junction embankment. Options 2 and 4 being offline scored green, it being considered there was good scope to vary the design. Option 3 being part offline/part online scored grey, it being considered there was moderate scope to vary the design.

Sifting Recommendation

Based on a number of the metrics it was concluded that Option 4 was the best performing option against the EAST criteria.

Based on the scores the next best performing arrangement was Option 3. However, this would provide a second offline solution that is a hybrid between Option 1 and Option 2. There are some complexities in the delivery of the option particularly in the south eastern corner of the roundabout, steepened/reinforced slopes being required, and is expected to cost substantially more than Option 1 due to the new eastbound slip road, in particular the length of structures on that.

Whilst Option 1 did not perform as well against the scheme objectives it was considered that at this stage in the project it would be too early to rule out this option, due to the potential benefits it may provide including a lower cost solution offering good journey time savings (although noting that construction delays have not yet been taken into account).

Therefore, the recommendation was made that Option 4 and Option 1 were to be developed further through to Design Fix B.

6.3 Further Stage 1 Option Development (Design Fix B)

6.3.1 Option 1 further development

Following the sifting workshop development of Option 1 focussed on looking at the earthworks and the constraints around the edge of the junction, in particular the flood zones.

Option 1

As noted above, Option 1 uses steepened earthworks slope to avoid earthworks from the widened slip roads and roundabout encroaching into constraints, principally Flood Zone 3 at the base of the embankment.

The most constrained area was the southern corner of the junction roundabout, with the proximity of the eastern end of the Belstead Brook culvert under the A12. A retaining wall was envisaged here, rather than steeper slopes, but the resulting height of the wall was considered difficult to design and construct. The design of the roundabout circulatory carriageway was therefore revised so that in this area there was some widening into the centre of the existing roundabout. This provided an increased distance from the edge of the widened highway to the end of the culvert and reduced the height of the retaining wall to around 5m maximum. The layout for Option 1 at Design Fix B is shown in Figure 6-6.

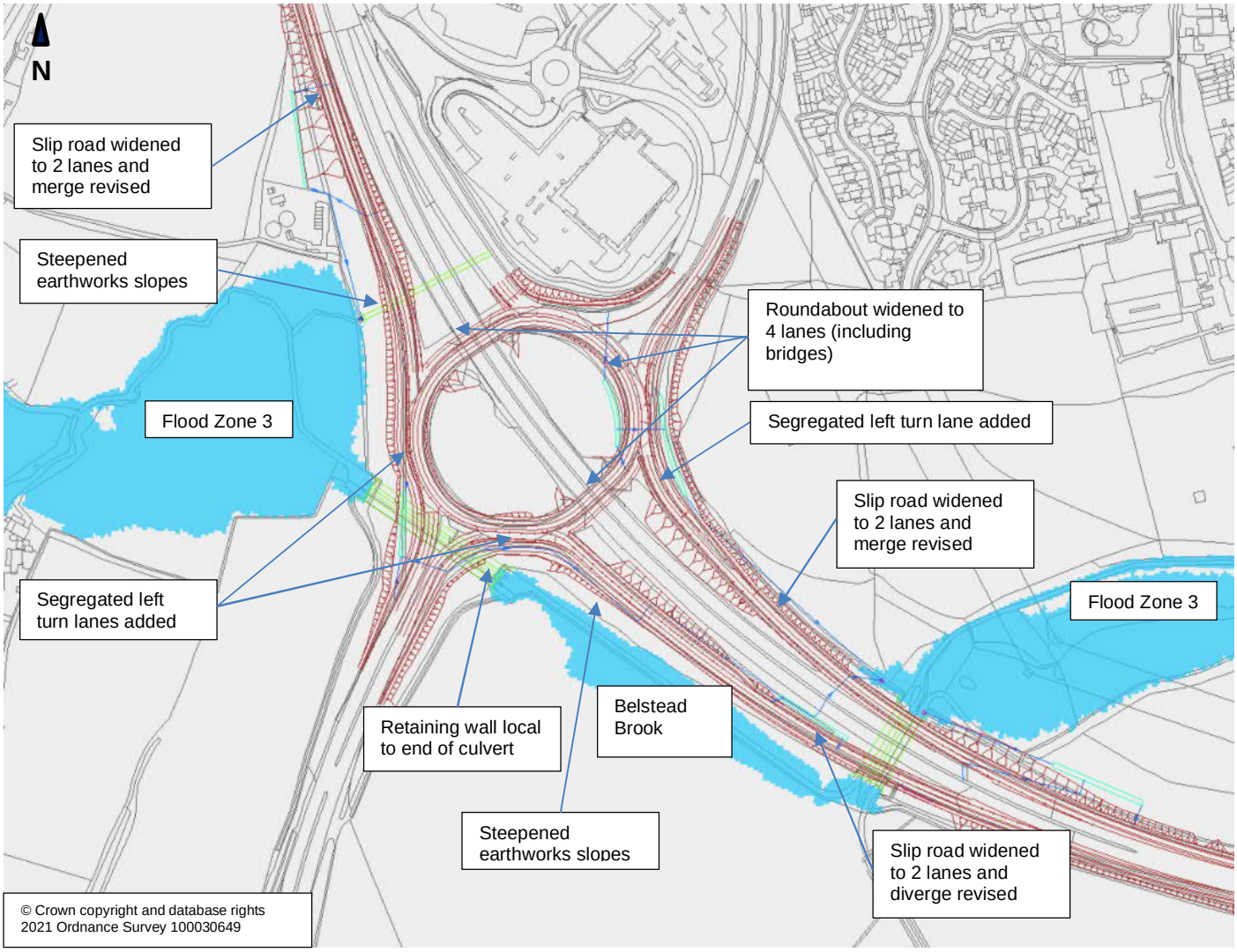


Figure 6-6: Stage 1 Option 1 – Design Fix B

Option 1B – earthworks alternative

A variant of Option 1, termed Option 1B, was developed to explore what the implications would be if normal earthworks slopes were used rather than the steepened slopes / retaining wall. For this a 1:3 slope was assumed. The road layout would be exactly the same as Option 1, the only difference being in the earthworks.

With the normal earthworks slopes the following additional works would be required:

- Flood compensation areas, area of land excavated to create additional flood plain to compensate for flood plain storage lost due to the new embankment footprint
- Realignment of around 160m of the Belstead Brook
- Extension of the Belstead Brook culvert under A12 at both ends
- Increased earthworks fill material requirement

This variant is shown in Figure 6-7.

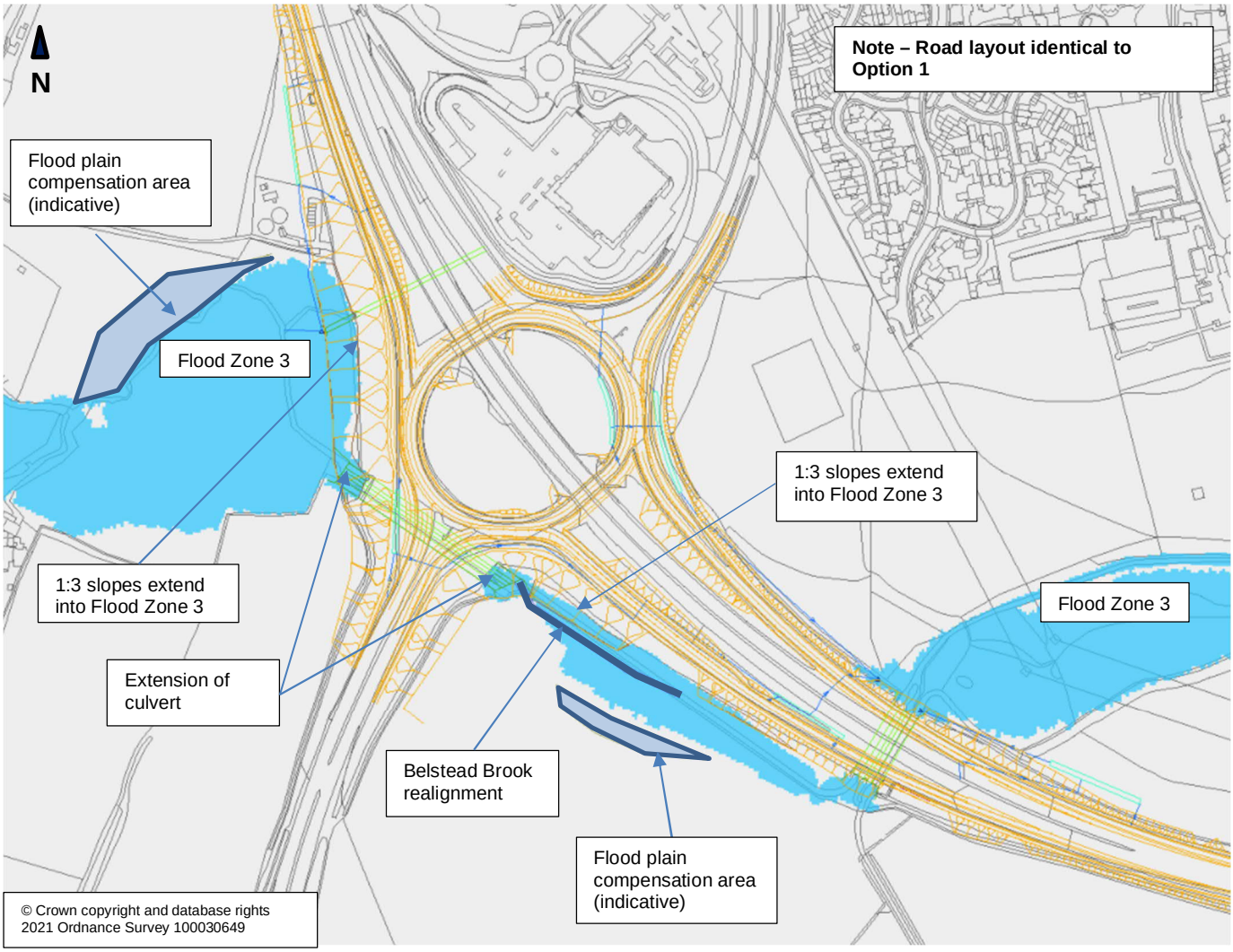


Figure 6-7 - Stage 1 Option 1B – Design Fix B

Highway Drainage

For both variants of Option 1 it is anticipated that the existing highway drainage outfall points would be retained. To mitigate the impact of the additional paved area attenuation storage would be provided to reduce flows, this attenuation being anticipated to generally be in the form of underground storage tanks. Details of any existing treatment facilities in the existing highway drainage system are not known at this time; this would be examined in future design stages and the feasibility of retrofitting new measures explored.

6.3.2 Option 4 further development

Minor adjustments were made to Option 4 earthworks on the southern A12 approach, the layout was otherwise the same as Design Fix A. This adjustment meant a subsequent change in the scheme footprint however it is envisaged that at a later stage in design, this can be potentially designed to minimise the impact on any affected properties.

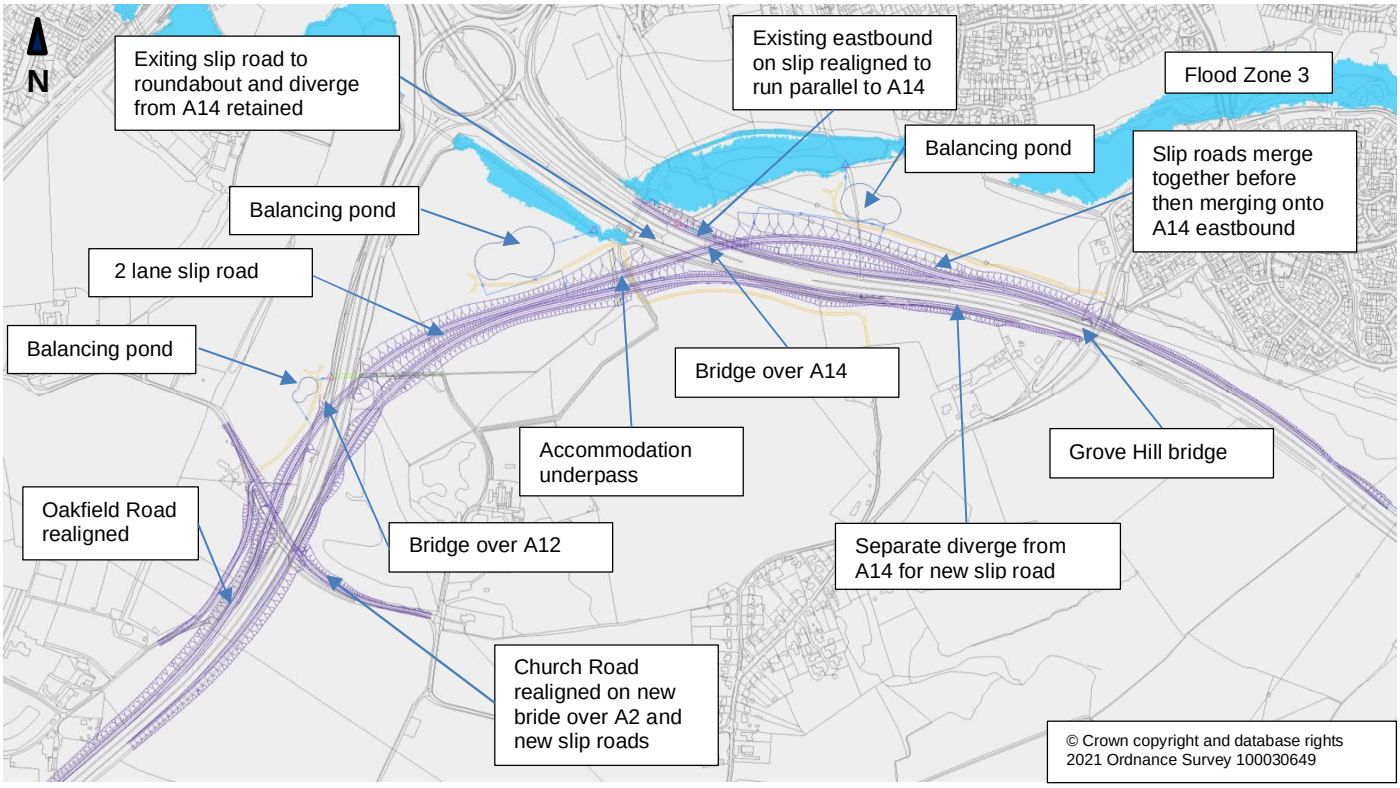


Figure 6-8 - Stage 1 Option 4 – Design Fix B

Highway Drainage

For Option 4 it is anticipated that the existing highway drainage outfall points would be retained for the existing Junction 55 roundabout and slip roads. For the new slip roads new outfalls would be provided with balancing ponds provided to reduce flows down to “greenfield” runoff rates (the rate of runoff from undeveloped land). The balancing ponds would also provide the opportunity to provide vegetative treatment to the highway runoff to mitigate any potential pollution effects.

6.4 Engineering Assessment

6.4.1 Engineering

Geometric Provision

The design has been developed in accordance with DMRB standards, in particular CD 109 “Highway link design”, CD 122 “Layout of Grade Separated Junctions”, CD 127 “Cross-sections and headrooms” and CD 116 “Geometric Design of Roundabouts”

At this stage, some departures from standards have been identified for both Option 1 and 4. The most significant departures for both Option 1 and Option 4 relate to the existing A14 crest curve in the vicinity of Grove Hill Underbridge. The existing crest curve is tighter than the desirable minimum crest curve to current standards. The extended or new slip roads merge/diverge onto/from the A14 in this area and the existing crest curve (and resulting stopping sight distance) being below desirable minimum would be a departure. The geometry of the new slip roads and need to provide separation from A14 Junction 56 mean that the extended or new slip roads have to merge/diverge in this area. To change the crest curvature would require complete

reconstruction of the A14 over a considerable length with very high associated cost and environmental impact hence it is not practicable to do this and so a departure from standard is proposed. The mitigation for the departure will be considered further in future design stages but could include a mandatory 60mph speed restriction in this area.

For Option 4, due to constraints including the existing Grove Hill underbridge the separation between successive diverges from the A14 westbound cannot be achieved. Similar to the crest curve issue, a 60mph speed restriction could be potential mitigation for this.

For Option 1, another consideration is the headroom available for the widened Copdock Mill Interchange north bridge. Due to the constraints of the existing roundabout and A14 levels it is anticipated that it will not be possible to provide the headroom requirements that would normally be applied to new construction works. It is anticipated, though, that the absolute minimum DMRB headroom requirement (the “maintained” headroom for existing structures, compliant with legal requirements) can be provided. This would constitute a departure from standard but such a situation is not uncommon when widening existing bridges.

Departures and mitigation will be given further consideration in future design stages.

Drainage

At this stage, drainage design has been limited to assessment of potential outfalls and calculation of storage requirements. No design of pipe networks has been undertaken.

6.4.2 Constructability

Generally, there is space around the junction to provide reasonable working space for highway construction albeit there are various constraints which the design has to account for.

Option 1/1B

Option 1/1B are 100% online construction and will mean that the works would be delivered in closer proximity to other road users through prolonged periods of traffic management deployment. Option 1/1B provides a more significant traffic management challenge due to its online nature It is envisaged to have the most significant impact on road users through the requisite traffic management. It is also expected that any lane closures would only be allowed overnight (8pm to 6am) and hence the daily working window for contractor is not substantial; this is likely to extend the construction programme with significant amounts of night working being required.

The widening of the two junction bridges are anticipated to be the longest duration construction activity. These works, including construction of the new widened abutments and piling would require traffic management on the A14 mainline. Temporary hardening of the A14 central reserve might be needed to create additional space to allow lanes to be realigned temporarily to facilitate these works. Installation of the beams for the widened bridges would require overnight closure of the A14, with traffic diverted, potentially using the Junction 55 slip roads.

Option 1

In Option 1, the utilisation of steepened slopes to avoid the flood zone constraint at the toe of the embankments requires a strengthened earthworks solution. At this stage a geogrid type solution is envisaged but the solution may vary with further consideration in later design stages. For a geogrid type solution, temporary works would have to be factored in for the temporary excavation required to install the geogrid and backfill the soil. This temporary excavation would likely to

require support (potentially sheet piles), lane closures and (or) narrow lanes to provide sufficient space for the excavation to be undertaken. Temporary safety barriers would be required to protect the excavation works.

Locally, on the south-east corner of the roundabout, adjacent to the Belstead Brook culvert there is insufficient space for a geogrid solution and hence a vertical wall would be required, with a sheet pile wall anticipated. At this stage, it is envisaged that the sheet pile walls would be driven into the ground without the need for pre-augering, potentially avoiding the need for heavy pile driving plant which would require lane closures on site for this activity.

Option 1B

In Option 1B, whilst steepened slopes are avoided, there are other potential complications. The widened earthworks would need to be benched into the existing embankments. With earthworks slopes extending into the flood zone there is potential for flooding to affect the works. Extension of the existing Belstead Brook culvert under the A12 at both ends would be a significant task, with some demolition of the concrete collar headwall to the culvert required to form a joint to allow extra segments to be added. Construction of new aprons and training walls, the realignment of the Belstead Brook itself and excavation for flood compensation storage area would all require working in or adjacent to water.

Option 4

Option 4 is approximately 25% online construction therefore most of the construction works could be undertaken without traffic management deployment or significant disruption to the road user (relative to Option 1A and 1B). Some online works would be needed where the new slip roads tie in to the A12/A14 and for the construction of the new bridges crossing the A12 and A14. Overnight closures of the A12 and A14 would be needed for the installation of beams for the overbridges.

Earthworks volumes

Table 6-2 summarises the earthworks impact of the options. ‘Cut’ is the amount of material to be excavated as part of the construction and ‘Fill’ is the amount of material to form the embankments (new or widened) required. The overall balance (earthworks balance) between these two determines whether material will need to be exported or imported from the area. Whilst all options would require material import, Option 4 requires substantially more earthworks than Options 1 and 1B. The volumes in Table 6-2 are measured from finished ground surface to existing ground surface for the engineering earthworks for the roads; at this stage allowance for topsoil depth and the road pavement construction have not been included. Environmental mitigation bunds have not been designed at this stage and so are not included in these volumes. At this stage it has been assumed that all excavated material will be unsuitable for use in the new/widened embankments.

Option	Cut (m3)	Fill (m3)	Balance (m3)	Import/Export
Option 1	7,930	31,446	-23,516	Import Required
Option 1B	7,704	99,921	-92,217	Import Required
Option 4	92,435	421,762	-329,327	Import Required

Table 6-2: Options Earthworks Quantities

The earthworks design would be refined in future design stages and the volumes quoted above change. A strategy for the sourcing of imported fill would also be developed.

6.4.3 Public Utility diversions

Option 1

Whilst highway infrastructure such as traffic signals, telecommunications and street lighting would need to be replaced where the slip roads and roundabout are widened, the anticipated effect on 3rd party utilities in Option 1 and 1B is anticipated to be limited to where the east facing slips are extended and widened with:

- Diversion of 11kV overhead line that crosses A14 east of Belstead Brook culvert
- Protection of a pumped rising foul watermain east of the Belstead Brook culvert
- Potential modification to service culvert and 40” water main that crosses the A14 east of Belstead Brook.

Details of the diversion works would be developed in future design stages.

Option 4

This option presents more utilities challenges in comparison to Option 1. There following 3rd party utilities works are anticipated:

- Diversion of the 2 132kV overhead lines running north of the A14 as existing pylons clash with the proposed new slip roads and their earthworks
- Diversion of 11kV overhead line that crosses A14 east of Belstead Brook culvert
- Diversion of 40” water main that crosses A14 east of Belstead Brook culvert in a service culvert. The proposed new slip roads including the bridge over the A14 clash with the existing location of the main. Due to alignment design constraints the road layout cannot be revised so, subject to confirmation at a later design stage, the crossing of the main under the A14 would be moved to a suitable location.
- Diversion of a pumped rising foul watermain east of Belstead Brook culvert
- Diversion of utilities in Church Road area

Details of the diversion works would be developed in future design stages.

6.5 Operational Assessment

The nose to tail collisions occurring during traffic flow breakdown can be expected to fall to a greater extent if Option 4 is taken forward as the proposed option. This is due to the option providing free-flowing links between A12 southbound to A14 eastbound and A14 eastbound to A12 southbound thus taking those movements from the junction itself.

Side swipe collisions account 18% (17) of the total collisions. The circumstances prior to the lane change will be explored in both options to determine where mitigation can be provided to reduce the numbers of such collisions.

At this stage it is anticipated that the collision types currently associated to the junction would remain for Option 1, albeit with an objective to achieve a reduction. For Option 4, new collision types and circumstances would likely evolve, but again a reduction in collisions from existing should be anticipated. The scheme, during PCF Stage 2, will set a safety objective, however the reductions proposed may vary for each option.

6.6 Maintenance Assessment

Highways England are responsible for maintaining this junction, including routine and cyclic maintenance.

The proposals at the junction would introduce new maintenance activities including the maintenance of retaining walls, culverts and slopes (and the additional bridges in Option 4), as well as the continued maintenance of existing infrastructure such as signs, street lighting and safety fencing. A key principle of this scheme will be to provide a five-year maintenance free period post construction, as well as exploring opportunities to reduce the maintenance need.

For Option 1, the overall layout would be similar to existing and as such maintenance access arrangements are anticipated to broadly be similar to the existing arrangements, for instance with maintenance laybys adjacent to the traffic signal system control cabinets.

The earthworks solutions in Option 1 were given consideration with discussions with Highways England's specialists, to discuss the merits of Option 1 (with steepened slopes) and Option 1B variant (with 1:3 slopes). For Option 1, it was discussed that for undertaking inspections on a 1 in 1 slope, for the range of heights of slopes envisaged visual inspections would be undertaken from the top and bottom of the slope; for higher slopes the maintainers could utilise a Mobile Elevated Work Platform (MEWP). A maintenance access would need to be provided along the toe of the embankment. Furthermore, it is envisaged that a small berm could be provided hence the detail of this can be developed in later design stages. The sheet pile wall next to the end of the Belstead Brook culvert was considered a workable solution. From a maintenance perspective it was considered that the solution with steeper slopes and the retaining wall was feasible. At this stage, the CDM risks associated with the steep slope and maintenance activities are envisaged to be mitigated with pedestrian guardrails at the back of verge to prevent falls down the slope. A Vehicle Restraint System will be provided (subject to a detailed assessment at a later design stage) to mitigate the inherent risk for road users.

For the Option 1B variant, it was discussed that without the steeper slopes there would be consenting issues with encroachment in the flood zone (also discussed in section 2.5.5 of this report), works to the watercourse and extending the culverts would have their own difficulties and risks and that the amount of earthworks fill material required was substantially greater, leading to this being a more costly solution.

Overall, it was agreed that the steeper slopes and retaining wall would be acceptable and based on the need to avoid encroaching on the flood zone area, was the optimum solution.

For Option 4, for the new slip roads in particular, the possibility exists to improve maintenance access arrangements. For instance, the new drainage outfalls and balancing ponds would have off-network access provided, via new access tracks from local roads.

A more comprehensive assessment of maintenance requirements, including access, will be provided at a later stage. As part of this, consultation with the relevant stakeholders will be undertaken to ensure all maintenance issues are taken account of.

The design should incorporate safe means for maintenance teams to access assets, including the provision of maintenance hard standings within a 300m walking distance to a maintainable asset. The walking route will also need to be safe and off network access is desirable, although where this cannot be achieved the walking route should be protected by safety fencing. One of the laybys on the northbound A12 that will be affected by this scheme does have a maintenance need within it for access too cabinets, and the future access of these cabinets will need to be considered in the design.

6.7 Technology Assessment

As noted in section 2.5.9 there is existing technology on both the A14 and A12 in the area affected by this scheme.

At this stage in design, an allowance has been made for provision of a duct network to cater for any future modifications or upgrades in the operational regime.

In Option 4, as a result of the location of the new slip roads some existing electronic variable message signs would need to be relocated: two MS3 type signs on the A12 northbound, an MS4 type sign on the A14 eastbound and an MS3 type sign on the A14 westbound. The location of the moved signs would be confirmed in later design stages.

For both Option 1 and Option 4, it is expected that Comprehensive CCTV Coverage such as Pan-tilt-zoom (PTZ) cameras will be provided linked to the Regional Control Centre (RCC). CCTV will be used to confirm the presence of incidents and to cover the extent of the junction (both new and existing elements) and diverge/merges.

6.8 Environmental Assessment

This section summarises the environmental assessment that has been undertaken. The full environmental assessment can be found in the Stage 1 Environmental Assessment Report (EAR) HE604639-JAC-EGN-SCHW_00-RP-LE-0005. A comparison summary of the scheme options by topic is in Appendix C.

6.8.1 Air Quality

The air quality modelling for both Option 1/1B and Option 4 shows that there are no predicted exceedances of the Air Quality Strategy (AQS) objectives for NO2 (nitrogen dioxide) or PM10 (particles less than 10 microns in diameter) at any worst-case receptor locations in either the do-minimum or do-something scenarios for the opening year.

As a result of Option 1/1B in the opening year, five residential receptors are predicted to experience an increase in annual mean NO2 concentrations, while two residential receptors are predicted to experience an increase in annual mean PM10 concentrations. As a result of Option 4 in the opening year, four residential receptors are predicted to experience an increase in annual mean NO2 concentrations, while two residential receptors are predicted to experience an increase in annual mean PM10 concentrations. However, the changes in pollutant concentration at all receptors are not significant as the annual average pollutant concentrations predicted for the opening year are below the annual mean AQS objectives for both NO2 and PM10.

The N (nitrogen) deposition rate is predicted to increase slightly at four ecological receptors as a result of Option 1/1B: Bentley Long Wood, Brockley Wood, Stour and Orwell Estuaries and Spring Wood/Millennium Wood. Although the total nitrogen deposition for Option 1/1B is predicted to be greater than the lowest critical loads for four of the five modelled ecological receptors, the residual effects of operational vehicle emissions have been determined to be not significant.

The N deposition rate is predicted to increase slightly at three ecological receptors as a result of Option 4: Brockley Wood, Stour and Orwell Estuaries and Spring Wood/Millennium Wood. Although the total nitrogen deposition for Option 4 is predicted to be greater than the lowest critical loads for four of the five modelled ecological receptors, the residual effects of operational vehicle emissions have been determined to be not significant. However, it should be noted that the change in nitrogen deposition at Spring Wood/Millennium Wood is close to significance threshold.

Construction vehicle emissions impacts have not been assessed at this stage.

6.8.2 Cultural Heritage

Construction would largely result in temporary adverse impacts to a number of built heritage resources, historic landscapes and archaeological remains. These impacts include:

- Minor aural and visual disturbance within the settings of high value listed buildings;
- Partial or complete removal of low or moderate value archaeological remains; and
- Removal of small areas of low or moderate value historic landscapes.

With mitigation, such as vegetation screening or archaeological excavation and recording, these impacts are generally reduced and are not considered to be significant.

Option 4 is likely to result in significant impacts to a number of listed buildings during construction as a result of moderate aural and visual disturbance within the settings of high value listed buildings – Belstead Hall, the Church of St Peter, Church of St Mary, 4 and 5 Holly Lane, Belstead House, and Barn at Belstead Hall.

During the operational stage, impacts to built heritage assets are only likely to occur as a result of Option 4. These impacts are generally not significant and include minor impacts to high value listed buildings due to:

- Realignment and modernisation of Church Lane;
- Visual and aural impacts of the new road traversing the rural landscape; and
- Erosion of the rural character due to the enlarged road system and potential closer proximity of electrical pylons in views (to be confirmed depending on proposals for diversion of utilities).

Two significant impacts have been identified as a result of Option 4:

- Visual and aural impacts of the new road passing through the rural landscape immediately north of the grounds of Belstead Hall, affecting the grade II listed Belstead Hall and grade II listed Barn at Belstead Hall. The impact is unlikely to be reduced with vegetation screening and therefore has potential to be significant.
- Partial and complete removal of two medium value ring ditches.

6.8.3 Landscape and Visual Effects

As a result of the poor intervisibility within the area due to woodland and tree cover, there are unlikely to be any direct effects on the Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB) resulting from the construction or operation of the scheme options.

Option 4 is likely to have significant impacts on the ‘Additional Scheme Area’ associated with the AONB during both construction and operation. This is due to the location of the proposed slip roads, which bisect the corner of the ‘Additional Project Area’ (in a south west to north west trajectory), and as such the works will sit further inside the area compared to Option 1 and Option 1B.

During construction, all options are likely to have significant impacts on the Rolling Estate Farmlands Local Landscape Character Area (LLCA). During operation, only Options 1B and 4 are anticipated to significantly impact the Rolling Estate Farmlands LLCA. This is due to an increased area of vegetation removal in Option 1B and the presence of the additional slip roads, prominent embankment slopes and highways infrastructure in Option 4.

During construction and operation, all options are likely to have significant impacts to the visual amenity of a number of residential, recreational, and commercial receptors. However, Option 4 is likely to have significant impacts to a greater number of receptors during both construction and operation:

- Option 1 – 9 receptors during construction, 3 receptors during operation;
- Option 1B – 11 receptors during construction, 3 receptors during operation; and
- Option 4 – 13 receptors during construction, 12 receptors during operation.

6.8.4 Biodiversity

Option 1 is anticipated to have the least significant impacts on ecological features within the study area, due to its smaller Proposed Scheme extents and lack of modification to existing culverts and channels of Belstead Brook.

Option 1B requires the most works to culverts and channels of Belstead Brook and could potentially have the highest impacts on statutory designated sites downstream of the Proposed Scheme.

Option 4 could potentially have more significant impacts on ecological features as this Option requires substantial works within the flood plain located between the A14 and Belstead Meadows, which is therefore likely to require detailed avoidance and mitigation measures to minimise effects upon designated sites, habitats and species potentially present.

While all options involve the removal of varying extents of semi-natural habitat, which will require mitigation and/or compensation, Option 4 requires the largest area of land take, including land from a non-statutory designated site Belstead Brook Wood County Wildlife Site. This option footprint would include the largest area of Habitats of Principal Importance and would cause fragmentation of retained habitat to the south of the junction.

6.8.5 Geology and Soils

The only likely significant effect predicted at this stage is related to soil quality, as there are no geological receptors and no significant potential sources of land contamination. Soil quality impacts relate to the removal of agricultural land and potential degradation of soil quality during construction, although the latter could likely be mitigated via the implementation of good practice mitigation measures.

Other receptors, namely hydrology, hydrogeology and human health, are unlikely to be impacted by the Proposed Scheme options as there are no significant sources of contamination. This will be confirmed through ground investigation during Stage 2.

6.8.6 Material Assets and Waste

Options 1B and 4 are considered to have potential for significant impacts in relation to waste due to the generation of hazardous waste. In the absence of suitable infrastructure within the East of England region, this could require disposal outside of the region. This significance could be reduced once further information has been determined and a more detailed assessment can be carried out at a later stage.

6.8.7 Noise and Vibration

For Option 1 and Option1B, there are nine residential dwellings within 100-200m, located in a high noise level area (shown on Defra Strategic Noise Maps), that would become closer to the road as

a result of the widened carriageway. Acoustic mitigation measures would be required due to the magnitude of change in noise.

The remaining dwellings and other sensitive receptors within 600m of any new or altered road associated with the Proposed Scheme are unlikely to require acoustic mitigation measures due to separation distances resulting in small magnitudes of change in road traffic noise, or existing dominant sources of road traffic noise.

For Option 4, there are a number of residential dwellings that are likely to require acoustic mitigation due to the magnitude of change in noise levels likely to be experienced. This includes:

- Within 50-100m, 10 dwellings located adjacent to the A14 in a high noise level area;
- Within 100-200m, 136 dwellings located adjacent to the A14 in a high noise level area, and 3 residential dwellings are located adjacent to the A12;
- Within 200-300m, 2 residential dwellings are located adjacent to the A12, adjacent to proposed alignment; and
- Within 300-600m, 43 dwellings located in Belstead would experience increase road traffic noise due to a new link closer to the village.

6.8.8 Population and Human Health

No significant impacts are anticipated to land use and access receptors (i.e. walking, cycling and horse riding, private properties, development land and businesses, agricultural land holdings, and community assets) as a result of construction or operation of Option 1 and1B. Options 1 and 1B are anticipated to have largely neutral or positive impacts on human health determinants during construction, due to:

- Temporary diversions of public rights of way, provision of replacement access to open and natural green space, and maintaining accessibility; and
- Provision of net additional employment opportunities in the local area.

In contrast, there are a number of significant adverse impacts to land use and access receptors associated with Option 4, including:

- Potential partial closure of some PRoW routes;
- Access restrictions or disruptions to residential properties along Oakfield Road (west of A12) and Grove Hill Road (south of A14), as well as business premises along A12 (e.g. Copdock Kennels), London Road and Church Lane.
- Reduced amenity to community assets (e.g. St Marys Church ground and Burnet Meadow open space) due to increased visual and dust disturbances during construction. Additionally, there could be reduced usage of these facilities during the construction; and
- Permanent land take of Grade 2 agricultural land is expected from construction of this option. The actual amount of land take would be calculated in later stages of design; however it is anticipated to be comparatively larger than for Options 1 or 1B.

Impacts to human health determinants are mixed for Option 4, with a negative effect on access to green space and nature. Although attempts would be made for PRoW access to be maintained throughout the construction period and where possible to maintain access to existing natural spaces, there would still be a degree of disruption faced by the people who would want to visit these green spaces.

During operation, with increased capacity of the junction from all options, there could be quicker access to these businesses, resulting in possible higher footfall resulting in negligible positive benefit to the surrounding businesses. Similarly, the operation of the Scheme may improve accessibility to local employment and training opportunities with indirect benefits on mental health and well-being.

6.8.9 Road Drainage and Water Environment

Surface Water Quality

Increase in traffic volume could result in potential adverse impact on water quality due to an increase in polluted runoff. Without appropriate mitigation (e.g. attenuation ponds) this could result in potentially significant effects. Option 4 includes proposals for balancing ponds, providing flow attenuation and treatment for water quality impacts for the new slip roads, mitigating these potentially significant effects. In Option 1 and 1B it is anticipated that some flow attenuation will be provided in the form of enlarged pipes, underground tanks or ditches depending on the location. For Options 1 and 1B, treatment for water quality effects would be considered in later more detailed design stages, including the existing drainage system, what existing measures are present and the potential to retrofit additional measures.

Hydromorphology

Option 1 would have the least impact on hydromorphology of the watercourses identified within the study area as it does not introduce new culverts. Both Option 1B and Option 4 have the potential to result in significant effects as a result of proposed culverting of watercourses. Option 1B includes a 29m extension of the A12 culvert on the Belstead Brook, resulting in a 160m long structure and Option 4 would introduce two additional culverts on Unnamed Watercourse 1, resulting in a loss of over 200m of existing channel morphology.

The outfalls proposed on Belstead Brook and two Unnamed Watercourses for Option 4 have the potential to result in significant effects without appropriate design and mitigation. Similarly, without appropriate design and mitigation, the realignments proposed on the Belstead Brook for Option 1B and on Unnamed Watercourse 1 for Option 4 would also have the potential to result in significant effects.

Groundwater

The Proposed Scheme lies within a groundwater Source Protection Zone (SPZ) 3 associated with a groundwater abstraction situated approximately 2 km to the east of the existing junction 55 roundabout.

Option 4 is likely to result in more potentially significant effects to the groundwater environment than Option 1 and 1B during construction and operation. This is largely due to new cuttings which may require dewatering during construction, and potentially during operation. Furthermore, Option 4 is located closer to secondary groundwater receptors including groundwater abstractions. For Option 1, where cuttings are proposed, they are relatively shallow and involve widening of existing cuttings and as such these cuttings are unlikely to significantly alter the exiting groundwater regime.

Flood Risk

Across all options, construction activities such as temporary earthworks and general site activities taking place in the floodplain of all watercourses have the potential to create a temporary loss of floodplain storage. Alterations to culverts and other structures conveying water could also result in

a temporary loss of capacity and the potential blocking of drainage systems with construction debris would reduce capacity, which has potential to increase flood risk.

Option 1B encroaches into Flood Zones 2, 3 and 3b associated with the Belstead Brook. Alterations to the A12 culvert could affect flood flow conveyance and remove floodplain storage, where new infrastructure (such as culverts and road embankments) are located within the floodplain. There is potential for floodplain compensation to mitigate for the flood risk impacts although this would have to be assessed at a later stage. Hydraulic modelling during later stages would enable fluvial flood risk to be refined.

Option 4 includes a proposed crossing at the confluence of two sections of Unnamed Watercourse 1. This could impact existing surface water flood risk, potentially obstructing or altering existing surface water flows. However, with suitable mitigation in the design of the culvert crossing, this aspect of Option 4 may not be a distinguishing potential impact in relation to flood risk of this option.

6.8.10 Climate

Carbon

- Option 1 is expected to have the lowest embodied carbon as it has the lowest amount of cut and fill earthworks. With steeper slopes and smaller footprint than Option 1B, the quantity of materials required is expected to be lower.
- Option 1B is expected to have higher embodied carbon than Option 1, but lower than Option 4. More materials will be required due to the larger footprint and, as this option extends into the flood zone, additional measures will be required to increase the resilience of the infrastructure.
- Option 4 is expected to have the highest embodied carbon due to a more than 300% increase in earthworks required, increased sign removal and outbuildings and the additional free flow link roads.

Resilience

- Option 1 will have a minimal impact on the flood zone, reducing potential impacts to the assets and their operation, maintenance and refurbishment, as well as users.
- Option 1B extends into the flood zone, increasing the potential impacts to the assets and their operation, maintenance and refurbishment, as well as users. The construction phase also faces an increased risk of site flooding.
- Option 4 avoids the flood zone and increases capacity of the hydrological network (through provision of balancing ponds) and is therefore considered to be the most resilient option in terms of climate change and user resilience.

6.9 Walking Cycling Horse-Riding Assessment

Scheme specific objectives for WCH users have yet to be determined by the scheme, however, a specific project objective has been detailed as follows; 'Helping cyclists, walkers, and other vulnerable users of the network'.

Utilising the above objective, it is currently considered that Option 1 will not have a WCH remit. This is in part due to the scope and scale of the option considered against any works that could be required and secondly, there not being a readily direct improvement for conditions as part of the schemes scope.

For Option 4, the scheme will continue to accommodate the PRoW routes it will sever, and where practical improve the network affected where practical. Once the WCH assessment takes place in Stage 2, the opportunities and scope of works can be better defined.

For Option 1, there are no permanent impacts to WCH routes; Washbrook BR53 may be impacted during construction works associated with the A14 slip roads, but these will be managed through the to be developed Traffic Management Plan.

For Option 4, the WCH routes around Belstead will be severed by the proposal and as such will require accommodation/re-routing as part of the schemes scope. Belstead BR39 is also likely to be impacted during construction, but these impacts will be managed through the to be developed Traffic Management Plan.

As previously mentioned, a site visit for the WCH Assessment has not yet taken place, including the formal consultation with user groups. However, an early stakeholder reference group has identified that some PROWs could be converted to bridleways and that safety concerns at the junction mean that the perceived WCH usage at the junction is very low.

6.10 Traffic Analysis

This section presents a summary of the traffic forecasting appraisal work that has been completed for the Stage 1 A14 Junction 55 Copdock Interchange Junction improvement Scheme.

This section is structured as follows:

- Modelling Approach – overview of methodology for Stage 1;
- Traffic Forecasting – summary of traffic forecasting and outputs; and
- Impact of Scheme Options – summary of scheme impacts.

Reference should be made to the following reports for further information:

- Transport Data Package HE604639-JAC-HTP-SCHW_00-RP-TR-0001
- Transport Modelling Package HE604639-JAC-HTP-SCHW_00-RP-TR-0004
- Transport Forecasting Package HE604639-JAC-HTP-SCHW_00-RP-TR-0005
- Combined Modelling and Appraisal Report HE604639-JAC-HTP-SCHW_00-RP-TR-0007

6.10.1 Development of the Traffic Model

Modelling Approach

Highways England have developed five strategic traffic models to assess the regional impacts of packages of significant Road Investment Strategy (RIS) schemes. The South East Regional Traffic Model (SERTM), is the relevant regional model to A14 Junction 55, the version of that being used being SERTM v1.4.

The 'A14 J55 Copdock Interchange SERTM' model has been developed from SERTM v1.4 for the sole purpose of appraisal of the A14 Copdock Interchange scheme.

The 'A14 J55 Copdock Interchange SERTM' model is comprised of a highway model and a variable demand model (VDM). A summary of the key elements of the model are outlined below.

Travel Demand Data

Existing transport data was utilised to provide as up to date information on travel demand (both patterns and volumes) and network performance as was available. The model represents traffic conditions for an average weekday in March 2019. It should be noted that due to time constraints and the current situation with Covid19, it was not possible to commission a new traffic data collection for this stage of model development.

The existing transport data collation included the following elements:

- Automatic Traffic Counts (ATC);
- manual Classified Counts (MCC);
- Junction Turning Counts (JTC);
- A number of different traffic models;
- DfT Road traffic Statistics ; and
- DfT Teletrac data.

The majority of the travel demand within the A14 Copdock Interchange model comes from the parent SERTM model (developed from mobile phone data with a base year of 2015). This travel demand was further enhanced via zonal disaggregation within the Ipswich area and the incorporation of travel data from the Suffolk County Transport Model.

The highway network component of the model was developed from SERTM but enhanced with reference both to the Suffolk County Model and also with additional link density and node structure added to the model to assist in its representation of the network supply in the local scheme area.

Assignment Models

The model includes a highway network developed in SATURN software. In line with Highways England guidance, the network for the A14 J55 Copdock Interchange Model makes use of a two-stage structure, with levels of detail reducing away from the centre of the study area. The breakdown of the proposed network structure will therefore be:

- Fully Modelled Area:
  - Area of Detailed Modelling; and
  - Rest of the Fully Modelled Area.
- External Area

In the detailed model area, intersections are modelled explicitly allowing for "blocking back" from upstream junctions with an increased level of network density modelled. Outside of the detailed model area, more emphasis is placed on modelling the strategic road network to accommodate traffic volumes to and from the external areas.

Assignment Model Time Periods

The assignment model represents the following time periods:

- Morning Modelled period to be an average hour over the period 07:00-10:00;
- Interpeak period to be an average hour representation of 10:00-16:00
- Evening modelled period to be an average hour representation of 16:00-19:00

Demand Model

A demand model has been developed in DIADEM and HEIDI software. The key characteristics of the model include:

- Macro time period choice – whether to travel in the AM peak, Inter peak, PM peak or Off-Peak period;
- Mode choice – whether to travel by car or public transport (PT); and
- Distribution (destination choice) – whether to travel to one destination or another

As in the case of SERTM, the trip frequency response is not used in the A14 J55 VDM, but the time period, mode and distribution responses are each applied to all the variable demand segments

Each of these models will be applied based on changes in “generalised cost” (which includes both monetary costs and travel time) by mode, time period and movement.

6.11 Traffic Forecasting

Traffic forecast have been developed for the following years and each model period:

a) 2027 which represents the opening year of the scheme

b) 2042 which provides an estimate of the scheme impact 15 years after opening (the design year)

c) 2051 the furthest year in the future for which national travel demand projections are available and provides a further reference point in the 60-year appraisal period for economic assessment. Thus, also reducing uncertainty in extrapolation from 2042 to end of 60 year.

This is consistent with TAG guidance which suggests 15 years after opening is a typical assumption for the design year.

6.11.1 Transport Demand

An inventory of future year proposed land-use changes has been documented in a model development uncertainty log. This log provides a listing of housing and employment development sites with information gathered from the following Local Authorities:

- Suffolk County Council
- Cambridgeshire County Council
- Essex County Council
- Highways England

The development of future year travel demand forecasts has accounted for the inclusion of developments that have been classified with an uncertainty level of “near certain” or “most likely”.

Future year traffic forecasts have been constrained to National Trip End Model growth (TEMPRO version 7.2) through the use of HEIDI. Traffic growth has been distributed spatially to proposed future development sites and has then been constrained to NTEM growth in accordance with DfT Transport Appraisal Guidance.

Reference should be made to the A14 J55 Copdock Interchange Transport Forecasting Package HE604639-JAC-HTP-SCHW_00-RP-TR-0005 for further information.

6.11.2 Transport Supply

Provided below are the transport supply assumptions for the without schemes and with scheme scenarios.

Without Scheme Scenario

The development of future year without scheme highway networks have accounted for the inclusion of scheme that have been classified with an uncertainty level of “near certain” or “most likely”.

Table 6-3 below presents the highway schemes that have been included in the development of future year models. These listed schemes have been identified from reference to the model development uncertainty log.

No	Schemes	Year
1	A14 Cambridge to Huntingdon	2020
2	A12 Chelmsford to A120 widening	2025
3	A47 & A12 junction enhancements	2021
4	M25 Junction 28 improvement	2022
5	M11 Junction 7 junction upgrade	2021
6	M11 junction 7a	2022
7	A120 between Braintree and the A12	2027
8	A120 to A133 Link Road	2024
9	A133 Colchester to Clacton route improvements	2020
10	Chelmsford north east bypass	2025
11	Radial Distributor Road 1	2024
12	Radial Distributor Road 2 in North East Chelmsford	2022

Table 6-3 - Highway schemes included in model development

With Scheme Scenario

The stage 2 appraisal comprised of the assessment of two potential scheme options. Characteristics of each scheme option specific to the modelling are listed below.

Option 1 – online option with widening of roundabout circulatory carriageway, widening of slip roads, addition of segregated left turn lanes – as described in sections 5.2.1.1, 6.1.1 and 6.3.1

Option 4 – offline option with new free flowing links between the A12 and the A14 east – as described in sections 6.1.4 and 6.3.2

As Option 1B has the same road layout as Option 1, no separate modelling of this option was required.

6.12 Impact of Scheme Options

The impact of scheme options is presented below with reference to the following key points of interest:

- Forecast Traffic Flow Volumes
- Journey Time Reduction

The two assessments have been selected as they clearly highlight the impact of both the scheme options with reference to relieving congestion and improving connectivity between the road network. Further traffic and economic impacts are detailed in the Transport Forecasting Package and Combined Modelling and Appraisal Report.

6.12.1 Traffic Flows

Forecast daily flows given by the traffic modelling for 2019 and 2042 with the scheme being implemented (Do Something - DS) and without the scheme being implemented (Do Minimum - DM) are shown in Table 6-4. The Annual Average Daily Traffic (AADT) is presented.

Movement	Forecast Daily Flow 2019 AADT	Forecast Daily Flow 2042 DM AADT	Forecast Daily Flow 2042 DS Option 1 AADT	Forecast Daily Flow 2042 DS Option 4 AADT
A12 (South) to A14 (East)	10,311	11,168	13,106	16,677
A14 (East) to A12 (South)	10,723	13,586	14,913	15,991
A12 (South) to A14 (West)	8,691	9,993	12,714	11,900
A14 (West) to A12 (South)	9,492	11,902	11,969	12,388
A12 (South) to A1214 (North)	5,190	4,950	7,746	6,650
A1214 (North) to A12 (South)	5,945	7,739	7,403	7,371

Table 6-4 - Forecast Traffic Volumes (Do Minimum and Do Something) (vehicles)

The forecast traffic flows for the morning peak, inter-peak and evening peak periods with the scheme options in place (Do Something - DS) and without the scheme options in place (Do Minimum - DM) are shown in Table 6-5 to Table 6-7.

Movement	Do Minimum Forecast Peak Flow			Do Something Forecast Peak Flow			
				Option 1 (increasing capacity at Interchange)		Option 4 (decreasing traffic at Interchange)	
	2019	2042	Net Increase	2042	Net Increase from 2042 DM	2042	Net Increase from 2042 DM
A12 (South) to A14 (East)	771	921	150	1029	108	1373	452
A14 (East) to A12 (South)	939	1,062	123	1257	195	1380	318
A12 (South) to A14 (West)	683	725	41	1090	366	1044	319
A14 (West) to A12 (South)	865	936	71	832	-104	962	26
A12 (South) to A1214 (North)	370	278	-93	733	456	633	356
A1214 (North) to A12 (South)	314	540	227	502	-38	440	-100

Table 6-5 - Do Minimum and Do Something Traffic Flows (AM Peak) (vehicles)

Movement	Do Minimum Forecast Peak Flow			Do Something Forecast Peak Flow			
				Option 1 (increasing capacity at Interchange)		Option 4 (decreasing traffic at Interchange)	
	2019	2042	Net Increase	2042	Net Increase from 2042 DM	2042	Net Increase from 2042 DM
A12 (South) to A14 (East)	716	762	46	902	140	1033	271
A14 (East) to A12 (South)	603	923	320	943	20	986	63
A12 (South) to A14 (West)	571	705	134	807	102	761	56
A14 (West) to A12 (South)	528	754	226	769	15	768	14
A12 (South) to A1214 (North)	316	330	14	418	88	414	83
A1214 (North) to A12 (South)	438	525	87	538	13	526	1

Table 6-6 - Do Minimum and Do Something Traffic Flows (Inter-peak) (vehicles)

Movement	Do Minimum Forecast Peak Flow			Do Something Forecast Peak Flow			
				Option 1 (increasing capacity at Interchange)		Option 4 (decreasing traffic at Interchange)	
	2019	2042	Net Increase	2042	Net Increase from 2042 DM	2042	Net Increase from 2042 DM
A12 (South) to A14 (East)	771	776	5	947	171	1371	595
A14 (East) to A12 (South)	947	1,010	62	1158	148	1260	250
A12 (South) to A14 (West)	681	748	67	963	215	866	118
A14 (West) to A12 (South)	816	988	173	1082	94	1075	86
A12 (South) to A1214 (North)	494	490	-4	665	175	457	-33
A1214 (North) to A12 (South	525	641	116	557	-84	634	-7

Table 6-7 - Do Minimum and Do Something Traffic Flows (PM Peak) (vehicles)

It can be seen that for the movements between the A12(South) and A14 (East) Option 4, with the free-flowing links and so significantly increased capacity, results in a larger increase in flow (and traffic throughput) than Option 1. For the other movements, the differences between the options vary.

Changes in traffic flows in the wider network around A14 Junction 55 are shown in the figures in Appendix E. Of particular note in these figures is the reduction in northbound traffic flow on London Road (the old A12) through Copdock and Washbrook, which was identified in section 2.3.5 as a route suffering from "rat-running": 72% reduction with Option 1 and 77% reduction with Option 1 in the morning peak in 2042 and to 53% reduction with Option 1 and 41% with Option 4 in the evening peak in 2042.

6.12.2 Journey Times

Forecast journey times with the scheme being implemented (Do Something - DS) and without the scheme being implemented (Do Minimum - DM) are shown in Table 6-8 to Table 6-10.

Movement	Do Minimum Forecast Journey Times			Do Something Forecast Journey Times			
				Option 1 (increasing capacity at Interchange)		Option 4 (decreasing traffic at Interchange)	
	2019	2042	Net Increase	2042	Net Increase from 2042 DM	2042	Net Increase from 2042 DM
A12 (South) to A14 (East)	7.3	9.9	2.6	6.2	-3.7	4.4	-5.5
A14 (East) to A12 (South)	4.1	6.6	2.5	5	-1.6	3.9	-2.7
A12 (South) to A14 (West)	6.6	9	2.4	4.9	-4.1	5.4	-3.6
A14 (West) to A12 (South)	5.3	6.4	1.1	8.6	2.3	5.9	-0.5
A12 (South) to A1214 (North)	5.5	7.5	2	3.5	-4	3.6	-3.9
A1214 (North) to A12 (South)	2.8	3.1	0.3	3.2	0.1	3.1	0

Table 6-8 - Do Minimum and Do Something Journey times (AM Peak) (minutes)

Movement	Do Minimum Forecast Journey Times			Do Something Forecast Journey Times			
				Option 1 (increasing capacity at Interchange)		Option 4 (decreasing traffic at Interchange)	
	2019	2042	Net Increase	2042	Net Increase from 2042 DM	2042	Net Increase from 2042 DM
A12 (South) to A14 (East)	4.7	7.2	2.5	5.2	-2	3.7	-3.5
A14 (East) to A12 (South)	3.6	4.2	0.6	4	-0.2	3.6	-0.6
A12 (South) to A14 (West)	4	5.7	1.7	4.3	-1.4	4.4	-1.3
A14 (West) to A12 (South)	4.4	5.2	0.7	5.2	0	4.9	-0.3
A12 (South) to A1214 (North)	3.2	4.5	1.4	3.2	-1.4	3.1	-1.5
A1214 (North) to A12 (South)	2.7	3.1	0.4	3.2	0.1	3	-0.1

Table 6-9 - Do Minimum and Do Something Journey times (Inter-peak) (minutes)

Movement	Do Minimum Forecast Journey Times			Do Something Forecast Journey Times			
				Option 1 (increasing capacity at Interchange)		Option 4 (decreasing traffic at Interchange)	
	2019	2042	Net Increase	2042	Net Increase from 2042 DM	2042	Net Increase from 2042 DM
A12 (South) to A14 (East)	7	9	2.1	6.2	-2.8	4.8	-4.2
A14 (East) to A12 (South)	4.4	6.4	2	5.1	-1.3	4	-2.4
A12 (South) to A14 (West)	4.8	6.7	1.9	4.7	-2.1	4.8	-2
A14 (West) to A12 (South)	4.8	5.9	1.1	5.7	-0.2	5.4	-0.5
A12 (South) to A1214 (North)	4.4	5.9	1.5	3.3	-2.6	3.2	-2.7
A1214 (North) to A12 (South	3	3.3	0.3	3.8	0.5	3.8	0.5

Table 6-10 - Do Minimum and Do Something Journey times (PM) (minutes)

The modelling shows that the existing delays at the junction would increase by up to an additional 2.6 minutes in 2042 if no improvements were to be made at the junction.

The modelling shows both options for most movements provide significant reductions in journey time. For the strategic movement between the A12(South) and the A14(East) in the morning peak Option 1 results in a journey time reduction of 3.7 minutes and Option 4 results in a journey time reduction of 5.5 minutes; the larger reduction being as expected, due to the new free-flowing link bypassing the junction roundabout. For the strategic movement between the A14(East) and the A12(South) in the morning peak Option 1 results in a journey time reduction of 1.6 minutes and Option 4 results in a journey time reduction of 2.7 minutes. Journey time reductions for the evening peak for these same movements are slightly less than those for the morning peak.

For the other traffic movements passing through the junction the journey time reductions for Option 1 and Option 4 are broadly similar. This confirms that the removal of the traffic from the existing junction roundabout through the new free-flowing links in Option 4 does free up capacity at the existing roundabout to cater for the other movements and confirms that no changes to the existing junction are required in Option 4, except the minor changes to roadmarkings proposed.

Whilst the proposed options would significantly reduce journey times through the junction, the modelling does show small increases in journey time on the A14 mainline in both directions. For a route from A14 Junction 51 (A140) to Junction 61 (Dock Gate No.1, Felixstowe) journey times increase by up to 39 seconds for Option 1 and 43 seconds for Option 4. This is due to the proposed reduction in speed limit between Junctions 55 and 56 from 70mph to 60mph as mitigation for departures, as discussed in section 6.4.1. Further details of journey times for different routes can be found in the Transport Forecast Package HE604639-JAC-HTP-SCHW_00-RP-TR-0005.

6.13 Sensitivity Tests

In line with TAG two additional sensitivity tests have been conducted allowing for different traffic growth scenarios: one for a lower growth and the other a higher (or Optimistic) growth. Both of these lie either side of the Core Scenario.

Both of these scenarios concluded with plausible and expected results with the optimistic scenario generally having higher traffic levels, longer journey times and higher economic benefits (than the core scenario) when comparing the DS options with the DM. The low growth scenario displayed lower traffic flows and journey times and consequently a lower economic benefit when compared to the Core scenario

Further details of the process to develop these sensitivity tests can be found in the Transport Forecast Package HE604639-JAC-HTP-SCHW_00-RP-TR-0005.

6.14 Economic Assessment

6.14.1 Scheme Cost

Estimates of the costs associated with building each of the options were produced by Highways England's commercial cost estimating team. These costs include design and preparation costs, the cost of supervising construction, cost of the construction works themselves, including utility diversions and the cost of land to be purchased for the scheme. The "most likely" costs, including construction price inflation and risk (outturn costs) are shown in Table 6-11.

In order to compare scheme costs and benefits on a consistent basis in accordance with HM Treasury guidance the costs are converted into Present Value of Costs (PVC) for use in the economic appraisal. PVCs are in 2010 prices (i.e. excluding general inflation from 2010 onwards) and have discounting applied (i.e. adjusted to reflect greater value being placed on having money now than in the future).

Option	Outturn cost (£m)	PVC (£m)
Option 1	£77.1	£38.7
Option 1B	£86.0	£43.2
Option 4	£248.4	£109.7

Table 6-11: Option costs

Option 1B (with extended earthworks slopes) is slightly more costly than Option 1 (with steepened earthworks slopes), whilst having the same road layout. Due to the impact Option 1B would have on the flood zone, as discussed in section 6.16.1 it was decided not to progress further with Option 1B, hence it is not included in the economic analysis in the following section.

6.14.2 Economic Benefits and BCR

The appraisal of the A14 Junction 55 Copdock scheme has been based on DfT's TAG guidance producing a Level 1 benefit, or PVB, of £43.0m for Option 1 and £115.0m for Option 4 for the core traffic growth scenario.

The costs of the scheme, less user charging revenue for the core traffic growth, or PVC, is estimated to be £38.5m for Option 1 and £109.2m for Option 4.

An overview of the scheme benefits is presented in Table 6-12.The benefit cost ratio for Option 1 has been calculated at 1.12 and Option 4 has been calculated at 1.07 including journey time reliability.

Description	Benefits/ Costs	Option 1	Option 4
Weekday	PVB (£m)	£23.2m	£71.5m
	PVC (£m)	£38.7m	£109.7m
	NPV (£m)	-£15.6m	-£38.2m
	Initial BCR	**0.60**	**0.65**
Including Weekend and Off peak	PVB (£m)	£43.0m	£115.0m
	PVC (£m)	£38.5m	£109.2m
	NPV (£m)	£4.4m	£5.8m
	Initial BCR	**1.12**	**1.05**
Including journey time reliability	JTR (£m)	£0.2m	£1.4m
	PVB (including JTR) (£m)	£43.2m	£116.4m
	NPV (£m)	£4.7m	£7.4m
	Adjusted BCR	**1.12**	**1.07**

Table 6-12: Appraisal Overview

Note: all monetary values are in 2010 market prices discounted to 2010

6.14.3 Value for Money

Overall, Option 1 currently provides the highest BCR in terms of Level 1 impacts. However, it should be noted that Option 1 is expected to have significantly higher disbenefits because of delays due to construction impacts and would also be likely to have smaller agglomeration impacts due to the size and scale of the scheme in comparison to Option 4. As a result, further work is recommended at Stage 2 before a preferred route option is decided upon. This should include qualitative assessments of construction delays and agglomeration benefits.

It is also believed that the proposed 60mph speed limit between Junction 55 and 56 and resulting small increase in journey times for through traffic on the A14, as discussed in section 6.12.2, is having a significant adverse impact on these results. Again, further work is recommended in Stage 2, to confirm these impacts and consider alternatives.

6.15 Appraisal Summary Tables

Completed appraisal summary tables (AST) can be found in Appendix F.

6.16 Planning Assessment

6.16.1 Compliance with principle policy tests

As stated in section 4.3.1, the NN NPS is the principal national policy document against which the Proposed Scheme is considered. Appendix D sets out the critical policies in the NN NPS which must be met in order to gain consent.

Each scheme option has been assessed for its alignment with, and implications for, the principles and topics set out in the NN NPS. Each option has been scored against each topic on a Red-Amber-Green (RAG) scoring system. The scorings are shown in Table 6-13.

Topic	Option 1	Option 1B	Option 4
Safety			
Air Quality			
Internationally designated sites, SSSI and NNR			
Irreplaceable habitats (ancient woodland and veteran trees)			
Protection of other habitats and species			
Civil and military aviation and defence interests			
Coastal change			
Flood risk			
The historic environment			
National Parks, the Broads & AONB			
Land use: Green Belt			
Land use: open space / sports and recreational buildings and land			
Noise and vibration			
Water quality and resources			
Minerals Safeguarding Areas			
Community severance, health and well-being			
Utilities Diversion			
Overall RAG score			

Table 6-13: Summary of NN NPS policy risks (RAG score)

Having compared the three options against the key policy topics in the NN NPS outlined above, it is clear that the Option 1 design provides the lowest overall risk approach. However, it needs to be borne in mind that the footprint of Option 1 is very small when compared with Option 4. Option 4 therefore raises more issues associated with the potential for direct environmental effects which will be assessed in detail through the EIA process.

As outlined in section 6.4.3, the scheme is likely to require modifications to and diversion of existing public utilities. In particular, Option 4 would require diversion of existing high voltage 132kV overhead electricity lines. The impacts of realignment of the 132kV line may have to be considered concurrently with the A14 Junction 55 improvement scheme. Depending on the nature and in particular the length of the diversion route, the diversion may be considered an NSIP in its own right although if the diversion is placed underground then this will not be classed as an NSIP. Discussions are on-going with UK Power Networks and greater clarity over the expected route of the diversion and consequent implications with respect to environmental and policy issues is expected to emerge in PCF Stage 2.

Although Option 1B has a similar overall footprint to Option 1, the biggest single high-risk policy issue relates to the likely impacts on Flood Zone 3B resulting from the extended roundabout earthworks. This would likely result in an adverse impact on the functional flood plain which would be difficult to mitigate with a high risk of an objection from the Environment Agency. It will also be difficult to make a strong case following the sequential and exception tests that Option 1 cannot achieve the same highway design/safety benefits as Option 1B but without the adverse environmental impacts. Noting this and the discussions on maintenance as described in section 6.6 it was decided not to pursue Option 1B further.

6.16.2 Local Planning issues

As mentioned previously in section 4.3.2, due to the nature of the Proposed Scheme as a DCO project, the content of local plans may be a material consideration but are subsidiary to policies from within the NN NPS. While acknowledging this, Table 6-14 below outlines some of the key objectives identified within each plan relating to the Strategic Roads Network and the A14 Junction 55 improvement scheme.

Planning Policy Document	Policies/Objectives	Conformity with the Proposed Scheme
Adopted Suffolk Minerals and Waste Plan 2020	***Aims and objectives:*** *Objective 2: providing a Key Diagram that illustrates a spatial strategy for the location of minerals and waste development and shows centres of population (as an indication of sources of waste arisings and aggregates demand), transport links and areas of constraint.*	Having assessed the Key Diagram, the scheme does not encroach into any minerals and/or waste sites and no interactions are expected
Ipswich Adopted Local Plan 2011-2031	***Strategic Objectives:*** *1. High standards of design will be required in new development. Development must be sustainable, environmentally friendly and resilient to the effects of climate change. Standards of acceptability will be raised progressively from 2006 (Building Regulations) levels for all developments in the town in terms of design and environmental performance.* *2. Every development should contribute to the aim of reducing Ipswich's carbon emissions below 2004 levels.* *11. To improve air quality and create a safer, greener, more cohesive town.*	The main ways in which the scheme contributes to the delivery of the objectives of the Adopted Ipswich plan is through the reduction of carbon emissions through reduced traffic and car idling, as well as high quality design that improves road efficiency and road user safety,

Planning Policy Document	Policies/Objectives	Conformity with the Proposed Scheme
Emerging Ipswich Local Plan 2018-2036	***Policy CS20 Key Transport Proposals*** *The Council supports key transport proposals needed to mitigate the traffic impacts within Ipswich of planned growth within the Ipswich Strategic Planning Area. These may include:* *g. Infrastructure improvements where necessary* ***Policy ISPA2 Strategic Infrastructure Priorities*** *The Council will work with partners such as the other local planning authorities in the ISPA, Suffolk County Council, Clinical Commissioning Groups, utilities companies, Highways England and Network Rail in supporting and enabling the delivery of key strategic infrastructure, and in particular the timely delivery of:* *b) A14 improvements;*	The Proposed Scheme will deliver the key transport and infrastructure priorities identified in Policies CS20 and ISPA2 to delivery an enhanced road network.
Babergh Adopted Local Plan 2006	***Chapter 9. Transport*** *Objective 1 To encourage an effective and efficient transport system that provides greater opportunities for choice for all members of the community; and to balance the needs of the car against the needs of public transport and non-motorised users such as cyclists and pedestrians.* *Objective 2: reduce the environmental impact of travel and to limit the growth of road traffic.* *Objective 4: make adequate provision for all transport modes in new developments that recognises the wider strategy for such modes.* *Objective 5: To safeguard land for highways and other transport proposals.*	The Proposed scheme will contribute towards achieving the transport objectives identified, delivering a more effective and efficient transport system that will reduce the environmental impact of travel and provide for alternative transport modes within the design.
Mid Suffolk's Adopted Core Strategy (2008)	***Objective SO 6-*** *Provision of housing, employment, retail, infrastructure and access to services will be coordinated to enable communities to be balanced, inclusive and prosperous.* ***Objective SO3-*** *To respond to the possible harm caused by climate change Mid Suffolk will seek to minimise its carbon footprint, by encouraging a shift to more sustainable travel patterns. In particular the Council will address congestion and pollution and ensure that all new development minimises its carbon emissions, and carbon consumption and is adapted to future climate change.*	The Proposed scheme will aid in the delivery of Mid Suffolk's coordinated infrastructure policy and will aid in minimizing the carbon footprint of Mid Suffolk.
Babergh and Mid-Suffolk New Joint Local Plan (Emerging)	***Objective vi.*** *To reduce the drivers of climate change as much as possible from a social, economic and environmental perspective, with the ambition to be carbon neutral by 2030.* ***Objective vii.*** *To enable all communities to thrive, grow, be healthy, active and self-sufficient through*	The Proposed Scheme will contribute towards a reduction in carbon emissions and will provide the necessary infrastructure for local communities to thrive.

Planning Policy Document	Policies/Objectives	Conformity with the Proposed Scheme
	supporting the provision of the necessary infrastructure,	

Table 6-14: Summary of local policy conformity

7. Summary of Stakeholder Engagement and Public Consultation

The non-statutory public consultation will take place in PCF Stage 2, scheduled to commence late 2021. The following section outlines the methods of stakeholder engagement that have been carried out during PCF Stage 1. These have included Stakeholder Reference Group (SRG) meetings and targeted engagement with the Port of Felixstowe and logistics and haulage operators.

7.1 Identifying Stakeholder Groups

To identify the relevant stakeholders, extensive mapping took place at the start of the scheme. Meetings were held with Highways England and port and freight experts within Jacobs to help identify stakeholders, how they stand to be affected, their influence on the scheme and appropriate communication channels to be used to ensure an inclusive approach. The key groups that will be engaged with include statutory and elected representatives, local authority officers, regional and regulatory bodies, motorised and non-motorised road users, customers and the local community.

The stakeholder list will continue to be updated as the scheme progresses.

Stakeholder Reference Groups

Two stakeholder reference groups were established: the Community and Environment group and the Trade and Economic Development group. The Community and Environment Group consists of ward councillors and relevant portfolio holders, representation from county council groups, environmental groups and walking, cycling and horse-riding representatives. The Trade and Economic Development group consists of relevant county council portfolio holders, representatives, trade and economic bodies and representation from freight and haulage businesses.

Figure 7-1 shows the timeline of engagement with these groups. These groups meet every four months with a total of four rounds of meetings scheduled prior to the non-statutory consultation, which is expected in late 2021.

These meetings were designed to support the development of options and encourage active participation in the development and design processes. During these meetings both groups have been provided with relevant project updates on the technical development of the scheme in order for them to develop informed opinions based on the information provided and the knowledge they already possess of the scheme area.

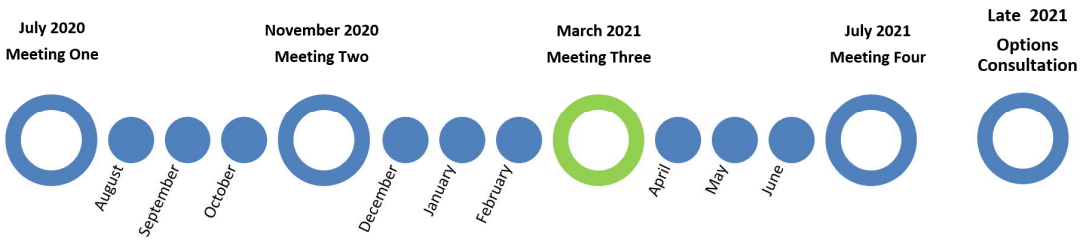


Figure 7-1: Stakeholder Engagement timeline

At the first round of meetings for each group attendees were asked about their experiences with the junction. Among concerns raised were congestion at peak times, rat running, safety concerns

and a high proportion of HGV traffic that use the junction. When asked about the junction experience outside of peak times increased traffic at weekends and holidays was also mentioned.

At the second round of meetings there was discussion surrounding the long-term impacts of the COVID-19 pandemic, planned local developments, growth at the Port of Felixstowe and maintaining the connectivity for walking, cycling and horse-riding users on nearby bridleways and underpasses.

At the third round of meetings, the key agenda points are the walking, cycling and horse-riding assessment process and the continued progress of options development.

Each meeting has provided anecdotal evidence that shows an overall support for the need for improvements to benefit the long-term growth and prosperity of the region and to help facilitate other growth and development opportunities.

7.2 Targeted engagement with the Port of Felixstowe

The A14 Junction 55 Copdock Interchange plays a key role in supporting the functioning of the Port of Felixstowe and facilitating future expansion plans. With this in mind, it is important to engage with the Port of Felixstowe throughout the development and progression of the scheme.

The Port of Felixstowe has been invited to take part at the trade and economic stakeholder reference group meetings and separate meetings with representatives have also been held. Outputs from these discussions have included a better understanding of the existing situation at the junction, a robust account of how the port operates, information on the origins and destination of the HGVs that utilise the port, and the potential expansion at the port. Discussion was also held with the Port regarding high winds causing closures at Orwell Bridge and the port itself and the future of the port post Brexit.

As the scheme progresses, the relationship with the Port will be maintained and strengthened through targeted engagement and feedback sought on the options being progressed.

7.3 Targeted engagement with Freight and Logistics community

On the 12th November 2020, a virtual coffee morning was held, invites were sent to Logistics UK, CILT, Road Haulage Association, and the Port User Group at the Port of Felixstowe. This meeting was held in order to directly engage with freight and haulage businesses for their perspective as frequent and strategic road users.

At this meeting attendees gave opinions on the importance of reliability and journey times, how the costs of delays are measured by logistics companies, how closures at Orwell Bridge are managed and their thoughts on progressing solutions. It was found out that a consequence of the traffic issues at A14 Junction 55 has been some companies factoring in unreliability and building in extra time (currently between two or three hours) into their operations. It was also mentioned that issues at the junction can result in missed delivery slots. At its worst, missed delivery slots can result in the goods being rejected and the haulier losing revenue.

When discussing Orwell Bridge and A14 Junction 55 closures, it was noted that the freight and logistic community have no appropriate alternative when Orwell Bridge and A14 Junction 55 are closed as going through Ipswich causes significant delays and the local roads are not suitable for haulage traffic. These disruptions, as well as the interruptions caused by excessive wind, effects the productivity of the fleets. Lastly, attendees also mentioned that they believed that reliability is more important than journey times, speeds and delays as poor reliability reduces the ability for companies to plan efficiently.

7.4 Equality, Diversity and Inclusion

Equality Diversity and Inclusion groups are another audience will be actively engaged with as the scheme progresses. Identifying these groups has begun through the use of Acorn, a market leading geodemographic classification tool, and a stakeholder mapping exercise.

All engagement activity and materials planned will need to give consideration to differing needs and make broad provision to accommodate those, for example ensuring that events are easily accessible, and that information can be made available in differing formats if required.

Discussions will be held with relevant stakeholders as part of the ongoing engagement activity for the project and this information will be used to benchmark the reach of engagement and consultation amongst harder to reach communities and to shape any further engagement which is required. Any existing channels or approaches for engaging with harder to reach groups will be identified and, where possible, these used for engagement and during the consultation.

This information will be kept in the Equality, Diversity and Inclusion Log which will be updated periodically as the scheme progresses.

7.5 Future Engagement

7.5.1 Approach to Public Consultation

The approach to public consultation is a public facing document which sets out how it is intended to consult on schemes at a non-statutory level. The approach to public consultation will be developed in collaboration with relevant local authorities and we will provide an opportunity for them to give feedback on our consultation approach.

Consulting on the approach to consultation is anticipated to take place during the middle of 2021.

7.5.2 MP briefings

Members of Parliament will be briefed by the Highways England public affairs team to ensure they have sight of what is happening in their constituency.

The stakeholder engagement team will provide project updates at key milestones throughout the project to the public affairs team to ensure all briefings are up to date and accurate.

7.6 Advertising ahead of the consultation

Ahead of the public consultation we have planned to use a variety of different channels for advertising. The regional Twitter and Facebook pages have been identified as appropriate social media channels to be used by Highways England to raise awareness of key announcements and advertise engagement and consultation opportunities.

The scheme will be featured on the Highways England Pipeline website will be reviewed regularly and used to communicate key developments on the scheme. The website will also include a link to our consultation platform which will house all consultation materials. E-leaflets, updates and newsletters will be distributed to key stakeholders, customers and local communities announcing key milestones and exhibitions. This will be particularly useful for those who have signed up for pipeline scheme updates through the website.

8. Conclusions and Recommendations

8.1 Assessment Summary

Three options were carried forward from PCF stage 0, Options 1-3, and developed together with an additional option, Option 4.

Sifting of the options identified that Option 4 was the best performing option and would be developed further and assessed in detail. Option 3 was the next best performing but was broadly similar in nature to Option 4, being largely an offline type option. Option 1 was therefore taken forward due to it being a different type of option, online, and potentially providing a lower cost solution offering good journey time savings.

A variant of Option 1, with alternative earthworks, Option 1B, was developed, featuring extended earthworks slopes rather than the steepened earthworks slopes of Option 1.

In Option 1, the basic layout of the existing junction is retained, but its capacity increased. It is a completely online option and so its construction will require extensive traffic management. The use of strengthened slopes and retaining walls in this option limits the footprint of the option and avoids impact on the Belstead Brook and its flood zone. The overall environmental impact of Option 1 is the least of the options. It has the smallest earthworks requirement and the lowest embedded carbon. Option 1 has the lowest cost of the options being considered. In terms of compliance with the principal policy tests, in particular compliance with NN NPS, Option 1 is considered to have the least risk with most items scored “green”. Because it retains the existing junction layout, traffic between the A12 and the A14 toward Felixstowe has to pass through the junction, as the present layout so this option does not provide a step change in the provision for this strategic movement and does not increase resilience. The weaving of traffic on the A12 approach would remain with this option, similar to the existing layout.

Option 1B shares the same road layout as Option 1. The extended earthworks associated with this option would have a significant impact on Flood Zone 3b, increase the material requirement, embedded carbon and environmental impact. The cost of Option 1B is slightly more than Option 1. In terms of compliance with the principal policy tests, in particular compliance with NN NPS, the encroachment of the earthworks into the flood zone Option 1B has been identified as the largest risk in the options to future consent of the scheme, scoring “red”. Option 1 with steepened slopes avoids this impact and has been confirmed as a valid and feasible solution including consideration of future maintenance. Accordingly, as Option 1 is a valid alternative sharing the same road layout, it was decided not to pursue Option 1B.

Option 4 is the most extensive of the options, adding new free-flowing links to the junction. It has the largest footprint and more environmental impact. It has the largest earthworks requirement and the greatest embedded carbon. Significant diversion of public utilities will be required to facilitate this option and it has the highest cost of the options being considered. In terms of compliance with the principal policy tests, in particular compliance with NN NPS has higher risk than Option 1, with more risks scored “amber”; there are no “red” items, however. Option 4 through the provision of new free-flowing links between the A12 and the A14 toward Felixstowe provides a significant improvement for this key strategic movement, increasing resilience and so improving access to the Port of Felixstowe, a key part of the remit of this scheme. By removing traffic from the existing junction, it frees up capacity of the existing junction for other movements. The new free-flow links between the A12 and A14 provide an alternative routing to the existing roundabout and so increase resilience.

Traffic modelling shows that both Option 1 and Option 4 would lead to significant reductions in journey times for routes passing through the junction. The free-flowing links in Option 4 produce larger reductions for the key strategic movement between the A12 the A14 toward Felixstowe.

In terms of economics, both Option 1 and Option 4 have similar BCRs, both being in the low category.

8.2 Options recommended for Public Consultation

It is recommended that Option 1 and Option 4 are both taken forward to the non-statutory public consultation in PCF stage 2 where the preferred option will be determined at the end of Stage 2.

8.2.1 Option Development

It is recommended that Option 1 and 4 are developed further in stage 2 to unlock additional benefit and/or reduce the scheme costs. Potential design and development could include:

- For Option 4, a detailed understanding of cost and the lead in time associated with the diversion of the 2 132kV overhead lines running north of the A14 as existing pylons clash with the proposed new slip roads and their earthworks
- For Option 4, consideration of minor changes to the existing junction roundabout, subject to traffic modelling
- Optimise earthworks balance
- Further consideration of departures and their mitigation measures

Appendix A. Options Sifting Methodology

1) Early Assessment Sifting Tool (EAST) criteria and sub criteria definition

<table>
<tr><th>Further Breakdown from Cases (Level 1)</th><th></th><th></th></tr>
<tr><td>Criteria (Level 2)</td><td>i. Identify problems and objectives of the option

<u>Extract from the EAST Guidance:</u>

• short description of what the identified problem is (e.g. scale of problem, timescale over which the problem will emerge, key drivers);
• what the option is trying to achieve; and
• whether the option aims to meet any specific transport, network or cross-cutting objectives (possibly non-transport related).</td><td>ii. Scale of Impact

<u>Extract from the EAST Guidance:</u>

• to what extent does the option alleviate the identified problem?

<table><tr><td>1</td><td>Very small overall impact</td><td>Would have a very small positive impact, possibly with undesirable consequences</td></tr><tr><td>2</td><td>Minor impact</td><td>Would have a modest overall impact</td></tr><tr><td>3</td><td>Moderate impact</td><td>Expected to have a reasonably significant impact on the problem identified</td></tr><tr><td>4</td><td>Significant impact</td><td>Expected to significantly alleviate the problem</td></tr><tr><td>5</td><td>Fully addresses the identified problem</td><td>Expected to fully solve the identified problem, without any undesirable consequences</td></tr></table>
Note: The description provides a guide to how the evidence is interpreted but it is for the respondent to judge the overall scale of impact, providing a justification in the space provided.

• respondents are expected to provide a brief justification for their assessment, highlighting supporting evidence.

• options that have only a very small or minor impact will not necessarily be penalised, particularly if they are low cost or part of an overall package.</td></tr>
<tr><td>Comments</td><td>Not assessed – commentary only and is common to all the options being considered. Further detail can be found in the Client Scheme Requirements.</td><td>The scale of impact will identify how well each option will impact on the identified problems.

Options will reduce journey times, not only for the Felixstowe traffic (i.e. South to East (and vice versa)) but also for all other traffic that would pass through J55 e.g. to / from Ipswich e.g. South to North (and vice versa). This will be assessed based on percentage forecast journey time reductions (i.e. Do Something minus Do Minimum) in 2041 for Weekday AM / IP / PM for the South to East (and vice versa) and South to North (and vice versa) movements. Draft results will be extracted from preliminary traffic model runs from a different (but readily available) version of the SERTM model. If time allows, demand flows for the same movements will be extracted too.</td></tr>
<tr><td>Sub-criteria (Level 3)</td><td>-</td><td>-</td></tr>
<tr><td>Sub-sub criteria (Level 4)</td><td>-</td><td>-</td></tr>
</table>

<table>
<tr><th>Further Breakdown from Cases (Level 1)</th><th>1. Strategic Case</th></tr>
<tr><td>Criteria (Level 2)</td><td>
iii. Fit with Wider transport & Government objectives

<u>Extract from the EAST Guidance:</u>
• how does the option fit within the EU legislative framework governing transport proposals? Does it complement EU proposals? Could it qualify for EU funding? Has it been considered whether Government funding for the option would contravene state aid rules or give rise to any other legal difficulties within an EU context?
• are there any other policies/proposals affecting the same study area as the option/package or addressing the same issues? Please provide details. Does the option complement/enhance pre-existing proposals or is there potential for conflict?
• might the option impact negatively on other modes or types of transport? In particular, has the assessment considered the impact passenger proposals might have on freight transport and vice versa?
• to what extent does the option make better use of existing infrastructure or demonstrate innovation in terms of ‘doing more with less’?
• how have other government priorities, beyond transport, been impacted by the option?

<table>
<tr><td>1</td><td>Poor fit</td><td>There is significant conflict with other policies/options affecting the study area which needs to be resolved. Possibly also conflicts with other modes.</td></tr>
<tr><td>2</td><td>Low fit</td><td>There is some conflict with other policies/options or modes.</td></tr>
<tr><td>3</td><td>Reasonable fit</td><td>Overall the option fits well with other policies affecting the study area.</td></tr>
<tr><td>4</td><td>Good fit</td><td>The option fits very well with other policies affecting the study area.</td></tr>
<tr><td>5</td><td>Excellent fit</td><td>Option complements other policies/proposals affecting study area, has no negative impacts on other modes or outcomes and demonstrates ‘doing more with less’.</td></tr>
</table>

Note: The description provides a guide to how the evidence is interpreted but it is for the respondent to judge the overall fit, providing a justification in the space provide.
</td></tr>
<tr><td>Comments</td><td>A qualitative assessment will be made based on a review of transport policies and proposals, and then assessing how each option “fits” with those transport policies and proposals. Assessment would also include identifying any potential for conflict or opportunities for enhancement of pre-existing proposals or existing infrastructure within the study area.</td></tr>
<tr><td>Sub-criteria (Level 3)</td><td>-</td></tr>
<tr><td>Sub-sub criteria (Level 4)</td><td>-</td></tr>
</table>

Further Breakdown from Cases (Level 1)	1. Strategic Case
Criteria (Level 2)	**iv. Fit with other objectives** **<u>Extract from the EAST Guidance:</u>** *These will vary depending on how the tool is being used. This is an opportunity to draw out and highlight any relevant network or regional objectives specific to an option and to outline how it performs against any local or modal objectives.*
Comments	(as per scheme objectives)
Sub-criteria (Level 3)	Scheme specific objectives: 1) Making the network safer 2) Keeping the network in good condition 3) Delivery of better environmental outcomes 4) Improving user satisfaction 5) Supporting the smooth flow of traffic 6) Encouraging economic growth 7) Helping cyclists, walkers and other vulnerable users of the network 8) Customer

TRANSPORT OBJECTIVES	
Define the high level objectives of the scheme, in terms of desired outcomes, such as improvement in journey times, reliability, safety, or catering for economic and housing growth. Where applicable, reference the objectives identified in the high level business case prepared through route strategies. More detailed objectives (flowing from the high level objectives) should be developed as the design evolves and particularly once the preferred option is selected. These detailed objectives, comprised of specific, targets and measures should reflect the guidance given in WebTAG and be consistent with the Appraisal Summary Table (AST). There should also be an objective to deliver a scheme which matches or improves on the value for money of the selected option, as it has been assessed at completion of the Option Phase and set out in the AST and Value for Money (VfM) assessment. This should be consistent with objectives provided in the RIS Investment Plan and/or Highways England Delivery Plan or any changes to that clearly identified.	<u>Making the network safer</u> There is an opportunity to reduce the number of collisions at the A14 Junction 55 roundabout and its approaches through segregation of specific vehicle movements and reduced queuing. Reduced weaving manoeuvres and alleviating potential mainline queuing from exit slips will further deliver safety benefits. Better network resilience through improved capacity will reduce driver frustration and rat running through inappropriate routes. <u>Keeping the network in good condition</u> Any new scheme would be delivered in accordance with the latest design standards with consideration of long term maintenance best practice. New asset would benefit from reduced maintenance requirements during early lifecycle. <u>Delivery of better environmental outcomes</u> There are two Noise Important Areas within the study area – whilst a constraint on potential options there are opportunities to reduce the impact on the surrounding community. Reduced vehicle queuing is likely to make a positive contribution to air quality. <u>Improving user satisfaction</u> The percentage of National Road Users' Satisfaction Survey respondents who are 'very' or 'fairly satisfied' is likely to increase given the forecast reductions in queueing and delay associated with all scheme options. The scheme will make a positive contribution to the relationship with Felixstowe Port, associated business users and local stakeholders. <u>Supporting the smooth flow of traffic</u> A scheme would help to maintain the smooth flow of traffic through the junction and, potentially, along the main line of the A12 and A14 by providing additional capacity and journey time reliability. Increased capacity will provide a more resilient network when incidents or planned works occur. <u>Encouraging economic growth</u> The junction is a key location on the route serving the key international gateway of Felixstowe Port and the Ipswich A14 Economic Opportunity Area. These are key employment growth areas with significant economic importance. The scheme would provide additional highway capacity to support this growth <u>Helping cyclists, walkers, and other vulnerable users of the network</u> There is no evidence of regular use of the junction by walkers, cyclists or equestrians. There is an NMU subway under the A14 some 500m to the north-west of A14 Junction 55, on the line of the former A12, which provides a direct traffic-free link into the Ipswich urban area for residents of the villages of Copdock, Washbrook and the rural hinterland. As such, the options may not directly improve conditions for cyclists, walkers and other vulnerable road users in the immediate vicinity of A14 J55, but the options should reduce rat-running at Beagle roundabout and surrounding local road network, thereby improving conditions for such road users in that vicinity. <u>Customer</u> Throughout the design and delivery stages, the scheme should ensure that customers and communities are fully considered. Specifically, this should include: • Understanding the needs of all segments of customers (including vulnerable users), stakeholders and partners • Responding to those needs such that the end product delivers an improved customer experience • Assessing the impact of works on road users and communities, minimising disruption and delivering appropriate mitigation measure. The assessment should look at issues through customers eyes

Sub-sub criteria (Level 4)	
Further Breakdown from Cases (Level 1)	**1. Strategic Case**
Criteria (Level 2)	**v. Planning and Land with Implications for Compulsory Acquisition - Fit & Risks'** **<u>Extract from the EAST Guidance:</u>** • Consider how the option fits with the NN NPS, Local policy and proposals and major development proposals. • Consider how the option impacts on the implications for compulsory acquisition.
Comments	As per Planning methodology: *"Suggest separate criterion under Strategic Fit for 'Planning and Land with Implications for Compulsory Acquisition - Fit & Risks' to include National level (NN NPS), Local level (local plan policies and planning commitments for major developments) and Land with Implications for Compulsory Acquisition (for risks relating to land ownership and acquisition)."*

Sub-criteria (Level 3)	**1) National Level: National Networks National Policy Statement and Major Development** National Networks National Policy Statement assessing the following key 'show stopper' policies: - Green Belt - Local Green Space - Defence interests sites - Civil and military aviation sites National Major Developments include: - National Infrastructure Projects listed on the PINS website of registered applications *N.B. We are still awaiting the following information: Aviation Safeguarding Areas and Ministry of Defence Land* *N.B No Green Belt in the Study Area* **2) Local Level: Local Plan Policy and Major Development** Local Plan Policy: - Identifying key policies along the route within the adopted and emerging local plans for the relevant local authorities *N.B. at this stage, only local policies relating to major development allocations are identified. Additional local policies will be considered at a later stage in the assessment process* Major Developments includes the following: - Major Planning Applications and Appeals dating from June 2015 (5 years) to present - Major Adopted and Emerging Allocations identified within the relevant adopted Development Plan and the emerging Development Plan (where they have reached preferred options stage) - Use type includes: residential, non-residential, minerals and waste and transport infrastructure The definition of 'major development' is provided in the Town and Country Planning (Development Management Procedure) (England) Order 2010 (TCPO) - The winning and working of minerals or the use of land for mineral-working deposits - Waste development - Dwellings: residential dwellings of 10 or more or where the site is 0.5ha or greater - Building or buildings where the floor space to be created by the development is 1,000 square metres or more or - Development carried out on a site having an area of 1ha or more **3) Land with Implications for Compulsory Acquisition** Special Category Land (defined in the Infrastructure and Planning Regulations 2009, Applications: Prescribed Forms and Procedure) including the following categories: - Common Land (including Town and Village Green) - Open Space - National Trust Land - Fuel or Field Garden Allotments Crown Land (including Ministry of Defence Land). The provisions in respect of Crown land are set out in section 135 of the Planning Act 2008 (as amended). *N.B Special Category Land includes:* • *Common land (including Town or Village Green)* • *Open Space (means any land laid out as a public garden, or used for the purposes of public recreation, or land which is a disused burial ground.* • *National Trust Land* • *Fuel or Field Garden Allotment* *N.B. It should be noted that information regarding disused burial grounds is not available at this stage and has not been included in the assessment.* *N.B. Special Category Land refers to Fuel and Field Allotments. At this stage we cannot determine if an allotment is a fuel or field garden allotments. Further work and research is required to determine this.*
Sub-sub criteria (Level 4)	-

<table>
<tr><th>Further Breakdown from Cases (Level 1)</th><th colspan="2">1. Strategic Case</th></tr>
<tr><td>Criteria (Level 2)</td><td>vi. Key uncertainties

<u>Extract from East Guidance:</u>
• what are the main uncertainties, especially those related to the government and strategic objectives?
• what are the most uncertain assumptions that have been made?</td><td>vii. Degree of consensus over outcomes

<u>Extract from the EAST Guidance:</u>
• what consultation has taken place with relevant stakeholders?
<table><tr><td>1</td><td>Little or no consultation has taken place yet, or consultation has revealed a high level of disagreement about the option’s ability to deliver the stated
outcomes</td></tr><tr><td>2</td><td>Little consultation and/or strong reasons to suggest the outcomes are controversial</td></tr><tr><td>3</td><td>Some consultation has taken place with some agreement</td></tr><tr><td>4</td><td>Wide consultation and broad agreement on the outcomes, possibly one or two areas of disagreement remaining</td></tr><tr><td>5</td><td>Extensive consultation has taken place with a high degree of consensus on
the outcomes</td></tr></table>
Note: The table provides a guide to how the evidence is interpreted but it is for the respondent and stakeholders to judge the overall quality</td></tr>
<tr><td>Comments</td><td>A qualitative statement shall state how each of the main uncertainties and assumptions will be reviewed against the option to assess its validity and impact. Any option specific assumptions will also be captured and qualitatively assessed. From this process the key uncertainties, especially those related to the government strategic objectives, will be drawn out.</td><td>Representative groups and individuals will have been engaged through a Stakeholder Reference Group. These groups were presented with the key attributes of the developing options – primarily online vs offline options. These stakeholders were provided the opportunity to share insights and feedback on how they believe the key features and attributes would contribute to achieving the scheme objectives.</td></tr>
<tr><td>Sub-criteria (Level 3)</td><td>-</td><td>-</td></tr>
<tr><td>Sub-sub criteria (Level 4)</td><td>-</td><td>-</td></tr>
</table>

Further Breakdown from Cases (Level 1)	2. Economic Case	
Criteria (Level 2)	**i. Economic Growth** **<u>Extract from the EAST Guidance:</u>** *The assessments of connectivity and reliability should apply to business travel (which includes freight) and commuters.* *<u>Connectivity</u>* • *will journeys get shorter, quicker and/or cheaper?* • *in some cases, options will have opposite impacts on time and cost and respondents will need to weigh up the individual impacts to form an overall judgement.* *<u>Reliability</u>* • *will the option impact on the day to day variability in journey times or the average minutes of lateness?* • *will there be any impact on the number of incidents?* *<u>Wider economic impacts</u>* • *at this stage, respondents are not expected to assess wider economic impacts, instead the questions are intended to screen whether there may be an impact that would need to be considered in more detail later on in the appraisal process, should the option progress.* *<u>Resilience</u>* • *does the option have an impact on the vulnerability of the network to terrorism, severe weather events or the effects of climate change?* *<u>Delivery of housing</u>* • *in some cases, the need for new development in a specific location will mean that the development will require some form of transport development to support it.* • *respondents are asked to assess how their option will facilitate new housing.*	**ii. Carbon emission** **<u>Extract from the EAST Guidance:</u>** *The decision tree on carbon emissions is consistent with the Transport Business Case and takes account of the fact that carbon is valued differently depending on whether it is in the traded sector, and so covered by the EU Emissions Trading System, or in the non-traded sector. The respondent is asked to provide an overall assessment by considering:* • *what impact the option could have on carbon emissions either through changes in activity, an increase in embedded carbon, changes in the carbon content of fuel or changes in efficiency; and* • *whether the change in carbon emitted is associated with the traded or non-traded sectors.* *When assessing what impact the option will have upon transport activity, and what impact this will have on carbon emissions, it is important to consider how vehicle-km would change as a consequence of the option being implemented. This may involve commenting on changes in the number of vehicle trips, the number of public transport services being provided, changes to journey length and shifting vehicle occupancy levels, in both private and public transport. The respondent should use their judgement and evidence on the relative magnitudes of impacts to assess the net impact the option will have upon activity, noting impacts working in opposite directions in the comments box. Embedded carbon should also be considered when assessing the carbon impact of a project. Though this impact will tend to be less significant, building new infrastructure could have a notable effect on carbon emissions. The carbon content of the fuel used could also have a notable effect on carbon emissions. Please comment on the carbon content of the fuel indicating whether the carbon content per litre is lower or higher than in the 'base case' scenario. The respondent should consider how the option would impact or change efficiency, that is, fuel use per vehicle-km. The assessment should consider whether more efficient vehicles (this includes cars, freight carriers, trains and buses) could be used or more efficient speeds. If it has not been considered whether more efficient vehicles could be used at this stage in the appraisal process, then a best estimate based on similar schemes (perhaps in other regions or countries) or trends in the industry (for example Safe and Fuel-Efficient Driving (SAFED) training for bus drivers) would be welcomed with appropriate comments. The respondent may also want to consider if the option would encourage any behavioural change and note possible effects accordingly.*
Comments	-	Not assessed as insufficient traffic modelling data available at this time

Sub-criteria (Level 3)	**1)** Connectivity (impact on journey times; impact on cost of travel). The draft journey time reductions (as described above for Scale of Impact) for those movements to / from the Port of Felixstowe (i.e. South to East (and vice versa)) will be used. **2)** Reliability (variability of journey times under normal traffic conditions i.e. without incidents). This will assess the impact of each option on the day to day variability in journey times. As a quantitative method of assessment will not be available at this early stage, a qualitative assessment will be made e.g. options that introduce further grade-separation at junctions will score more highly than options that do not. **3)** Wider economic Impacts. A quantitative assessment cannot be assessed at this early stage. Instead, a qualitative assessment we will made based on each option's likely contribution to agglomeration etc. **4)** Resilience (variability of journey times under abnormal traffic conditions i.e. when incidents have occurred e.g. weather (high winds, major snow events etc), major accidents, animals on the road etc). A qualitative assessment will be undertaken based on those movements that might benefit from increased SRN capacity. **5)** Delivery of Housing. This will consider how each option would help to facilitate significant new areas of housing within the study area.	
Sub-sub criteria (Level 4)	-	-

Further Breakdown from Cases (Level 1)	2. Economic Case
Criteria (Level 2)	**iii. Socio-distributional Impacts and the Regions** **<u>Extract from the EAST Guidance:</u>** *<u>Social and distributional</u>* *Social and distributional impacts need to be considered when assessing the impact of options on noise, air quality, severance, accessibility, security, accidents, user benefits and personal affordability. Respondents will need to consider whether the expected impact of their option (both positive and negative) is either significant in extent or concentrated in terms of the people groups or spatial areas affected, or both.* • *might the option have negative or positive impacts on specific groups of people, including children, older people, disabled people, Black and Minority Ethnic communities, people without access to a car and people on low incomes?* • *can all of the expected negative impacts be eliminated through some form of amendment to or redesign of the initial option(s)?* • *where there are positive impacts, and where negative impacts cannot be eliminated, are impacts sufficiently minor and socially and/or spatially dispersed such that a detailed SDI appraisal is disproportionate to the potential impacts?* • *where impacts are either significant or concentrated, a full SDI appraisal will need to be undertaken as part of a Transport Business Case. See http://www.dft.gov.uk/webtag/documents/project- manager/unit2.13d.php for more information.* • *if the option has negative impacts on particular vulnerable social groups (elderly, low income, disabled etc), it should consider whether additional measures can be introduced to mitigate this impact.* *<u>Regeneration</u>* • *does the option have an impact on a targeted regeneration area where poor transport been identified as a constraint and, if so, what is the impact likely to be?* *<u>Regional imbalance</u>* • *this is intended to identify the extent to which the proposal impacts on a region or sub-region which is underperforming when compared to other areas or to the country as a whole. This underperformance or 'weakness' will need to be defined in terms of economic and/or social indicators.* • *for further details on regional imbalance metrics see paragraph 8.3.3 of WebTAG 3.5.3d http://www.dft.gov.uk/webtag/documents/expert/pdf/unit3.5.3d.pdf*
Comments	-
Sub-criteria (Level 3)	1) Social and Distributional. Assessment will be made at a high level for those vulnerable groups which we can identify from existing (2011) demographic census data, i.e. children; older people; disabled people; black and minority ethnic communities; people without access to a car; and people on low incomes. 2) Regeneration. A qualitative assessment will be undertaken that will consider whether each option impacts on targeted Enterprise Zones etc, where poor transport has been identified as a key major highway constraint. 3) Regional Imbalance. Not considered relevant to due to the size of the scheme.
Sub-sub criteria (Level 4)	

Further Breakdown from Cases (Level 1)	2. Economic Case
Criteria (Level 2)	**iv. Local Environment** **<u>Extract from the EAST Guidance:</u>** *<u>Air Quality</u>* • *the Air Quality Strategy for England, Scotland, Wales and Northern Ireland sets health-based objectives for nine air pollutants and two for the protection of ecosystems. The objectives are the same or similar to mandatory limit values set in European Directives, which the UK Government is legally obliged to meet.* • *local authorities have a duty to review and assess local air quality and where it is found that objectives for pollutants are unlikely to be met by the due date they have to declare Air Quality Management Areas. Respondents should therefore note whether their option impacts on any AQMAs.* *<u>Noise</u>* • *respondents are asked to refer to the DEFRA noise action plan http://www.defra.gov.uk/environment/quality/noise/environment/actionpl an/index.htm to assess whether their option is likely to impact on a noise problem area.* *<u>Natural environment, heritage and landscape</u>* • *landscape refers to both the physical and cultural (i.e. use and management) characteristics of the land. Physical characteristics include fields, hedges, trees and streams. Cultural characteristics include stone walls, water meadows and field barns.* • *the man-made historic environment (heritage) comprises:* o *buildings (individually or in association) of architectural or historic significance;* o *areas, such as parks, gardens, other designed landscapes or public spaces, remnant historic landscapes and archaeological complexes; and* o *sites (e.g. ancient monuments, places with historical associations such as battlefields, preserved evidence of human effects on the landscape, etc.).* • *heritage also includes the sense of identity and place which the combination of these features provides.* • *natural environment includes impacts on biodiversity and water.* *<u>Streetscape and urban environment</u>* *Streetscape is the physical and social characteristics of the built and unbuilt urban environment and the way in which we perceive those characteristics. It is this mix of characteristics and perceptions that make up and contribute to townscape character and give a 'sense of place' or identity. Appraising the impact of options on natural environment, heritage, landscape and streetscape should broadly follow WebTAG's environmental capital approach:* • *what are the characteristic features of the countryside/heritage/streetscape/biodiversity/water environment?* • *what is the importance of the features identified? Who are they important to and why? What are their relationships in terms of overall landscape/streetscape forms/heritage patterns/biodiversity and water?* • *how will the option impact on these features, including effects on its distinctive quality and substantial local diversity?* • *respondents should produce an overall assessment of whether the option is likely to have a positive, negative or no impact, noting key elements in the comments box.* *Further information on the environmental capital approach can be found at: http:/ http://www.dft.gov.uk/webtag/documents/expert/unit3.3.6.php*
Comments	We will address all of the topics covered in the guidance – but will also consider other topics considered in DMRB. Topics will be considered on a qualitative basis only.

Sub-criteria (Level 3)	1) Improve the net environmental impact of transport on communities. Subtopics: Noise and vibration; Air quality; and Population and human health. A five-point scale has been used to highlight material planning constraints or effects for which NNNPS describes a presumption against development except in exceptional circumstances. 2) Reduce the impact of new infrastructure on natural and historic environment by design. Subtopics: Climate; Landscape; Cultural heritage; Biodiversity; Geology and soils; Road drainage and the water environment; Material assets and waste; and Cumulative effects. As for (1) above, a five-point scale has been used to highlight material planning constraints or effects for which NNNPS describes a presumption against development except in exceptional circumstances. .
Sub-sub criteria (Level 4)	-

Further Breakdown from Cases (Level 1)	2. Economic Case	
Criteria (Level 2)	**v. Well-being** **<u>Extract from the EAST Guidance:</u>** *<u>Physical activity</u>* • *the impact the option has on physical activity should be noted and it is relevant if the option impacts on an area of deprivation or poor health.* *<u>Injury or deaths</u>* • *the impact on the number of people killed or injured in transport accidents should be assessed as well as the impact on the risk of travelling.* • *this should include all transport-related accidents, including those accessing transport modes (for example injuries caused by stairs or escalators) or those sustained while working.* *<u>Crime</u>* • *options that address perceptions of crime are relevant in addition to those that demonstrably reduce crime.* *<u>Terrorism</u>* • *respondents are asked to consider if the option might affect our vulnerability to terrorism and note in the comments box provided.* *<u>Enabling people to enjoy access to a range of goods, services, people and places</u>* • *does the option make it easier for people to access key locations (doctors, hospitals, supermarkets etc)?* • *does it make leisure trips quicker or cheaper?* • *does it make leisure trips more reliable? Will it have an impact on the number of incidents?* *<u>Severance</u>* • *severance issues relate primarily to pedestrians though they can affect all non-motorised modes including cyclists and equestrians.* • *respondents should consider the impact on pedestrian movement, for example, whether there will be hindrance to pedestrian movement, whether some people (particularly children and old people) are likely to be dissuaded from making journeys on foot, or they will be less attractive to others or whether people will be deterred to the extent that they reorganise their activities?*	**vi. Expected Value for Money Category** **<u>Extract from the EAST Guidance:</u>** • *value for money measures the benefits for each £1 of costs. It includes both the benefits and costs that can be counted in monetary terms (which can be described as a benefit/cost ratio) and other non-monetised impacts such as regeneration and environmental effects.* • *have you calculated the BCR (benefit cost ratio) and, if so, what is it?* *Further information on calculating the BCR can be found athttp://www.dft.gov.uk/webtag/documents/expert/pdf/unit3.5.4.pdf.* *It should be noted that there is a new BCR metric in draft TAG (formerly WebTAG) guidance. It is advised that calculations produce estimates using both metrics for comparison.* • *are there significant impacts which you have not been able to include in the BCR? What are these impacts and what evidence do you have on their scale?* • *if you have not yet calculated the BCR, is there evidence of the BCR and/or value for money of similar options that may be relevant, explaining why similar results might be expected?* *At a later stage, if your option belongs to a package of proposals, can you explain how low/medium value for money schemes are justified within the context of the package level business case?*

Comments	-	Robust Benefit Cost Ratios (BCRs) will not be available at this early stage. A comparative assessment will be undertaken qualitatively based on professional judgement of expected benefits and expected costs. This will be based on the quantitative BCRs that are available from the PCF0 study, but with due consideration of the caveats made at PCF0. If indicative benefits are available from the preliminary traffic model runs (as described above for Scale of Impact) and TUBA, these could be used instead.
Sub-criteria (Level 3)	1) Does it make leisure trips quicker, cheaper and more reliable? This will be an assessment of journey times similar to 1(ii) but using inter-peak models. 2) Safety. A qualitative assessment of the impact the option will on the FWI (Fatal weighted index) compared to the baseline 3) WCH (walking, cycling, horse-riding). GG 142 – current standard. A measure of the impact that the option will have on the current level of provision for walking, cycling and horse riding. Measured by determining whether the option provides new routes for WCH.	-
Sub-sub criteria (Level 4)	-	-

Further Breakdown from Cases (Level 1)	3. Managerial Case	
Criteria (Level 2)	**i. Implementation timetable from inception to delivery** **<u>Extract from the EAST Guidance:</u>** • *respondents will need to give an estimate of the timescales for implementing the option, from inception to delivery (this might include construction timescales or time for bringing legislation into force).* • *how long is the option expected to be in operation/force if it is a fixed term project? What timescales would be involved if it is a recurrent project?*	**ii. Public acceptability** **<u>Extract from the EAST Guidance:</u>** • *an assessment of whether there are likely to be any issues around public acceptability of the option. For example, will the option require a long period for public consultation?* • *does the option require behavioural changes (like mode shift or seatbelt campaigns)?* • *what stakeholder engagement has already taken place?* .
Comments	A qualitative assessment of the timescale and any differences between options, in particular the construction phase of the project.	Representative groups and individuals will have been engaged through a Stakeholder Reference Group. These groups were presented with the key attributes of the developing options – primarily online vs offline options. These stakeholders were provided the opportunity to share insights and feedback on how they believe the key features and attributes would contribute to achieving the scheme objectives. -
Sub-criteria (Level 3)	-	
Sub-sub criteria (Level 4)	-	-

<table>
<tr><th>Further Breakdown from Cases (Level 1)</th><th colspan="2">3. Managerial Case</th></tr>
<tr><td>Criteria (Level 2)</td><td>iii. Practical feasibility

<u>Extract from the EAST Guidance:</u>
• has the option been tested and proven to be practical and effective?
• how certain are you of the governance and legal feasibility of the option?
• who would operate the option?
• does the operator have the required statutory powers? Are there planning implications?
• if there is technology involved, it should be stated whether this is proven, prototype or still in development.</td><td>iv. Quality of the supporting evidence

<u>Extract from the EAST Guidance:</u>
• if it is based on evidence from where similar options have been implemented elsewhere, how transferable are the impacts likely to be?
• how well-developed is the supporting evidence at this stage?
• is it based on initial modelling?
<table><tr><td>1</td><td>Low level of supporting evidence - a scheme in the very early stages of development that has not been implemented elsewhere with little supporting data and/or analysis</td></tr><tr><td>2</td><td>Poor level of supporting evidence – may be some underlying data or some informal</td></tr><tr><td>3</td><td>Reasonable level of supporting evidence – good underlying data explaining the problem and some analysis of the outcomes</td></tr><tr><td>4</td><td>Good level of supporting evidence, possibly including some modelling and/or sensitivity testing demonstrating robust outcomes</td></tr><tr><td>5</td><td>High level of supporting evidence – option has been modelled in detail or subjected to a Transport Business Case appraisal</td></tr></table>Note: The table provides a guide to how the evidence is interpreted but it is for the respondent and stakeholders to judge the overall quality.</td></tr>
<tr><td>Comments</td><td>Engineering judgement is used to assess the risk associated with certain construction activity that may have an impact on project delivery. A qualitative judgement is made on the planning risks associated with each option.</td><td>Considers the quality of evidence which support each route options assessed. This will be a qualitative measure which reflects the technical team’s view on the quality of the work done at this stage of the assessment.</td></tr>
<tr><td>Sub-criteria (Level 3)</td><td>1) Using a matrix of factors an overall assessment of the anticipated difficulty associated with constructing each option is made
2) To provide a planning judgement to identify key risks associated with gaining a DCO.
National Networks National Policy Statement assessing the following key 'show stopper' policies from the National Networks National Policy Statement Risk Table (Options phase high-level):
- Safety; Air quality; Internationally designated sites and Sites of Special Scientific Interest (includes National Nature Reserves); Irreplaceable habitats including ancient woodland and veteran trees; Protection of other habitats and species; Civil and military aviation and defence interests; Coastal change; Flood risk; The historic environment (designated heritage assets); Nationally designated areas: National Parks, the Broads & Areas of Outstanding - Natural Beauty; Land use: Green Belt; Land use: open space / sports and recreational buildings and land; Noise and vibration; and Water quality and resources.</td><td>-</td></tr>
<tr><td>Sub-sub criteria (Level 4)</td><td>-</td><td>-</td></tr>
</table>

Further Breakdown from Cases (Level 1)	3. Managerial Case
Criteria (Level 2)	**v. Key risks** **<u>Extract from the EAST Guidance:</u>** • *what risks have been identified with regard to implementing such an option/project?* • *where appropriate, include an assessment of how probable they are, interdependencies with other sources of risk and their expected impact.* • *this might include examples of problems and risks experienced in similar schemes in the past, or extrapolations drawn from pilot schemes.* • *how will the identified risks be actively managed? What countermeasures could be introduced?*
Comments	A qualitative statement will state what risks have been identified and how probable they are. Each of the key risks will be reviewed against the option to assess its validity and impact. Any option specific risks will also be captured and qualitatively assessed, whilst identifying how they will be managed.
Sub-criteria (Level 3)	-
Sub-sub criteria (Level 4)	-

Further Breakdown from Cases (Level 1)	4. Financial Case	
Criteria (Level 2)	**i. Affordability** **<u>Extract from the EAST Guidance:</u>** • *the issue of affordability needs to be put in the context of the available budget and relevant budget period. This will vary depending on what the tool is being used for and should be clarified in relation to each study or project using the tool.* • *some options that are unaffordable in the immediate budget period may be affordable in later years. Also, when assessing how affordable an option may be, it may be relevant to consider what sort of package of options is being put forward alongside the option under consideration.*	**ii. Capital costs** **<u>Extract from the EAST Guidance:</u>** • *the user should select the appropriate cost category from the drop-down menu. Capital costs should include all the costs involved in setting up the option and getting it up and running. In some cases, cost information may be very uncertain. Respondents need to provide their best estimate, stating in the justification box if the estimate is particularly uncertain (and why).* *Comments should note:* • *the appraisal period over which the option has been assessed (see paragraph 3.9 for more information).* • *whether optimism bias has been applied and at what rate? If non- standard rates are being applied, what evidence do you have for the values used?*
Comments	As updated cost estimates are not available for the options this is not being assessed.	As updated cost estimates are not available for the options this is not being assessed.
Sub-criteria (Level 3)	-	-
Sub-sub criteria (Level 4)	-	-

Further Breakdown from Cases (Level 1)	4. Financial Case	
Criteria (Level 2)	**iii. Revenue costs** **<u>Extract from the EAST Guidance:</u>** • *includes subsidy costs* • *revenue costs include all running costs to keep the scheme in operation*	**iv. Cost profile** **<u>Extract from the EAST Guidance:</u>** • *do previous estimates include all implementation, operation, maintenance and enforcement costs including administration?* • *what are the costs (and savings) to business? In particular, you should consider whether there is the potential for disproportionate burden on small business and how this might be minimised.* • *if the option being considered is a regulation, what are the full/wider costs imposed?*
Comments	The quantum of operational and maintenance costs will broadly be proportional to the length of the scheme and the structural content. A simple measurement of these will be used to determine the range of revenue costs and where each option sits in this range.	As updated cost estimates are not available for the options this is not being assessed.
Sub-criteria (Level 3)	-	-
Sub-sub criteria (Level 4)	-	-

Further Breakdown from Cases (Level 1)	4. Financial Case
Criteria (Level 2)	**v. Overall cost risk** **<u>Extract from the EAST Guidance:</u>** • *respondents are asked to provide a risk rating of 1 (low risk) to 5 (high risk). Supporting evidence should be provided where possible and this might include examples of what similar schemes have cost in the past, how these costs have differed from original estimates or extrapolations drawn from pilot schemes.*
Comments	A qualitative assessment based on factors including: • Risk of cost increase • Complexity of option - unusual design elements, structural content • Known risks - suspect ground conditions, complex interfaces with existing infrastructure • Unusual construction techniques or risk of serious programme overrun
Sub-criteria (Level 3)	-
Sub-sub criteria (Level 4)	-

Further Breakdown from Cases (Level 1)	5. Commercial Case	
Criteria (Level 2)	**i. Flexibility of options** (in terms of deliverability) **Extract from the EAST Guidance:** • *to what extent can the option be scaled up or down depending on the level of funding available?* • *how easy would it be to stop the option/scheme once it has been put into operation? Or before it starts operating?* • *how easily could the scheme be amended to fit with changing circumstances?*	**ii. Where is funding coming from?** **Extract from the EAST Guidance:** • *brief qualitative statement on how capital and running costs will be financed and the certainty of funding*
Comments	Rather than the overall strategic criteria as above which are not as applicable to a scheme of this nature, a more location specific assessment will be undertaken. Flexibility of an option is a qualitative assessment of how easily the scheme design could be flexed to accommodate changing circumstances and avoid constraints during the design development stage. Constraints include environmental constraints and significant physical constraints.	A qualitative statement shall state how the option shall be funded (both capital cost and running costs). The assumption currently is that the option will be funded through the Road Investment Programme and that the required budget is available to develop the option. At this stage of the process the source of funding will not be a differentiator between options.
Sub-criteria (Level 3)	-	-
Sub-sub criteria (Level 4)	-	-

Further Breakdown from Cases (Level 1)	5. Commercial Case
Criteria (Level 2)	**iii. Any income generated?** **<u>Extract from the EAST Guidance:</u>** • *yes/no* • *best estimate of incomes generated from the scheme* • *have options for making beneficiaries pay for improvements been considered (e.g. fare increases)?*
Comments	In the context of a highways scheme, the assumption is that the only generation of income could come via a road toll. That is not applicable to a single junction improvement (as opposed to say a wholly new offline road improvement). Therefore, this criterion has not been assessed.
Sub-criteria (Level 3)	-
Sub-sub criteria (Level 4)	-

2) Early Assessment Sift Tool criteria and sub criteria measurement methodology

ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
1/i/-/-	Identify problems and objectives of the option	Not applicable - the EAST tool does not include grading for this criterion.	
1/ii/-/-	Scale of impact	**Dark green**	Expected to fully solve the identified problems (-50% reductions in journey times and congestion).
		Green	Expected to have a modest positive impact on alleviating the problems (-10% to -50% reductions in journey times and congestion).
		Grey	Expected to have a small positive impact on alleviating the problems (0% to -10% reductions in journey times and congestion).
		Amber	Expected to have a small negative impact on alleviating the problems (0% to +10% increase in journey times and congestion).
		Red	Expected to have significant negative impact on the identified problems (+10% to +50% increase in journey times and congestion).
1/iii/-/-	Fit with Wider transport & Government objectives	**Dark green**	Option significantly compliments wider transport and Government policies/proposals affecting study area, has no negative impacts on other modes or outcomes and demonstrates 'doing more with less'.
		Green	Option modestly compliments wider transport and Government policies/proposals affecting the study area.
		Grey	Option does not make any contribution towards wider transport and Government policies/proposals.
		Amber	Option has some conflict with wider transport and Government policies/options or modes.
		Red	Option significantly conflicts with wider transport and Government policies/proposals affecting the study area which would need to be resolved. Possibly also conflicts with other modes.

	ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
Intervention Objectives	1/iv/1/-	Making the network safer	**Dark green**	Highly Advantageous. The scheme is expected to achieve at least a 10% reduction in FWI (Fatal weighted index) from the baseline
			Green	Advantageous. The scheme is expected to achieve a reduction in FWI from the baseline below 10%
			Grey	Neutral Case. The scheme is expected to perform no worse than the existing baseline
			Amber	Disadvantageous. The scheme is expected to achieve a slight increase in the FWI than the existing baseline
			Red	Highly Disadvantageous. The scheme is expected to achieve a substantial increase in FWI than the existing baseline
	1/iv/2/-	Keeping the network in good condition - Designing health and safety into maintenance	**Dark green**	Highly Advantageous. Scheme compliments existing Highways England's policies and provides enhancements to maintenance strategies
			Green	Advantageous. Scheme compliments existing Highways England's policies and provides some enhancements to maintenance strategies
			Grey	Neutral
			Amber	Disadvantageous. Scheme compliments most of Highways England's policies but does not provide enhancements to maintenance strategies
			Red	Highly Disadvantageous. Scheme does not compliment Highways England's policies nor provide any enhancements to maintenance strategies

	ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description		Measurement scale
Intervention Objectives	1/iv/3/-	Delivery of better environmental outcomes	**Dark green**	Highly advantageous: Significant net beneficial effects (likely).
			Green	Slight or Moderately advantageous: Some net beneficial effects (likely).
			Grey	Neutral case: No effect or net neutral effects due to the balancing out of positive and negative effects, and likely availability of effective and affordable mitigation.
			Amber	Slight or Moderately Disadvantageous: Net adverse effects which are unlikely to be completely mitigatable but not expected to be a material planning consideration.
			Red	Highly Disadvantageous: Significant adverse effects which are unlikely to be mitigatable, expected to be a material planning consideration, and/or potentially not compliant with NN NPS policies.
	1/iv/4/-	Improving user satisfaction	**Dark green**	Based on engagement with stakeholders, assessors understand that stakeholders broadly agree the option meets scheme objectives and goes further to improve the local area and/or wider network.
			Green	Based on engagement with stakeholders, assessors understand that stakeholders broadly agree that the option meets objectives.
			Grey	Based on engagement with stakeholders, assessors understand that stakeholders generally agree that the option meets objectives, but some significant design considerations, changes or mitigations will be required.
			Amber	Based on engagement with stakeholders, assessors understand that stakeholders generally disagree that the option meets objectives, but some significant design considerations, changes or mitigations could help to achieve greater consensus.
			Red	Based on engagement with stakeholders, assessors understand that stakeholders broadly disagree that the option meets objectives.

	ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
Intervention Objectives	1/iv/5/-	Supporting the smooth flow of traffic (Assessment same as 1/ii/-/-)	**Dark Green**	Expected to fully solve the identified problems (-50% reductions in journey times and congestion).
			Green	Expected to have a modest positive impact on alleviating the problems (-10% to -50% reductions in journey times and congestion).
			Grey	Expected to have a small positive impact on alleviating the problems (0% to -10% reductions in journey times and congestion).
			Amber	Expected to have a small negative impact on alleviating the problems (0% to +10% increase in journey times and congestion).
			Red	Expected to have significant negative impact on the identified problems (+10% to +50% increase in journey times and congestion).
	1/iv/6/-	Encouraging economic growth	**Dark Green**	Option makes a step-change improvement in connectivity, reliability and resilience, or makes a significant contribution to wider economic impacts and delivery of housing aspirations.
			Green	Option makes a small improvement in connectivity, reliability and resilience, or makes a small contribution to wider economic impacts and delivery of housing aspirations.
			Grey	Option makes no improvement in connectivity, reliability and resilience, or makes no significant contribution to wider economic impacts and delivery of housing aspirations.
			Amber	Option results in a small decrease in connectivity, reliability and resilience, or has a small negative effect on wider economic impacts and delivery of housing aspirations.
			Red	Option results in a significant decrease in connectivity, reliability and resilience, or has a significant negative effect on wider economic impacts and delivery of housing aspirations.

	ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
Intervention Objectives	1/iv/7/-	Helping cyclists, walkers, and other vulnerable users of the network. Improve walking, cycling and horse riding links between communities and core traffic generators	**Dark green**	Highly Advantageous. Scheme accommodates and improves all impacted WCH links
			Green	Advantageous. Scheme accommodates most of the WCH links impacted
			Grey	Neutral Case. Scheme accommodates the existing WCH links but does not provide any enhancements
			Amber	Disadvantageous. Scheme accommodates most of the WCH links impacted but does not provide improvements
			Red	Highly Disadvantageous. Scheme does not accommodate any WCH links impacted
	1/iv/8/-	Customer (Assessment same as 1/iv/4)	**Dark green**	Based on engagement with stakeholders, assessors understand that stakeholders broadly agree the option meets scheme objectives and goes further to improve the local area and/or wider network.
			Green	Based on engagement with stakeholders, assessors understand that stakeholders broadly agree that the option meets objectives.
			Grey	Based on engagement with stakeholders, assessors understand that stakeholders generally agree that the option meets objectives, but some significant design considerations, changes or mitigations will be required.
			Amber	Based on engagement with stakeholders, assessors understand that stakeholders generally disagree that the option meets objectives, but some significant design considerations, changes or mitigations could help to achieve greater consensus.
			Red	Based on engagement with stakeholders, assessors understand that stakeholders broadly disagree that the option meets objectives.

<table>
<tr><th>ID referring to Appendix A1
(Level1/ Level2/ Level3/ Level4)</th><th>Description</th><th colspan="2">Measurement scale</th></tr>
<tr><td rowspan="2">1/v/1/-</td><td rowspan="2">National Level: National Networks National Policy Statement and Major Development</td><td>Green</td><td>The option does not impact any potential "show stopper" policies in the NN NPS relating to Local Green Space, civil and military aviation sites, and defence interest sites.

Low risk of the option not overcoming planning issues relating to the “show stopper” policies in the NN NPS, in relation to Local Green Space, civil and military aviation sites, and defence interest sites and it is considered that any national policy issues identified on the option would not have a significant impact on national policy.

And / or

The option does not impact Nationally Significant Infrastructure Projects

Low risk of the option not overcoming planning issues relating to national major committed developments (NSIPs / Transport and Works Act Orders) and it is considered that any national issues identified on the option would not have a significant impact on national major committed developments.</td></tr>
<tr><td>Amber</td><td>The option impacts potential "show stopper" policies in the NN NPS relating to Local Green Space, civil and military aviation sites, and defence interest sites.

Medium risk of the option not overcoming planning issues relating to the “show stopper” policies in the NN NPS, in relation to Local Green Space, civil and military aviation sites, and defence interest sites and it is considered that the national policy issues identified on the option could have a significant impact on national policy and further assessment is required to understand the level of impact.

And / or

The option impacts national major committed developments (NSIPs / Transport and Works Act Orders).

Medium risk of the option not overcoming planning issues relating to national major committed developments (NSIPs / Transport and Works Act Orders) and it is considered that the national issues identified on the option could have a significant impact on national major committed developments and further assessment is required to understand the level of impact.</td></tr>
</table>

		Red	The option impacts potential "show stopper" policies in the NN NPS relating to Local Green Space, civil and military aviation sites, and defence interest sites. High risk of the option not overcoming planning issues relating to the “show stopper” policies in the NN NPS, in relation to Local Green Space, civil and military aviation sites, and defence interest sites and it is considered that the national policy issues identified on the option will have a significant impact on national policy and is highly likely to raise insurmountable issues at examination. And / or The option impacts national major committed developments (NSIPs / Transport and Works Act Orders). High risk of the option not overcoming planning issues relating to national major committed developments (NSIPs / Transport and Works Act Orders and it is considered that the national issues identified on the option will have a significant impact on national major committed developments and further assessment is required to understand the level of impact.

ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
1/v/2/-	Local Level: Local Plan Policy and Major Development	**Green**	The option does not impact local major planning permissions or adopted and emerging allocations. Low risk of the option not overcoming planning issues relating to local major planning permissions or adopted and emerging allocations and it is considered that any local issues identified on the option would not have a significant impact on local policy.
		Amber	The option impacts local major planning permissions or adopted and emerging allocations. Medium risk of the option not overcoming planning issues relating to local major planning permissions or adopted and emerging allocations and it is considered that the local issues identified on the option could have a significant impact on local policy and further assessment is required to understand the level of impact.
		Red	The option impacts local major planning permissions or adopted and emerging allocations. High risk of the option not overcoming planning issues relating to local major planning permissions or adopted and emerging allocations and it is considered that the local issues identified on the option will have a significant impact on local policy and is highly likely to raise insurmountable issues at examination.
1/v/3/-	Land with Implications for Compulsory Acquisition	**Green**	The option does not impact Special Category Land and / or Crown Land (including Ministry of Defence Land). Low risk of the option not overcoming acquisition issues relating to Special Category Land and / or Crown Land (including Ministry of Defence Land).
		Amber	The option impacts Special Category Land (excluding National Trust Land) and / or Crown Land (including Ministry of Defence Land). Medium risk of the option not overcoming acquisition issues relating to Special Category Land and / or Crown Land (including Ministry of Defence Land). There must be a compelling case in the public interest for Special Category Land to be acquired and acquisition of Crown Land can only be included in an application for development consent if the Crown consents to it.
		Red	The option impacts National Trust Land. High risk of the option not overcoming acquisition issues relating to National Trust Land. High risk of the option not being granted special parliamentary powers on inalienable National Trust Land which could result in the land not being acquired and therefore the scheme could not go ahead. Section 130 of the Planning Act 2008 deals with land belonging to the National Trust inalienably. An application for development consent is subject to a request for granting special parliamentary

			powers if it proposes the compulsory acquisition of such inalienable land and the National Trust objects and does not withdraw its objection by the end of the examination stage.

ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
1/vi/-/-	Key uncertainties	Not applicable - The EAST tool does not include grading for this criterion.	
1/vii/-/-	Degree of consensus over outcomes (Assessment same as 1/iv/8)	**Dark Green**	Based on engagement with stakeholders, assessors understand that stakeholders broadly agree the option meets scheme objectives and goes further to improve the local area and/or wider network.
		Green	Based on engagement with stakeholders, assessors understand that stakeholders broadly agree that the option meets objectives.
		Grey	Based on engagement with stakeholders, assessors understand that stakeholders generally agree that the option meets objectives, but some significant design considerations, changes or mitigations will be required.
		Amber	Based on engagement with stakeholders, assessors understand that stakeholders generally disagree that the option meets objectives, but some significant design considerations, changes or mitigations could help to achieve greater consensus.
		Red	Based on engagement with stakeholders, assessors understand that stakeholders broadly disagree that the option meets objectives.
2/i/1/-	Connectivity	**Dark green**	Option makes a significant improvement in connectivity to / from Port of Felixstowe (-50% reductions in journey times and congestion).
		Green	Option makes a modest improvement in connectivity to / from Port of Felixstowe (-10% to -50% reductions in journey times and congestion).
		Grey	Option makes a small improvement in connectivity to / from Port of Felixstowe (0% to -10% reductions in journey times and congestion).
		Amber	Option makes a small decrease in connectivity to / from Port of Felixstowe (0% to +10% increase in journey times and congestion).
		Red	Option makes a significant decrease in connectivity to / from Port of Felixstowe (+10% to +50% increase in journey times and congestion).

ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
1/vi/-/-	Key uncertainties	Not applicable - The EAST tool does not include grading for this criterion.	
1/vii/-/-	Degree of consensus over outcomes (Assessment same as 1/iv/8)	**Dark Green**	Based on engagement with stakeholders, assessors understand that stakeholders broadly agree the option meets scheme objectives and goes further to improve the local area and/or wider network.
		Green	Based on engagement with stakeholders, assessors understand that stakeholders broadly agree that the option meets objectives.
		Grey	Based on engagement with stakeholders, assessors understand that stakeholders generally agree that the option meets objectives, but some significant design considerations, changes or mitigations will be required.
		Amber	Based on engagement with stakeholders, assessors understand that stakeholders generally disagree that the option meets objectives, but some significant design considerations, changes or mitigations could help to achieve greater consensus.
		Red	Based on engagement with stakeholders, assessors understand that stakeholders broadly disagree that the option meets objectives.
2/i/1/-	Connectivity	**Dark green**	Option makes a significant improvement in connectivity to / from Port of Felixstowe (-50% reductions in journey times and congestion).
		Green	Option makes a modest improvement in connectivity to / from Port of Felixstowe (-10% to -50% reductions in journey times and congestion).
		Grey	Option makes a small improvement in connectivity to / from Port of Felixstowe (0% to -10% reductions in journey times and congestion).
		Amber	Option makes a small decrease in connectivity to / from Port of Felixstowe (0% to +10% increase in journey times and congestion).
		Red	Option makes a significant decrease in connectivity to / from Port of Felixstowe (+10% to +50% increase in journey times and congestion).

ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
2/i/2/-	Reliability	**Dark green**	Further grade-separation at J55
		Green	Improvements to J55 but remains partially grade-separated
		Grey	No change.
		Amber	Minor decrease in capacity at J55.
		Red	Significant decrease in capacity at J55.
2/i/3/-	Wider Economic Impacts	**Dark green**	Yes, Wider Economic Impacts likely to materialise
		Red	No, Wider Economic Impacts unlikely to materialise
2/i/4/-	Resilience	**Dark green**	Option provides a high quality / high capacity alternative for traffic using J55.
		Green	Option provides a low capacity alternative for some of the traffic using J55.
		Grey	Option provides no alternative routes for traffic using J55.
		Amber	Option has a small negative impact on alternative routes for traffic using J55.
		Red	Option has a small negative impact on alternative routes for traffic using J55.

ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
2/i/5/-	Delivery of Housing	**Dark green**	This option will help to facilitate new housing aspirations.
		Grey	This option does not facilitate new housing aspirations.
		Red	This option will prevent new housing.
2/ii/-/-	Carbon Emission	Not assessed – insufficient evidence available at this time	
2/iii/1/-	Social and Distributional	**Dark green**	Net beneficial effects.
		Grey	No Change.
		Red	Net adverse effects.

<table>
<tr><th>ID referring to Appendix A1
(Level1/ Level2/ Level3/ Level4)</th><th>Description</th><th>Measurement scale</th></tr>
<tr><td>2/iii/2/-</td><td>Regeneration</td><td><table>
<tr><td>Dark green</td><td>Option would make a positive impact on Enterprise Zones etc</td></tr>
<tr><td>Grey</td><td>No Impact.</td></tr>
<tr><td>Red</td><td>Option would make a negative impact on Enterprise Zones etc</td></tr>
</table></td></tr>
<tr><td>2/iii/3/-</td><td>Regional Imbalance</td><td>Not considered due to scale of scheme</td></tr>
<tr><td>2/iv/1/-</td><td>Improve the net environmental impact of transport on communities</td><td><table>
<tr><td>Dark green</td><td>Highly advantageous: Significant net beneficial effects (likely).</td></tr>
<tr><td>Green</td><td>Slight or Moderately advantageous: Some net beneficial effects (likely).</td></tr>
<tr><td>Grey</td><td>Neutral case: No effect or net neutral effects due to the balancing out of positive and negative effects, and likely availability of effective and affordable mitigation.</td></tr>
<tr><td>Amber</td><td>Slight or Moderately Disadvantageous: Net adverse effects which are unlikely to be completely mitigatable but not expected to be a material planning consideration.</td></tr>
<tr><td>Red</td><td>Highly Disadvantageous: Significant adverse effects which are unlikely to be mitigatable, expected to be a material planning consideration, and/or potentially not compliant with NN NPS policies.</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>ID referring to Appendix A1
(Level1/ Level2/ Level3/ Level4)</th><th>Description</th><th>Measurement scale</th></tr>
<tr><td>2/iv/2/-</td><td>Reduce the impact of new infrastructure on natural and historic environment by design</td><td>
<table>
<tr><td>Dark green</td><td>Highly advantageous: Significant net beneficial effects (likely).</td></tr>
<tr><td>Green</td><td>Slight or Moderately advantageous: Some beneficial effects (likely).</td></tr>
<tr><td>Grey</td><td>Neutral case: No effect or net neutral effects due to the balancing out of positive and negative effects, and likely availability of effective and affordable mitigation.</td></tr>
<tr><td>Amber</td><td>Slight or Moderately Disadvantageous: Net adverse effects which are unlikely to be completely mitigatable but not expected to be a material planning consideration.</td></tr>
<tr><td>Red</td><td>Highly Disadvantageous: Significant adverse effects which are unlikely to be mitigatable, expected to be a material planning consideration, and/or potentially not compliant with NN NPS policies.</td></tr>
</table>
</td></tr>
<tr><td>2/iv/3/1</td><td>No net ecology loss</td><td>Not assessed as requirement is common to all options</td></tr>
</table>

ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
2/v/1/-	Does it make leisure trips quicker, cheaper and more reliable?	Dark green	Expected to fully solve the identified problems (-50% reductions in inter-peak journey times and congestion).
		Green	Expected to have a modest positive impact on alleviating the problems (-10% to -50% reductions in inter-peak journey times and congestion).
		Grey	Expected to have a small positive impact on alleviating the problems (0% to -10% reductions in inter-peak journey times and congestion).
		Amber	Expected to have a small negative impact on alleviating the problems (0% to +10% increase in inter-peak journey times and congestion).
		Red	Expected to have significant negative impact on the identified problems (+10% to +50% increase in inter-peak journey times and congestion).
2/v/2/-	Safety (Assessment same as 1/iv/1/-)	Dark green	Highly Advantageous. The scheme is expected to achieve at least a 10% reduction in FWI (Fatal weighted index) from the baseline
		Green	Advantageous. The scheme is expected to achieve a reduction in FWI from the baseline below 10%
		Grey	Neutral Case. The scheme is expected to perform no worse than the existing baseline
		Amber	Disadvantageous. The scheme is expected to achieve a slight increase in the FWI than the existing baseline
		Red	Highly Disadvantageous. The scheme is expected to achieve a substantial increase in FWI than the existing baseline
2/v/3/-	NMUs – WCH (walking, cycling, horse-riding) (Assessment same as 1/iv/7/-)	Dark green	Highly Advantageous. Scheme accommodates and improves all impacted WCH links
		Green	Advantageous. Scheme accommodates most of the WCH links impacted
		Grey	Neutral Case. Scheme accommodates the existing WCH links but does not provide any enhancements
		Amber	Disadvantageous. Scheme accommodates most of the WCH links impacted but does not provide improvements
		Red	Highly Disadvantageous. Scheme does not accommodate any WCH links impacted

<table>
<tr><th>ID referring to Appendix A1
(Level1/ Level2/ Level3/ Level4)</th><th>Description</th><th>Measurement scale</th></tr>
<tr><td>2/vi/-/-</td><td>Expected Value for Money Category</td><td>
<table>
<tr><td>Dark green</td><td>Option could have monetised benefits that very significantly exceed the costs.</td></tr>
<tr><td>Green</td><td>Option could have monetised benefits that significantly exceed the costs.</td></tr>
<tr><td>Grey</td><td>Option could have monetised benefits that moderately exceed the costs.</td></tr>
<tr><td>Amber</td><td>Option could have monetised benefits that slightly exceed the costs.</td></tr>
<tr><td>Red</td><td>Option could have monetised benefits that do not exceed the costs.</td></tr>
</table>
</td></tr>
<tr><td>3/i/-/-</td><td>Implementation timetable from inception to delivery</td><td>
<table>
<tr><td>Dark Green</td><td>The implementation of Stage 2, 3, 4, 5 & 6 mean that this option is sure to meet the opening date of November 2027</td></tr>
<tr><td>Green</td><td>The implementation of Stage 2, 3, 4, 5 & 6 mean that this option is very likely to meet the opening date of November 2027</td></tr>
<tr><td>Grey</td><td>The implementation of Stage 2, 3, 4, 5 & 6 mean that this option may meet the opening date of November 2027</td></tr>
<tr><td>Amber</td><td>The implementation of Stage 2, 3, 4, 5 & 6 mean that this option is unlikely to meet the opening date of November 2027</td></tr>
<tr><td>Red</td><td>The implementation of Stage 2, 3, 4, 5 & 6 mean that this option is highly unlikely to meet the opening date of November 2027</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>ID referring to Appendix A1
(Level1/ Level2/ Level3/ Level4)</th><th>Description</th><th colspan="2">Measurement scale</th></tr>
<tr><td rowspan="5">3/ii/1/-</td><td rowspan="5">How does the option perform against feedback from stakeholders?
(Assessment same as 1/iv/8)</td><td>Dark Green</td><td>Based on engagement with stakeholders, assessors understand that stakeholders broadly agree the option meets scheme objectives and goes further to improve the local area and/or wider network.</td></tr>
<tr><td>Green</td><td>Based on engagement with stakeholders, assessors understand that stakeholders broadly agree that the option meets objectives.</td></tr>
<tr><td>Grey</td><td>Based on engagement with stakeholders, assessors understand that stakeholders generally agree that the option meets objectives, but some significant design considerations, changes or mitigations will be required.</td></tr>
<tr><td>Amber</td><td>Based on engagement with stakeholders, assessors understand that stakeholders generally disagree that the option meets objectives, but some significant design considerations, changes or mitigations could help to achieve greater consensus.</td></tr>
<tr><td>Red</td><td>Based on engagement with stakeholders, assessors understand that stakeholders broadly disagree that the option meets objectives.</td></tr>
<tr><td rowspan="5">3/iii/1/-</td><td rowspan="5">Identify significant constraints that could affect project delivery</td><td>Dark green</td><td>The complexity and magnitude of construction issues for this option is desirable for construction.</td></tr>
<tr><td>Green</td><td>The complexity and magnitude of construction issues for this option has some desirable elements for construction</td></tr>
<tr><td>Grey</td><td>The complexity and magnitude of construction issues for this option has minor adverse effects on construction</td></tr>
<tr><td>Amber</td><td>The complexity and magnitude of construction issues for this option has adverse effects on construction</td></tr>
<tr><td>Red</td><td>The complexity and magnitude of construction issues for this option has significant adverse effects on construction</td></tr>
</table>

ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale	
3/iii/2/-	Provide a planning judgement to identify key risks associated with gaining a DCO	**Green**	Low risk of the option not overcoming national planning issues relating to the "show stopper" policies in the NN NPS and it is considered that any national policy issues identified on the option would not have a significant adverse effect on national policy. A case will need to be made to justify the benefits outweighing any adverse effects of the proposed development.
		Amber	Low risk of the option not overcoming national planning issues relating to the "show stopper" policies in the NN NPS and it is considered that any national policy issues identified on the option would not have a significant adverse effect on national policy. A case will need to be made to justify the benefits outweighing any adverse effects of the proposed development..
		Red	Low risk of the option not overcoming national planning issues relating to the "show stopper" policies in the NN NPS and it is considered that any national policy issues identified on the option would not have a significant adverse effect on national policy. A case will need to be made to justify the benefits outweighing any adverse effects of the proposed development..
3/iv/-/-	Quality of the supporting evidence	**Dark green**	High level of supporting evidence – the option has been modelled in detail or subjected to a Transport Business Case appraisal.
		Green	Good level of supporting evidence, possibly including some modelling and/or sensitivity testing demonstrating robust outcomes.
		Grey	Reasonable level of supporting evidence – good underlying data explaining the problem and some analysis of the outcomes.
		Amber	Poor level of supporting evidence – may be some underlying data or some informal analysis.
		Red	Low level of supporting evidence – an option in the very early stages of development that has not been implemented elsewhere with little supporting data and/or analysis.

ID referring to Appendix A1 (Level1/ Level2/ Level3/ Level4)	Description	Measurement scale
3/v/-/-	Key risks	Not applicable - The EAST tool doesn't include grading for this criterion.
4/i/-/-	Affordability	Not assessed as updated cost estimates for options are not available
4/ii/-/-	Capital costs	Not assessed as updated cost estimates for options are not available

<table>
<tr><th>ID referring to Appendix A1
(Level1/ Level2/ Level3/ Level4)</th><th>Description</th><th>Measurement scale</th></tr>
<tr><td>4/iii/-/-</td><td>Revenue costs</td><td>
<table>
<tr><td>Dark green</td><td>Slip road, roundabout and structures lengths are between 100 % to 149 % of lowest total</td></tr>
<tr><td>Green</td><td>Slip road, roundabout and structures lengths are between 150 % and 199 % of lowest total</td></tr>
<tr><td>Grey</td><td>Slip road, roundabout and structures lengths are between 199 % and 249 % of lowest total</td></tr>
<tr><td>Amber</td><td>Slip road, roundabout and structures lengths are between 249% and 300 % of lowest total</td></tr>
<tr><td>Red</td><td>Slip road, roundabout and structures lengths are greater than 300% of lowest total</td></tr>
</table>
</td></tr>
<tr><td>4/iv/-/-</td><td>Cost profile</td><td>Not applicable - The EAST tool doesn't include grading for this criterion.</td></tr>
<tr><td>4/v/-/-</td><td>Overall cost risk</td><td>
<table>
<tr><td>Dark green</td><td>No foreseeable potential for significant cost overruns</td></tr>
<tr><td>Green</td><td>Lower risk of significant cost overruns</td></tr>
<tr><td>Grey</td><td>Moderate risk of significant cost overruns</td></tr>
<tr><td>Amber</td><td>Higher risk of cost significant overruns</td></tr>
<tr><td>Red</td><td>Very high likelihood of significant cost overruns</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>ID referring to Appendix A1
(Level1/ Level2/ Level3/ Level4)</th><th>Description</th><th>Measurement scale</th></tr>
<tr><td>5/i/-/-</td><td>Flexibility of options</td><td>
<table>
<tr><td>Dark green</td><td>There is great scope to modify the design, there are no obvious constraints</td></tr>
<tr><td>Green</td><td>There is good scope to modify the design, there are few constraints</td></tr>
<tr><td>Grey</td><td>There is moderate scope to modify the design, the design is moderated constrained</td></tr>
<tr><td>Amber</td><td>There is limited scope to modify the design, the design is highly constrained</td></tr>
<tr><td>Red</td><td>There is negligible scope to modify the design, the design is very highly constrained</td></tr>
</table>
</td></tr>
<tr><td>5/ii/-/-</td><td>Source of funding</td><td>Not applicable - The EAST tool does not include grading for this criterion and is common to all options.</td></tr>
<tr><td>5/iii/-/-</td><td>Generation of income</td><td>Not applicable to this scheme</td></tr>
</table>

Appendix B. Options sifting scoring

Table B1 Strategic Case Scoring[1]

Level 2 Criteria	Level 3 Criteria	Option 1 Agreed Score	Option 2 Agreed Score	Option 3 Agreed Score	Option 4 Agreed Score	Discussions captured
ii) Scale of impact	[redacted]	G	G	G	G	All movements were considered within the assessment, however as noted above, it was agreed that consideration should be made for the main movement between A12S and A14E. Whilst undertaking the Journey Time modelling signal timings have been kept the same, so main impacts have been related to increasing capacity rather than optimising traffic signals. There are likely to be further minor improvements that can be made. The comparison is using the original version of SERTM, rather than the traffic model that is currently being calibrated/validated as part of the scheme. It was noted that Washbrook was not represented within the original model.
iii) Fit with Wider transport & Government objectives		G	G	G	G	It was agreed that all options would modestly compliment the transport and Government policies.
iv) Fit with other objectives	1) Making the network safer	DG	G	G	G	The assessment was carried out based on FWI rather than KSI. Option 1 was deemed to perform the best because there had been 1 fatality on the A14 NB on slip, as this is the only option that was modifying the slip road, it was expected that the scheme would achieve at least 10% reduction. All other options were perceived to introduce a reduction in FWI, however due to the relatively low number of incidents may be more challenging at this stage to categorically state that it would achieve a 10% reduction. As the design progresses more information will be available to assess this objective.
	2) Keeping the network in good condition - designing health & safety into maintenance	GR	G	G	G	Option 1 would not offer any new maintenance facilities so was considered to be neutral. Options 2-4 were judged to introduce opportunities for off network access and the use of longer lasting materials. However, with all the options would be introducing new structures and assets that would need to be maintained, that are complex in nature. Options 2-4 were deemed to provide some enhancements to the maintenance strategies.
	3) Delivery of better environmental outcomes	GR	A	A	A	Option 1 the footprint is restricted to the existing highway boundary, as a result the net environmental impact was considered neutral. Options 2-4 there was the potential for a slight positive impact on local community with improved connectivity and WCH facilities, however the natural receptors could be adversely impacted due to the new structures. Considered that impacts could substantially be mitigated. It was noted that Option 4 would provide a Slight Disadvantageous impact and Options 2 and 3 were likely to introduce a Moderate Disadvantageous impact.
	4) Improving user satisfaction	GR	G	G	G	The scoring was based on the feedback received during the Stakeholder Reference Groups (Community and Environment & Trade and Economic). Overall, the attendees considered that the offline approach would deliver more advantages for the area, and potentially betterment could occur if scheme required orders (e.g. linking up of PRoW and bridleways that had previously been severed).
	5) Supporting the smooth flow of traffic	G	G	G	G	Discussions were around whether reliability should be considered, and on the basis that Options 2-4 provided a free flow link, and option 1 retained signals whether that should be reflected in the scores. Consideration was made to whether Option 1 should be given a grey rating, it was decided because there was a separate criterion that considered reliability the score should remain as green.
	6) Encouraging economic growth	G	G	G	G	It was agreed that all options would make a small contribution towards the wider economic impacts and delivery of housing aspirations.
	7) Helping cyclists, walkers, and other vulnerable users of the network. Improve walking, cycling and horse-riding links between communities and core traffic generators	GR	DG	DG	G	It was noted that because this was a RIS 3 Scheme, it was not likely to be able to access any designated funds. This criterion has not considered the use of funds when assessing the options. Option 1 scored grey, because there are no WCH routes intersected by the scheme, as a result there would be no direct requirements to enhance the facilities. Options 2 and 3 footprints would likely have the greatest impact on PRoW, as a result the scheme would need to connect any severance and look to enhance the existing routes. As a result, it was considered that the options were likely to accommodate and improve the impacted WCH links. The footprint for Option 4 had less of an impact on the PRoW, as a result there would be less of a requirement to enhance the affected PRoW. It was noted that some members of the Stakeholder Reference Group had mentioned connecting severed parts of the

[1] The table is reflective of the criteria outlined in the sifting methodology, if criteria was identified as not to be assessed it will not appear within the table

								PRoW/Bridleway that had occurred in the past, this would be an opportunity for any of the Options that would be going through the Development Consent Order process.
	8) Customer	GR		G		G		The scoring was based on the feedback received during the Stakeholder Reference Groups (Community and Environment & Trade and Economic). Overall, the attendees considered that the offline approach would deliver more advantages for the area, and potentially betterment could occur if scheme required orders (e.g. linking up of PRoW and bridleways that had previously been severed).
v) Planning and Land with Implications for Compulsory Acquisition - Fit & Risks	1) National Level: National Networks National Policy Statement and Major Development	G		G		G		No impacts on the constraints, there is nothing that intersects with the options. There is low risk that not overcoming the planning issues. For National level sites the team are waiting for feedback on defence assets and aviation safeguarding areas (however they were deemed to be low risk). Discussions were held around whether Option 1 would require a Development Consent Order if the construction remained within the Highway Boundary. It was considered to be too early to categorically state because temporary possession of land would also need to be accounted for, so haul routes and size of construction compounds would need to be determined.
	2) Local Level: Local Plan Policy and Major Development	G		G		G		There are no major constraints from planned development identified for any of the options.
	3) Land with Implications for Compulsory Acquisition	G		G		G		Noted very unlikely that would change the scoring to an Amber. All parties agreed this should be scored as green.
vii) Degree of consensus over outcomes		GR		G		G		The scoring was based on the feedback received during the Stakeholder Reference Groups (Community and Environment & Trade and Economic). Overall, the attendees considered that the offline approach would deliver more advantages for the area, and potentially betterment could occur if scheme required orders (e.g. linking up of PRoW and bridleways that had previously been severed).

Table B2 Economic Case Scoring2

Level 2 Criteria	Level 3 Criteria	Option 1 Agreed Score	Option 2 Agreed Score	Option 3 Agreed Score	Option 4 Agreed Score	Discussions captured
i) Economic Growth	1) Connectivity	G	DG	DG	DG	The scoring metric was originally accounting for freight vehicles travelling from NE London to the Port of Felixstowe. Despite there being an 11-minute reduction in timescales over a longer journey duration (1.5-2hrs) the benefit was approximately 10% saving. Parties considered that an 11-minute journey time within the junction area was a significant saving, and as such should be reflected in the scoring. As a result, the Scoring criteria was modified to the following: Consider the performance over a reduced distance for vehicles travelling through the junction, A12 J31 – A14 J58. Dark Green; Journey time reduction >10 minutes Green; Journey time reduction <10minutes and >5 minutes
	2) Reliability	G	DG	DG	DG	Options 2-4 provide additional grade separation of dominant movement, which scored higher than the increased junction capacity but no increase in grade separation.
	3) Wider Economic Impacts	DG	DG	DG	DG	It was agreed that all options would make a small contribution to agglomeration and reduce imperfect market competition.
	4) Resilience	GR	G	GR	G	Not large step changes, better options 2 and 4 due to the free flow links in both directions. From an operational point of view, those that have an alternative route (in/around the junction) have better resilience.
	5) Delivery of Housing	DG	DG	DG	DG	It was agreed from a planning perspective there is no difference between the options, all would allow further housing and easier development.
iii) Socio-distributional Impacts and the Regions	1) Social and distributional	DG	DG	DG	DG	It was considered that Options 2 and 4 would be more advantageous to free up the existing junction, possibly for bus routes. It was noted that at the current time there are no bus routes that use the junction as a result it was agreed that all options should score the same.
	2) Regeneration	DG	DG	DG	DG	All options would provide a positive impact to the local Enterprise Zones around Ipswich and wider area.
iv) Local Environment	1) Improve the net environmental impact of transport on communities	GR	GR	GR	G	Options 2-4 would be taking additional traffic taken away from the population in NE corner of the junction, however through the introduction of structures/ there is a greater visual impact in SE and receptors overall. It was noted that Options 2 and 3 would be on a viaduct in open land (introducing a greater visual impact). It was considered due to the shorter lengths of structure and increased embankments, there is a greater ability to screen and replant reducing the impact of the option.
	2) Reduce the impact of new infrastructure on natural and historic environment by design	GR	A	A	A	Noted the options have a varying degree of impact, Option 4 avoids flood zone and Option 2 and 3 cross the flood zone multiple times. It was agreed that Option 4, whilst still attracting an amber rating would have a Slight disadvantageous impact, whereas Options 2 and 3 would have a Moderate disadvantageous impact.
v) Well-being	1) Does it make leisure trips quicker, cheaper and more reliable?	GR	GR	GR	GR	Group considered that most people would make trips on the off-peak when you are most likely to make the savings. As a result, it was considered the project would be unlikely to change the leisure trips significantly. All options were scored as Grey (small positive impact).
	2) Safety	GR	G	G	G	It was agreed that the assessment criteria should be modified under the economic case. Options 2-4 would likely to have a wider network safety benefit, whereas Option 1 does not resolve the weaving issues on the approach to the junction.
	3) NMUs – WCH (walking, cycling, horse-riding)	G	DG	DG	DG	Options 2-4 potentially improve the situation for the bridleway or connecting previous disconnected routes as part of the consenting process under orders.
vi) Expected Value for Money Category		G	G	G	G	Group queried whether the VfM should be the same, because Landscape monetisation considered in VfM but not BCR. Options scored green because early indication are benefits would significantly exceed costs.

[2] The table is reflective of the criteria outlined in the sifting methodology, if criteria was identified as not to be assessed it will not appear within the table

Table B3 Managerial Case Scoring3

Level 2 Criteria	Level 3 Criteria	Option 1 Agreed Score	Option 2 Agreed Score	Option 3 Agreed Score	Option 4 Agreed Score	Discussions captured
i) Implementation timetable from inception to delivery	[redacted]	G	GR	GR	G	All parties agreed with the suggested scoring detailed in presentation, refer to Appendix B for more details.
ii) Public Acceptability		GR	G	G	G	The scoring was based on the feedback received during the Stakeholder Reference Groups (Community and Environment & Trade and Economic). Overall, the attendees considered that the offline approach would deliver more advantages for the area, and potentially betterment could occur if scheme required orders (e.g. linking up of PRoW and bridleways that had previously been severed).
iii) Practical feasibility	1) Identify significant constraints that could affect project delivery	A	GR	GR	G	All parties agreed with the suggested scoring detailed in presentation, refer to Appendix B for more details.
	2) Provide a planning judgement to identify key risks associated with gaining a DCO	A	A	A	A	All parties agreed with the suggested scoring detailed in presentation, refer to Appendix B for more details.
iv) Quality of the supporting evidence	[redacted]	GR	GR	GR	GR	All parties agreed with the suggested scoring detailed in presentation, refer to Appendix B for more details.

Table B4 Financial Case Scoring[3]

Level 2 Criteria	Level 3 Criteria	Option 1 Agreed Score	Option 2 Agreed Score	Option 3 Agreed Score	Option 4 Agreed Score	Discussions captured
iii) Revenue costs		DG	GR	G	G	Potential for technology for Options 2-4 would have revenue costs associated with them. Depending where the slip roads end up may impact on the technology, increasing the project costs.
v) Overall cost risk		A	GR	GR	GR	Parties considered that all options have got a cost risk. It was agreed that whilst all options had a cost risk, proportionate to the cost of the scheme, Option A had a much greater likelihood of significant cost overruns.

Table B5 Commercial Case Scoring[3]

Level 2 Criteria	Level 3 Criteria	**Option 1** Agreed Score	**Option 2** Agreed Score	**Option 3** Agreed Score	**Option 4** Agreed Score	Discussions captured
i) Flexibility of options		A	G	GR	G	All parties agreed with the suggested scoring detailed in presentation, refer to Appendix B for more details.

[3] The table is reflective of the criteria outlined in the sifting methodology, if criteria was identified as not to be assessed it will not appear within the table

Appendix C. Environmental Assessment Summary

Topic	Option 1	Option 1B	Option 4
Air Quality *Construction vehicle emissions impacts have not been assessed at this stage.*	• Annual mean NO2 concentrations predicted to increase slightly at 5 residential 'worst-case' receptors at opening year. • Annual mean PM10 concentrations predicted to increase slightly at 2 residential 'worst-case' receptors at opening year. • These changes are not significant as the annual average pollutant concentrations predicted for the opening year are below the annual mean AQS objectives for both NO2 and PM10.		• Annual mean NO2 concentrations predicted to increase slightly at 4 residential 'worst-case' receptors at opening year. • Annual mean PM10 concentrations predicted to increase slightly at 2 residential 'worst-case' receptors at opening year. • These changes are not significant as the annual average pollutant concentrations predicted for the opening year are below the annual mean AQS objectives for both NO2 and PM10. • The change in N deposition at Spring Wood/Millennium Wood is close to the significance threshold (1% of the lowest critical loads).
Cultural Heritage	• Minor impacts unlikely to be significant with mitigation.	• Minor impacts unlikely to be significant with mitigation.	• Significant impacts to a number of listed buildings during construction as a result of moderate aural and visual disturbance within their settings. • Significant visual and aural impacts affecting the 2 grade II listed buildings during operation. • Partial or complete removal of two medium value ring ditches.
Landscape & Visual Effects	• Significant impacts on Rolling Estate Farmlands LLCA during construction.	• Significant impacts on Rolling Estate Farmlands LLCA during construction and operation.	• Significant impacts on 'Additional Scheme Area' associated with the AONB during construction and operation.

Topic	Option 1	Option 1B	Option 4
	• Potentially significant impacts to 9 receptors during construction, 3 during operation.	• Potentially significant impacts to 11 receptors during construction, 3 during operation.	• Significant impacts on Rolling Estate Farmlands LLCA during construction and operation. • Potentially significant impacts to 13 receptors during construction, 12 during operation.
Biodiversity	• Least significant impacts on ecological features, due to smaller extents and lack of modification to existing culverts and channels of Belstead Brook.	• Requires the most works to culverts and channels of Belstead Brook and could potentially have the highest impacts on statutory designated sites downstream.	• Substantial works within the flood plain between A14 and Belstead Meadows • Largest area of land take, including land from Belstead Brook Wood County Wildlife Site. • Largest area of Habitats of Principal Importance within footprint. • Fragmentation of retained habitat to the south.
Geology & Soils	• Permanent sealing of up to 13ha agricultural land and reduction of soil functions.	• Permanent sealing of up to 16ha agricultural land and reduction of soil functions.	• Permanent sealing of up to 28ha agricultural land and reduction of soil functions.
Material Assets & Waste	• Unlikely to cause significant impacts.	• Potential for significant impacts in relation to waste due to generation of hazardous waste	• Potential for significant impacts in relation to waste due to generation of hazardous waste
Noise & Vibration	• Approx. 9 dwellings within 600m likely to require acoustic mitigation due to becoming closer to the widened carriageway. • Remaining dwellings/ receptors within 600m are unlikely to require acoustic mitigation measures due to separation distances resulting in small magnitudes of change in road traffic noise, or existing dominant sources of road traffic noise.	• Approx. 9 dwellings within 600m likely to require acoustic mitigation due to becoming closer to the widened carriageway. • Remaining dwellings/ receptors within 600m are unlikely to require acoustic mitigation measures due to separation distances resulting in small magnitudes of change in road traffic noise, or existing dominant sources of road traffic noise.	• Approx. 191 dwellings within 600m likely to require acoustic mitigation due to magnitude of change in noise levels.
Population & Human Health	• No significant impacts to land use and access receptors likely.	• No significant impacts to land use and access receptors likely.	• Potential partial closure of some PRoW routes.

Topic	Option 1	Option 1B	Option 4
	• Temporary diversions of PRoWs, replacement access to open/ natural green space, and net additional employment opportunities in the local area during construction. • Improved access to businesses and employment/training opportunities during operation. • Some permanent land take of Grade 2 agricultural land.	• Temporary diversions of PRoWs, replacement access to open and natural green space, and net additional employment opportunities in the local area during construction • Improved access to businesses and employment/training opportunities during operation. • Some permanent land take of Grade 2 agricultural land.	• Access restrictions/ disruptions to residential properties along Oakfield Road, Grove Hill Road and business premises along A12, London Road and Church Lane. • Reduced amenity to community assets due to increased visual and dust disturbances during construction. • Potential reduced usage of facilities during construction. • Permanent land take of Grade 2 agricultural land likely to be larger. • Negative effect on access to green space/ nature during construction. • Improved access to businesses and employment/training opportunities during operation.
Road Drainage & Water Environment	• Least impact on hydromorphology as it does not introduce new culverts. • Potential significant effects on groundwater in the Principal and Secondary aquifers due to piling/sheet piling.	• Potentially significant hydromorphological effects as a result of proposed culverting of watercourses. • Lower potential for impacts to groundwater than Option 1. • Encroaches into Flood Zones 2, 3 and 3b associated with the Belstead Brook.	• Potentially significant hydromorphological effects as a result of proposed culverting of watercourses. • Potentially significant effects to the groundwater environment due to new cuttings which may require dewatering during construction and operation, and closer proximity to secondary groundwater receptors including groundwater abstractions. • Proposed crossing could impact existing flood risk.
Climate	• Lowest embodied carbon due to lowest amount of cut and fill earthworks. • Minimal impact on flood zone, reducing potential impacts to assets and their	• Higher embodied carbon than Option 1, but lower than Option 4. • Extends into flood zone, increasing potential impacts to assets and operation, maintenance and refurbishment, as well as users.	• Highest embodied carbon due to >300% increase in earthworks required, increased sign removal and outbuildings, and additional free flow link roads.

Topic	Option 1	Option 1B	Option 4
	operation, maintenance and refurbishment, as well as users.	Increased risk of site flooding during construction.	• Avoids flood zone and increases capacity of hydrological network.

Appendix D. Key NN NPS policies

	Para.	
Safety	4.66	The Secretary of State should not grant development consent unless satisfied that all reasonable steps have been taken and will be taken to: • minimise the risk of road casualties arising from the scheme; and contribute to an overall improvement in the safety of the Strategic Road Network.
Air quality	5.13	The Secretary of State should refuse consent where, after taking into account mitigation, the air quality impacts of the scheme will: • result in a zone/agglomeration which is currently reported as being compliant with the Air Quality Directive becoming non-compliant; or affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission at the time of the decision.
Internationally designated sites and Sites of Special Scientific Interest	5.27 – 5.29	Where a proposed development on land within or outside [an internationally designated site and/or] a SSSI is likely to have an adverse effect on an [internationally designated site and/or] a SSSI (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect on the site's notified special interest features is likely, an exception should be made only where the benefits of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs. Please be aware that paragraph 5.29 refers specifically to SSSIs, but paragraph 5.27 demonstrated that the Government places equal if not more weight on the protection of internationally designated sites. This therefore extends paragraph 5.29 to apply also to listed and candidate proposed Special Areas of Conservation, Special Protection Areas, Sites of Community Importance and Ramsar sites.
Irreplaceable habitats including ancient woodland and veteran trees	5.32	The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss.
Protection of other habitats and species	5.35 4.22– 4.25 & 5.27	… The Secretary of State should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits of the development (including need) clearly outweigh that harm. Where a development may negatively affect any priority habitat or species on a site for which they are a protected feature, any IROPI case would need to be established solely on one or more of the grounds relating to human health, public safety or beneficial consequences of primary importance to the environment.
Civil and military aviation and defence interests	5.62	Where, after reasonable mitigation, operational changes and planning obligations and requirements have been proposed, development consent should not be granted if the Secretary of State considers that: • a development would prevent a licensed aerodrome from maintaining its licence; • the benefits of the proposed development are outweighed by the harm to aerodromes serving business, training or emergency service needs; or

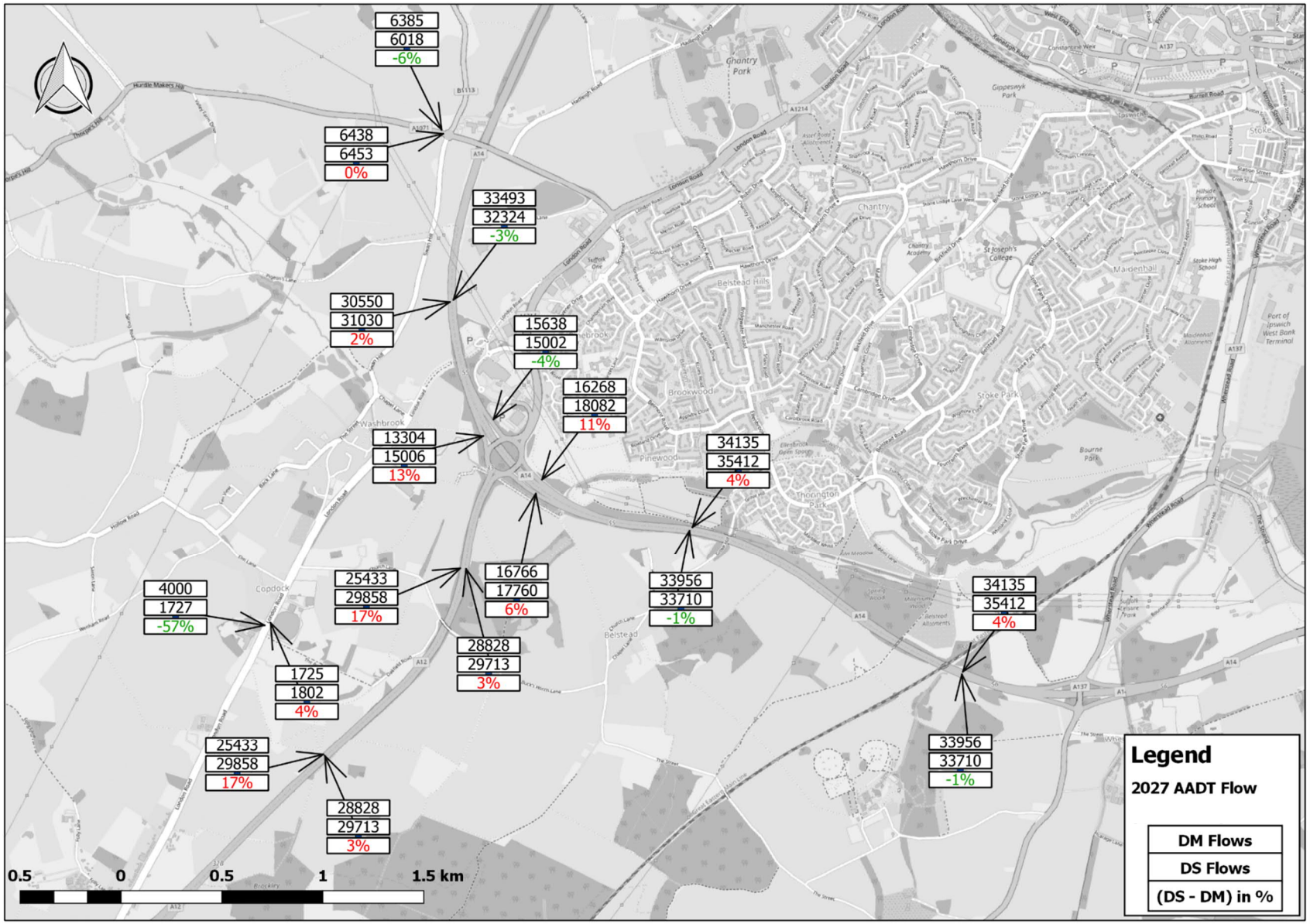
		the development would significantly impede or compromise the safe and effective use of defence assets or significantly limit military training.
Coastal change	5.75	When assessing applications in a CCMA, [Coastal Change Management Area], the Secretary of State should not grant development consent unless it is demonstrated that the development: • will be safe over its planned lifetime and will not have an unacceptable impact on coastal change; • will not compromise the character of the coast covered by designations; • provides wider sustainability benefits; and does not hinder the creation and maintenance of a continuous signed and managed route around the coast.
Flood risk	5.99 & 5.108	When determining an application the Secretary of State should be satisfied that flood risk will not be increased elsewhere and only consider development appropriate in areas at risk of flooding where (informed by a flood risk assessment, following the Sequential Test and, if required, the Exception Test), it can be demonstrated that: • within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and • development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and priority is given to the use of sustainable drainage systems. Both elements of the test will have to be passed for development to be consented. For the Exception Test to be passed: • it must be demonstrated that the project provides wider sustainability benefits to the community95 that outweigh flood risk; and a FRA must demonstrate that the project will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, will reduce flood risk overall.
The historic environment (designated heritage assets)	5.133	Where the proposed development will lead to substantial harm to or total loss of significance of a designated heritage asset, the Secretary of State should refuse consent unless it can be demonstrated that the substantial harm or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm, or alternatively that all of the following apply: • the nature of the heritage asset prevents all reasonable uses of the site; and • no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and • conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and

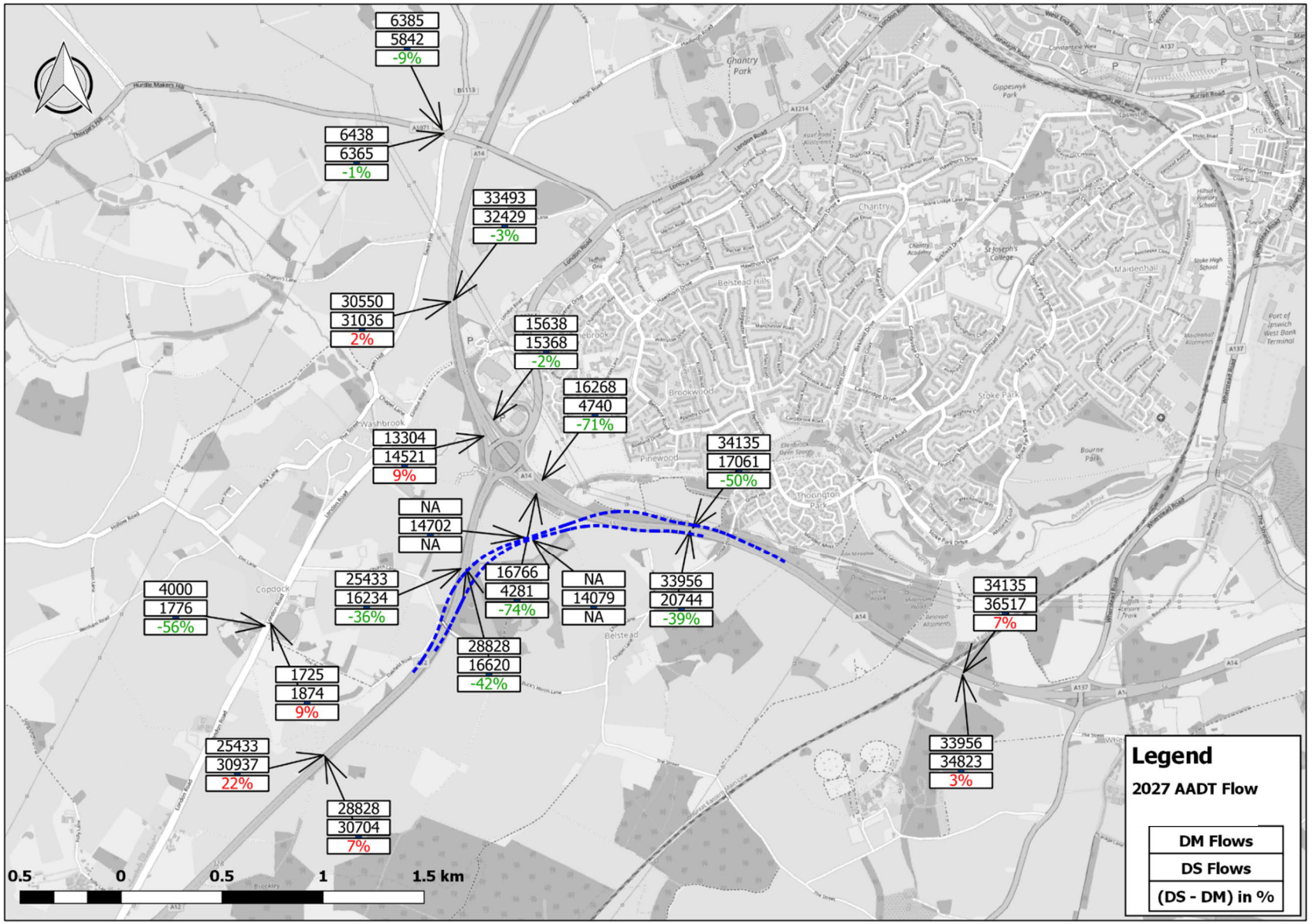
		the harm or loss is outweighed by the benefit of bringing the site back into use.
Nationally designated areas: National Parks, the Broads & Areas of Outstanding Natural Beauty	5.151 & 5.152	The Secretary of State should refuse development consent in these areas except in exceptional circumstances and where it can be demonstrated that it is in the public interest. Consideration of such applications should include an assessment of: • the need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it, upon the local economy; • the cost of, and scope for, developing elsewhere, outside the designated area, or meeting the need for it in some other way; and • any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated. There is a strong presumption against any significant road widening or the building of new roads and strategic rail freight interchanges in a National Park, the Broads and Areas of Outstanding Natural Beauty, unless it can be shown there are compelling reasons for the new or enhanced capacity and with any benefits outweighing the costs very significantly. Planning of the Strategic Road Network should encourage routes that avoid National Parks, the Broads and Areas of Outstanding Natural Beauty.
Land use: Green Belt	5.170 & 5.178	…. Metropolitan Open Land, and land designated as Local Green Space in a local or neighbourhood plan, are subject to the same policies of protection as Green Belt, and inappropriate development should not be approved except in very special circumstances. When located in the Green Belt national networks infrastructure projects may comprise inappropriate development. Inappropriate development is by definition harmful to the Green Belt and there is a presumption against it except in very special circumstances. The Secretary of State will need to assess whether there are very special circumstances to justify inappropriate development. Very special circumstances will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations. In view of the presumption against inappropriate development, the Secretary of State will attach substantial weight to the harm to the Green Belt, when considering any application for such development.
Land use: open space / sports and recreational buildings and land	5.174	The Secretary of State should not grant consent for development on existing open space, sports and recreational buildings and land, including playing fields, unless an assessment has been undertaken either by the local authority or independently, which has shown the open space or the buildings and land to be surplus to requirements, or the Secretary of State determines that the benefits of the project (including need) outweigh the potential loss of such facilities, taking into account any positive proposals made by the applicant to provide new, improved or compensatory land or facilities.

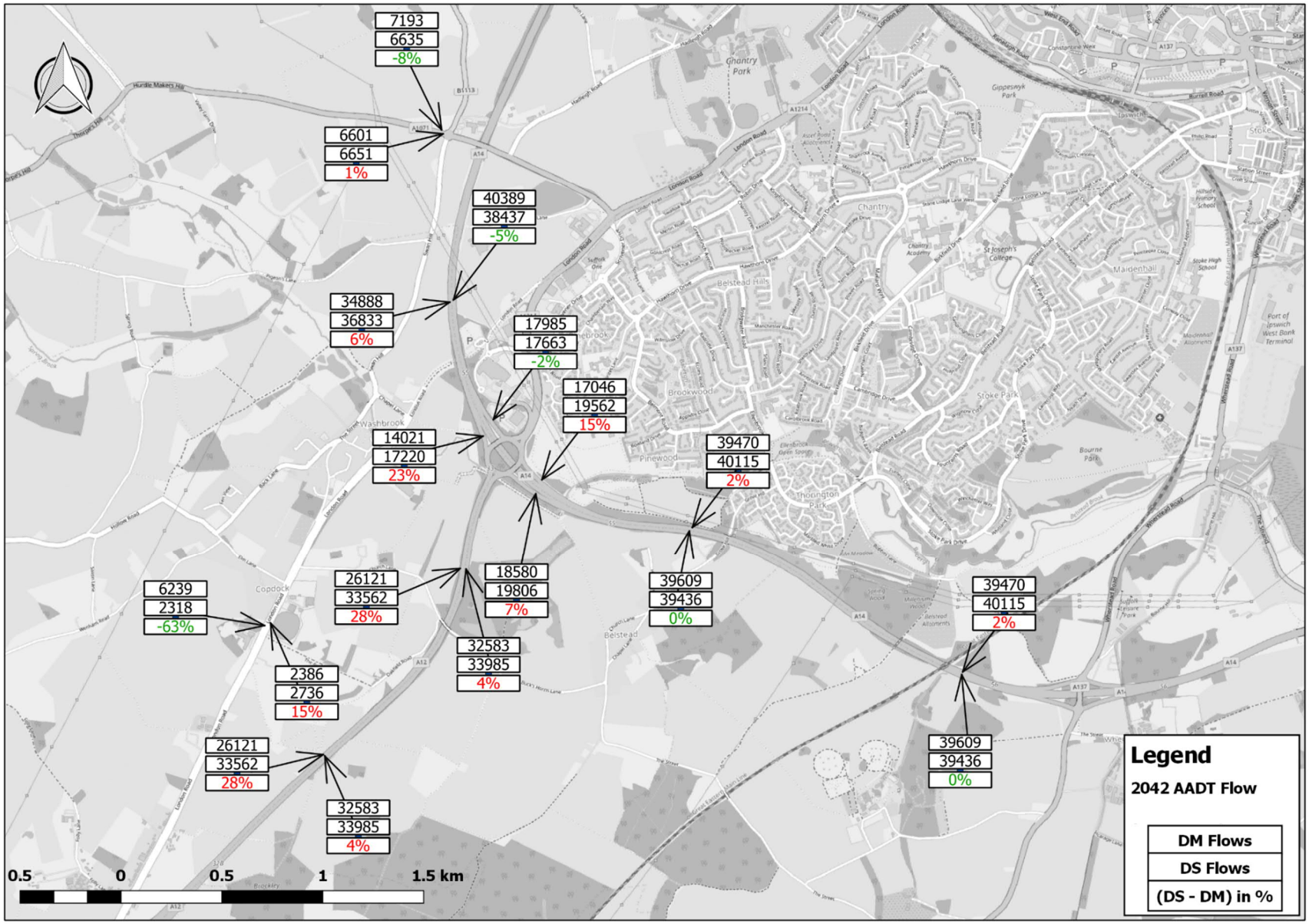
Noise and vibration	5.195	The Secretary of State should not grant development consent unless satisfied that the proposals will meet, the following aims, within the context of Government policy on sustainable development: • avoid significant adverse impacts on health and quality of life from noise as a result of the new development; • mitigate and minimise other adverse impacts on health and quality of life from noise from the new development; and contribute to improvements to health and quality of life through the effective management and control of noise, where possible.
Water quality and resources	5.227	… If the Environment Agency continues to have concerns and objects to the grant of development consent on the grounds of impacts on water quality/resources, the Secretary of State can grant consent, but will need to be satisfied before deciding whether or not to do so that all reasonable steps have been taken by the applicant and the Environment Agency to try to resolve the concerns, and that the Environment Agency is satisfied with the outcome.
Minerals Safeguarding Areas	5.169 & 5.182	Applicants should safeguard any mineral resources on the proposed site as far as possible. Where a proposed development has an impact on a Mineral Safeguarding Area (MSA), the Secretary of State should ensure that the applicant has put forward appropriate mitigation measures to safeguard mineral resources.
Community severance, health and well-being	3.22 & 4.79 - 4.82	Severance can be a problem in some locations. Where appropriate applicants should seek to deliver improvements that reduce community severance and improve accessibility. National road and rail networks and strategic rail freight interchanges have the potential to affect the health, well-being and quality of life of the population. They can have direct impacts on health because of traffic, noise, vibration, air quality and emissions, light pollution, community severance, dust, odour, polluting water, hazardous waste and pests. The applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. These impacts may affect people simultaneously, so the applicant, and the Secretary of State (in determining an application for development consent) should consider the cumulative impact on health.

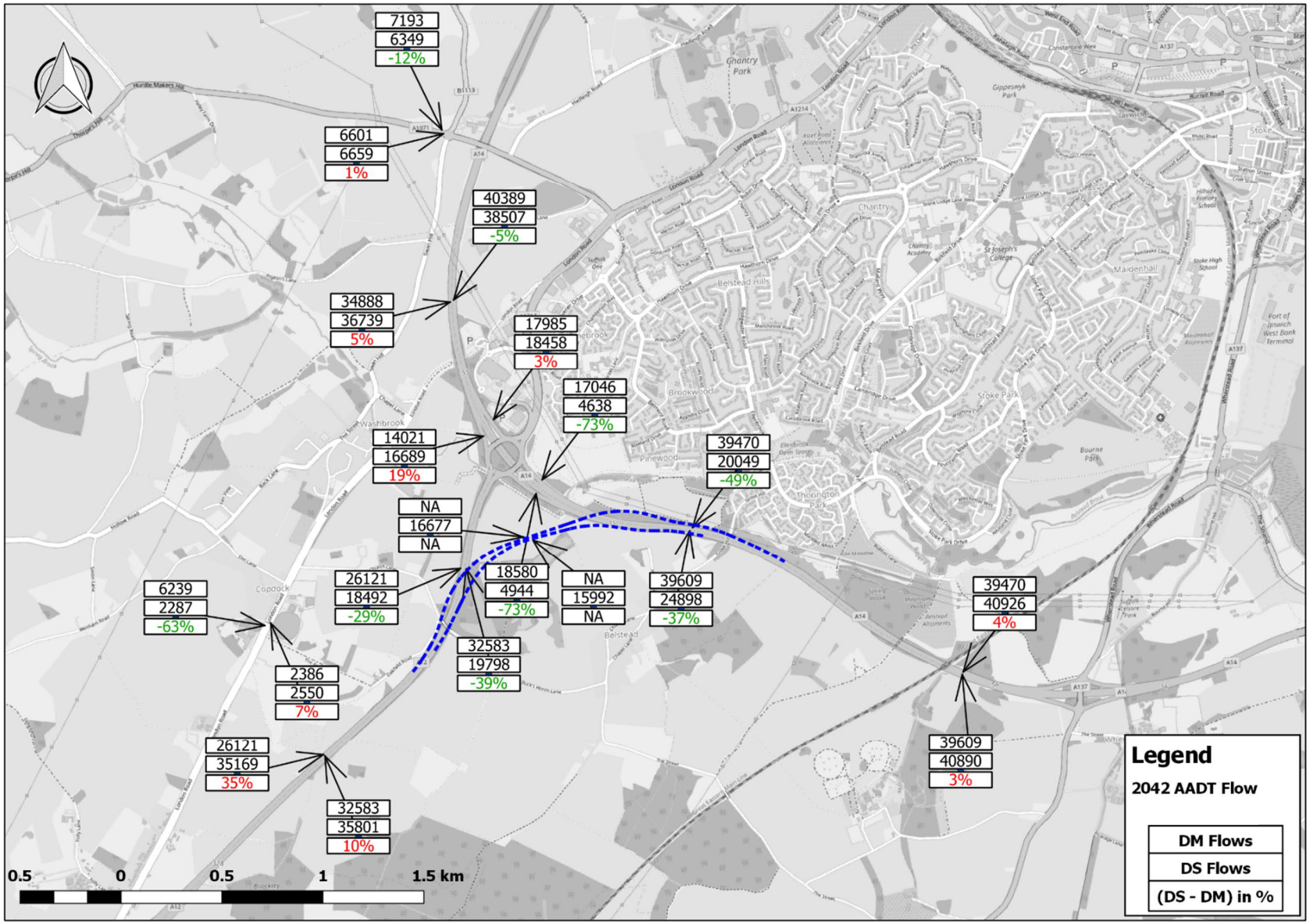
Appendix E. Traffic Flow Diagrams (AADT, AM, PM, IP)

AADT FLOWS

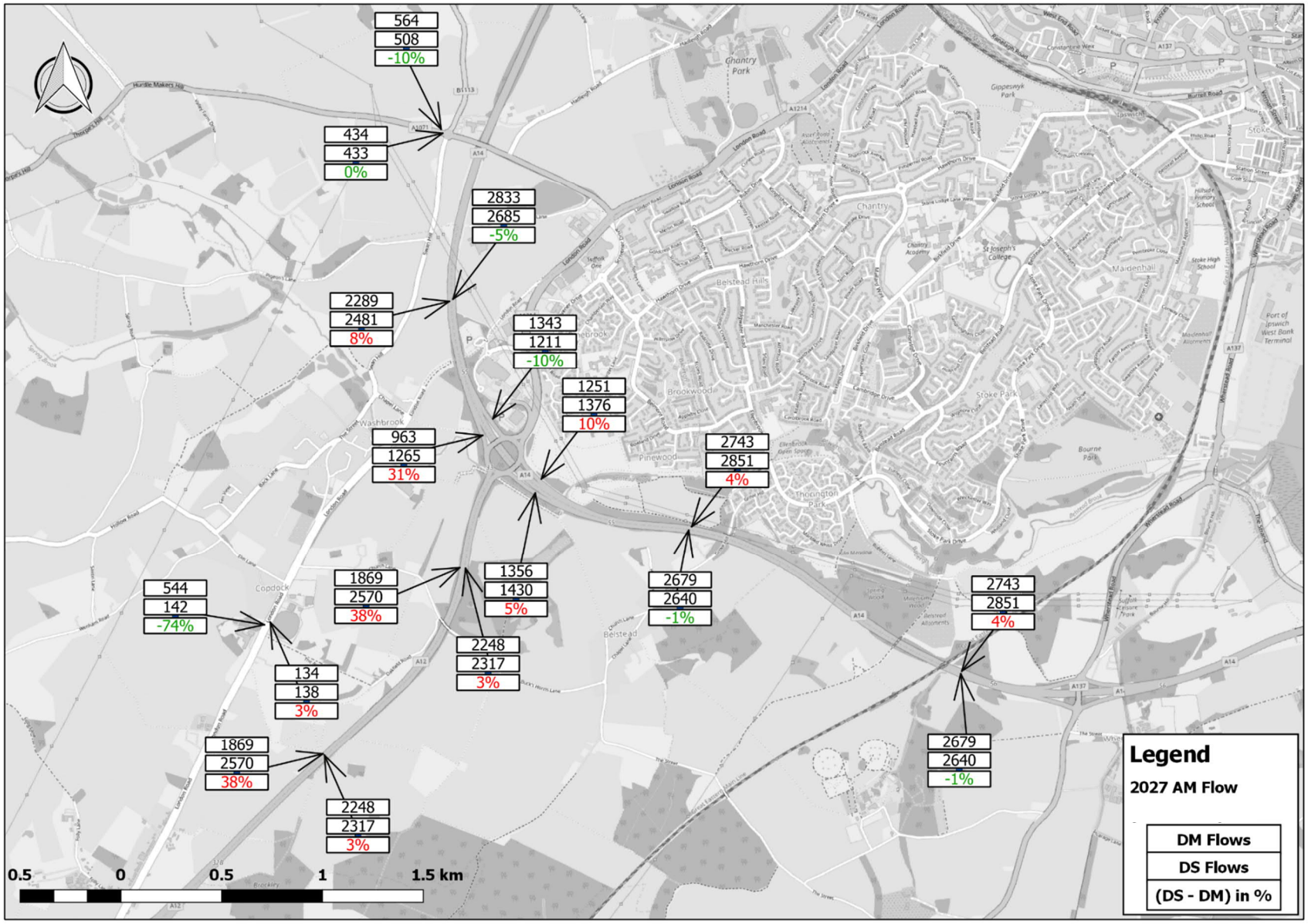

6385
6018
-6%
6438
6453
0%
33493
32324
-3%
30550
31030
2%
15638
15002
-4%
16268
18082
11%
13304
15006
13%
34135
35412
4%
33956
33710
-1%
4000
1727
-57%
25433
29858
17%
16766
17760
6%
28828
29713
3%
1725
1802
4%
34135
35412
4%
25433
29858
17%
28828
29713
3%
33956
33710
-1%
0.5
0
0.5
1
1.5 km
Legend
2027 AADT Flow
DM Flows
DS Flows
(DS - DM) in %

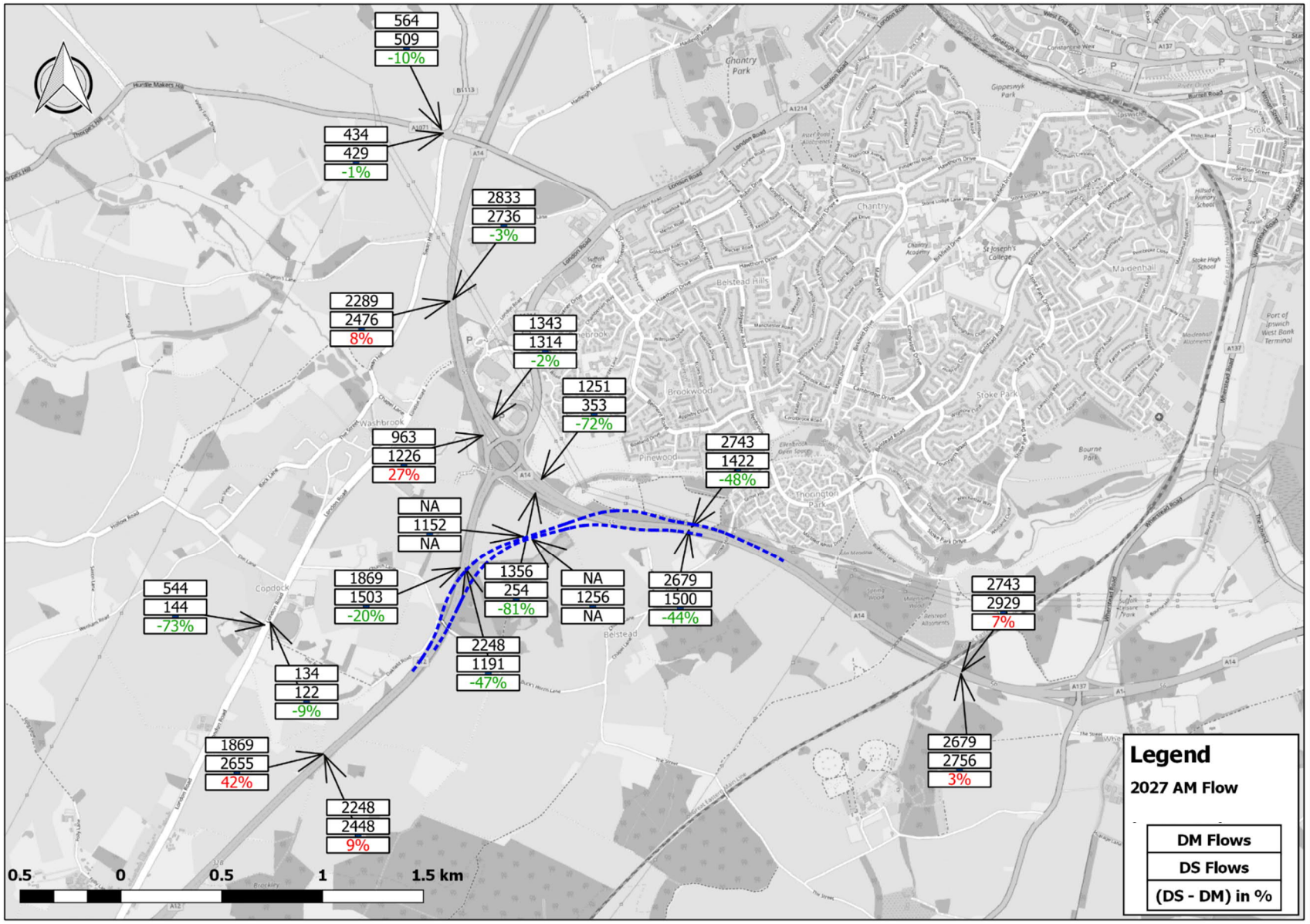

6385
5842
-9%
6438
6365
-1%
33493
32429
-3%
30550
31036
2%
15638
15368
-2%
16268
4740
-71%
13304
14521
9%
34135
17061
-50%
NA
14702
NA
4000
1776
-56%
25433
16234
-36%
16766
4281
-74%
NA
14079
NA
33956
20744
-39%
34135
36517
7%
28828
16620
-42%
1725
1874
9%
25433
30937
22%
28828
30704
7%
33956
34823
3%
0.5
0
0.5
1
1.5 km
Legend
2027 AADT Flow
DM Flows
DS Flows
(DS - DM) in %

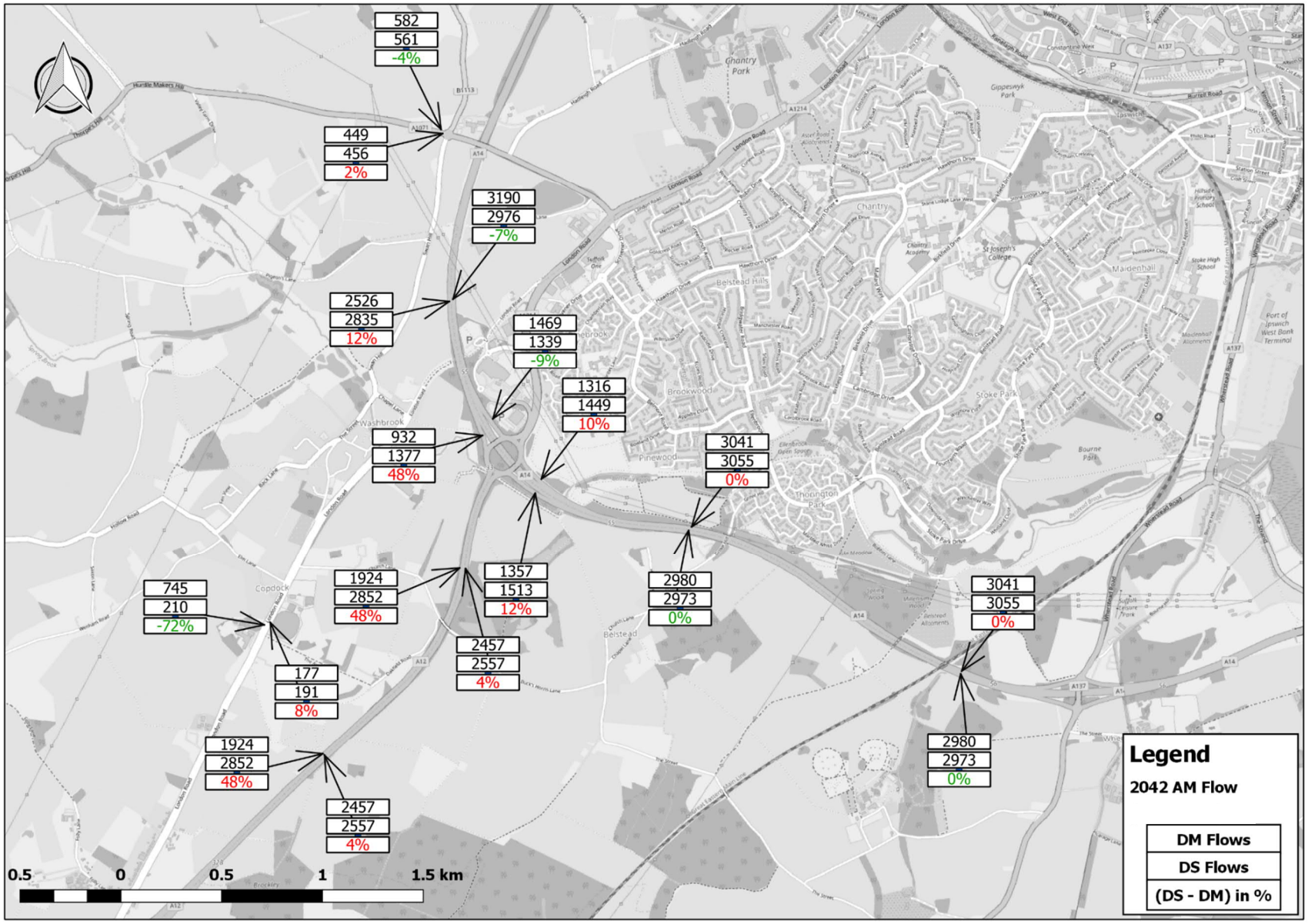

7193
6635
-8%
6601
6651
1%
40389
38437
-5%
34888
36833
6%
17985
17663
-2%
17046
19562
15%
14021
17220
23%
39470
40115
2%
6239
2318
-63%
26121
33562
28%
18580
19806
7%
39609
39436
0%
39470
40115
2%
32583
33985
4%
2386
2736
15%
26121
33562
28%
39609
39436
0%
32583
33985
4%
0.5
0
0.5
1
1.5 km
Legend
2042 AADT Flow
DM Flows
DS Flows
(DS - DM) in %

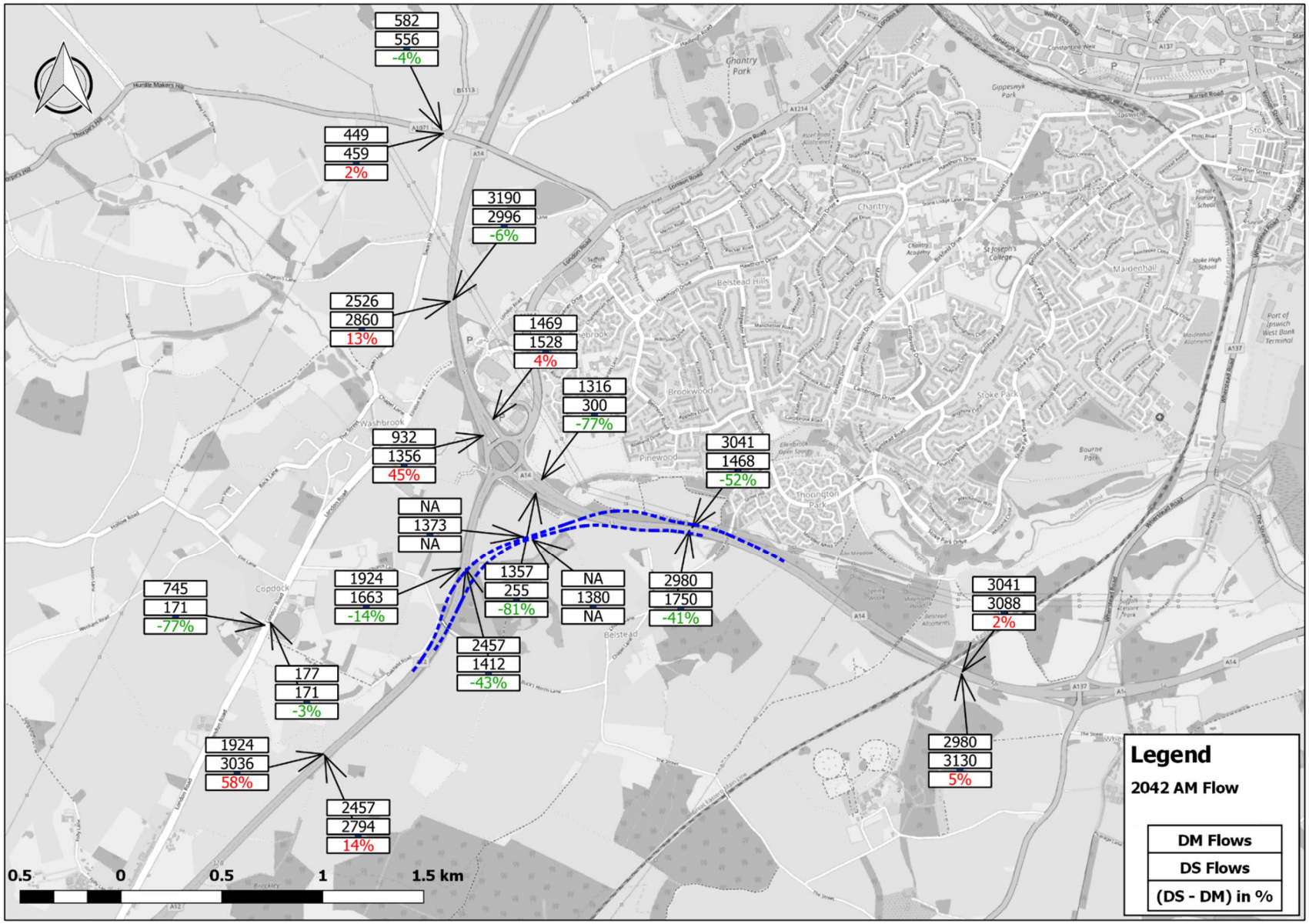

7193
6349
-12%
6601
6659
1%
40389
38507
-5%
34888
36739
5%
17985
18458
3%
17046
4638
-73%
14021
16689
19%
39470
20049
-49%
NA
16677
NA
6239
2287
-63%
26121
18492
-29%
18580
4944
-73%
NA
15992
NA
39609
24898
-37%
39470
40926
4%
32583
19798
-39%
2386
2550
7%
26121
35169
35%
32583
35801
10%
39609
40890
3%
0.5
0
0.5
1
1.5 km
Legend
2042 AADT Flow
DM Flows
DS Flows
(DS - DM) in %

AM PEAK FLOWS

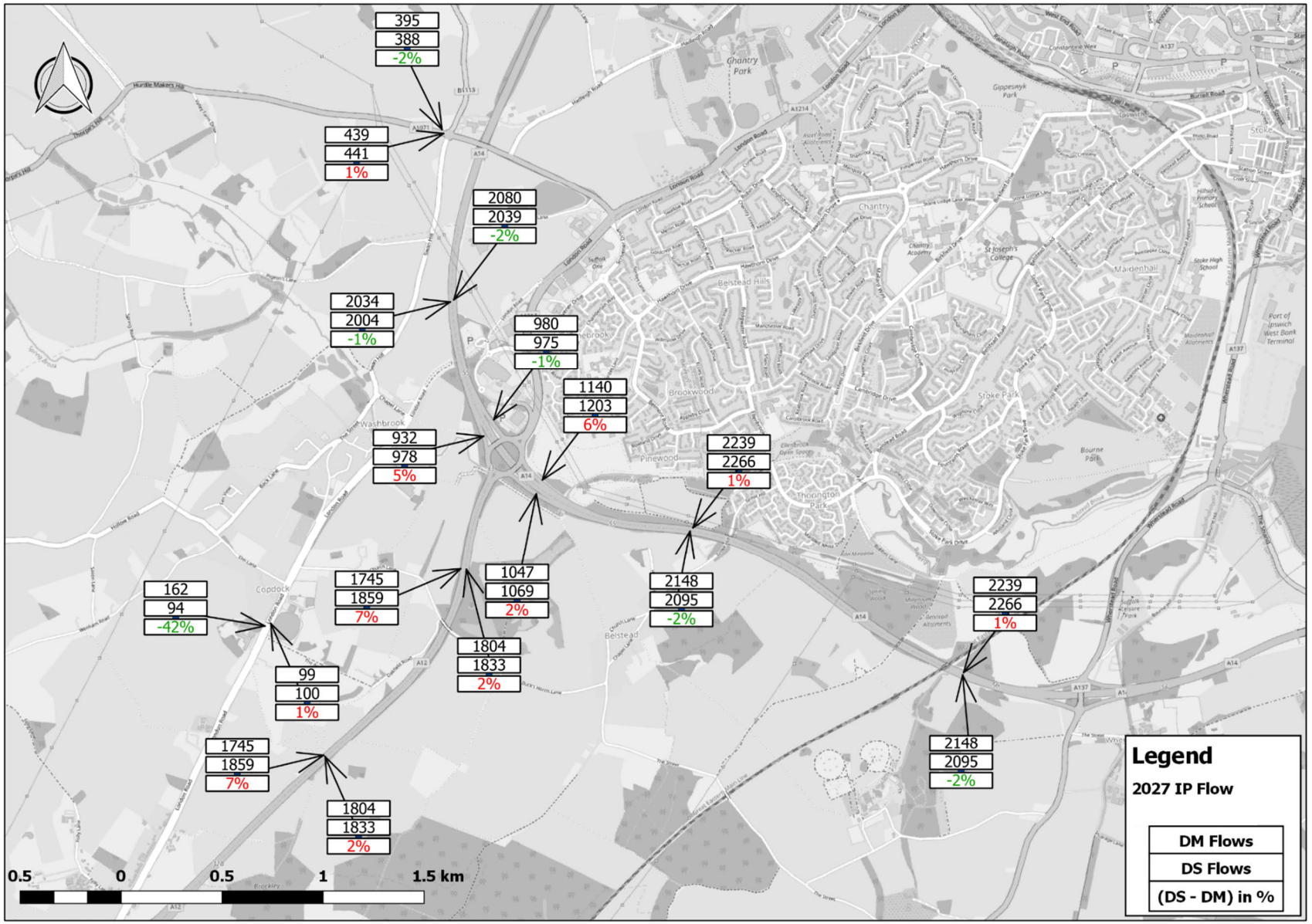

564
508
-10%
434
433
0%
2833
2685
-5%
2289
2481
8%
1343
1211
-10%
1251
1376
10%
963
1265
31%
2743
2851
4%
1869
2570
38%
1356
1430
5%
2679
2640
-1%
544
142
-74%
2248
2317
3%
134
138
3%
0.5
0
0.5
1
1.5 km
Legend
2027 AM Flow
DM Flows
DS Flows
(DS - DM) in %

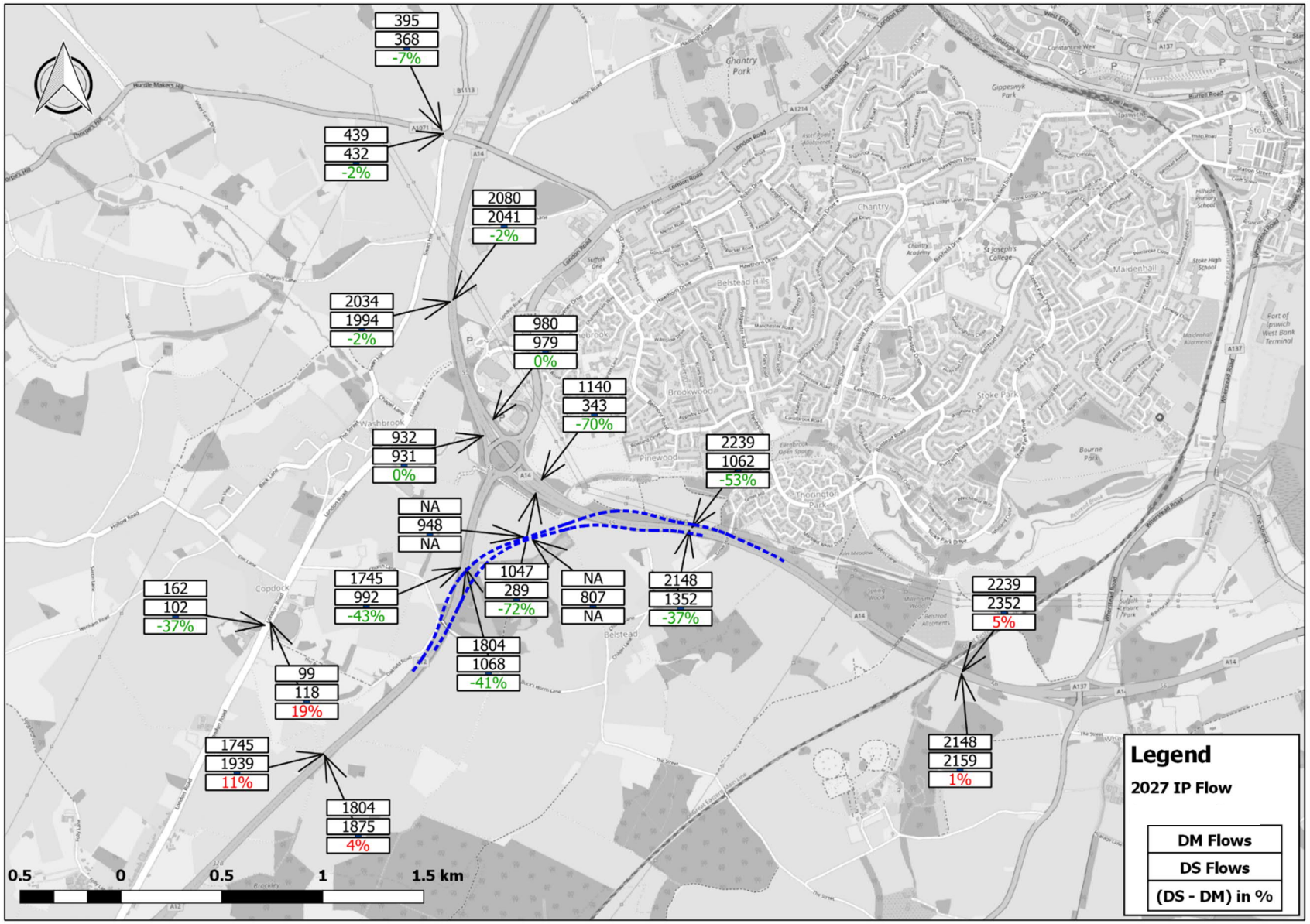

564
509
-10%
434
429
-1%
2833
2736
-3%
2289
2476
8%
1343
1314
-2%
1251
353
-72%
963
1226
27%
2743
1422
-48%
NA
1152
NA
544
144
-73%
1869
1503
-20%
1356
254
-81%
NA
1256
NA
2679
1500
-44%
2743
2929
7%
2248
1191
-47%
134
122
-9%
1869
2655
42%
2679
2756
3%
2248
2448
9%
0.5
0
0.5
1
1.5 km
Legend
2027 AM Flow
DM Flows
DS Flows
(DS - DM) in %

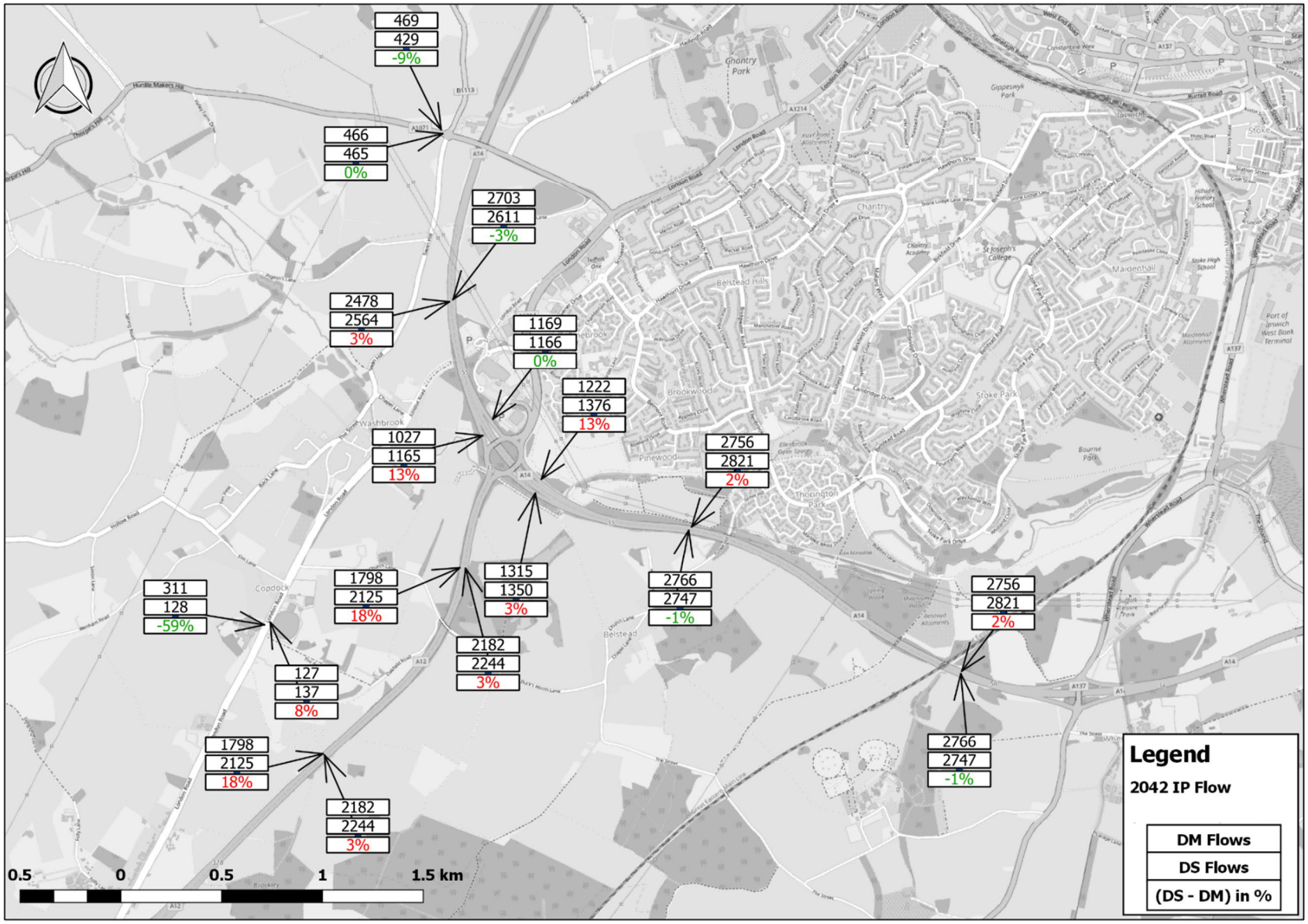

582
561
-4%
449
456
2%
3190
2976
-7%
2526
2835
12%
1469
1339
-9%
1316
1449
10%
932
1377
48%
3041
3055
0%
745
210
-72%
1924
2852
48%
1357
1513
12%
2980
2973
0%
3041
3055
0%
177
191
8%
2457
2557
4%
1924
2852
48%
2457
2557
4%
2980
2973
0%
0.5
0
0.5
1
1.5 km
Legend
2042 AM Flow
DM Flows
DS Flows
(DS - DM) in %

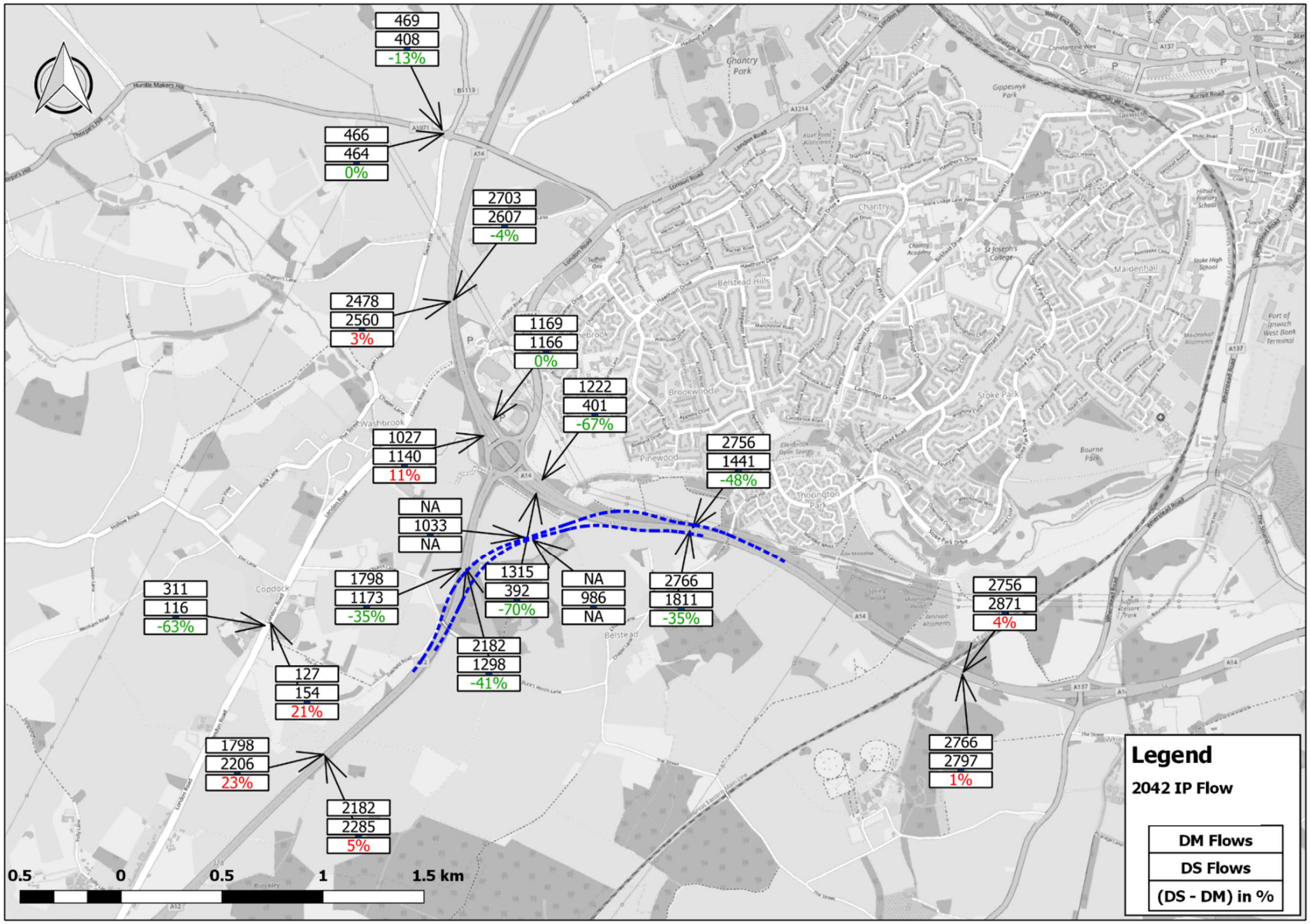

582
556
-4%
449
459
2%
3190
2996
-6%
2526
2860
13%
1469
1528
4%
1316
300
-77%
932
1356
45%
3041
1468
-52%
NA
1373
NA
745
171
-77%
1924
1663
-14%
1357
255
-81%
NA
1380
NA
2980
1750
-41%
3041
3088
2%
177
171
-3%
2457
1412
-43%
1924
3036
58%
2457
2794
14%
2980
3130
5%
0.5
0
0.5
1
1.5 km
Legend
2042 AM Flow
DM Flows
DS Flows
(DS - DM) in %

IP FLOWS

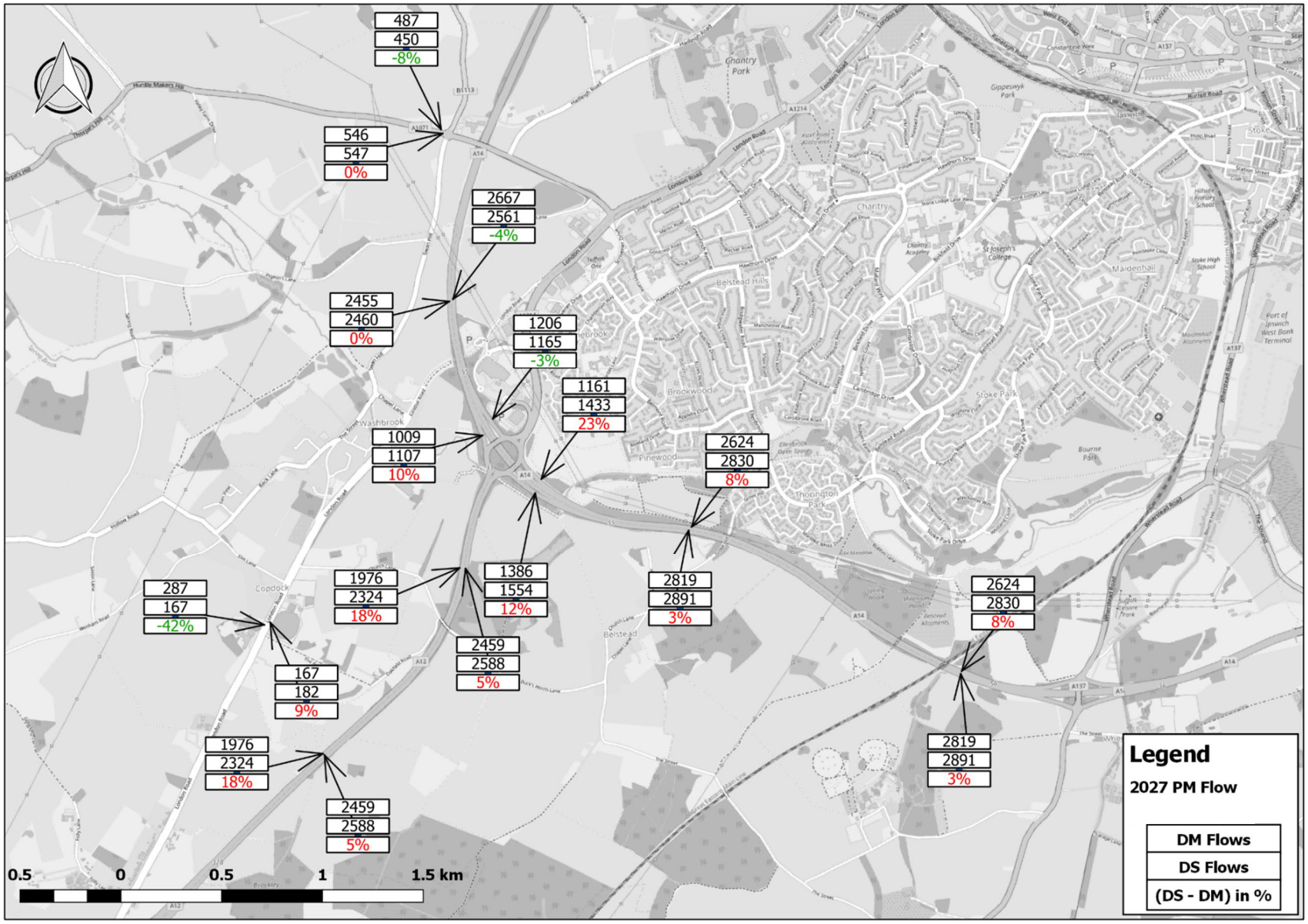

395
388
-2%
439
441
1%
2080
2039
-2%
2034
2004
-1%
980
975
-1%
1140
1203
6%
932
978
5%
2239
2266
1%
1047
1069
2%
1745
1859
7%
1804
1833
2%
2148
2095
-2%
162
94
-42%
99
100
1%
2239
2266
1%
1745
1859
7%
1804
1833
2%
2148
2095
-2%
0.5
0
0.5
1
1.5 km
Legend
2027 IP Flow
DM Flows
DS Flows
(DS - DM) in %

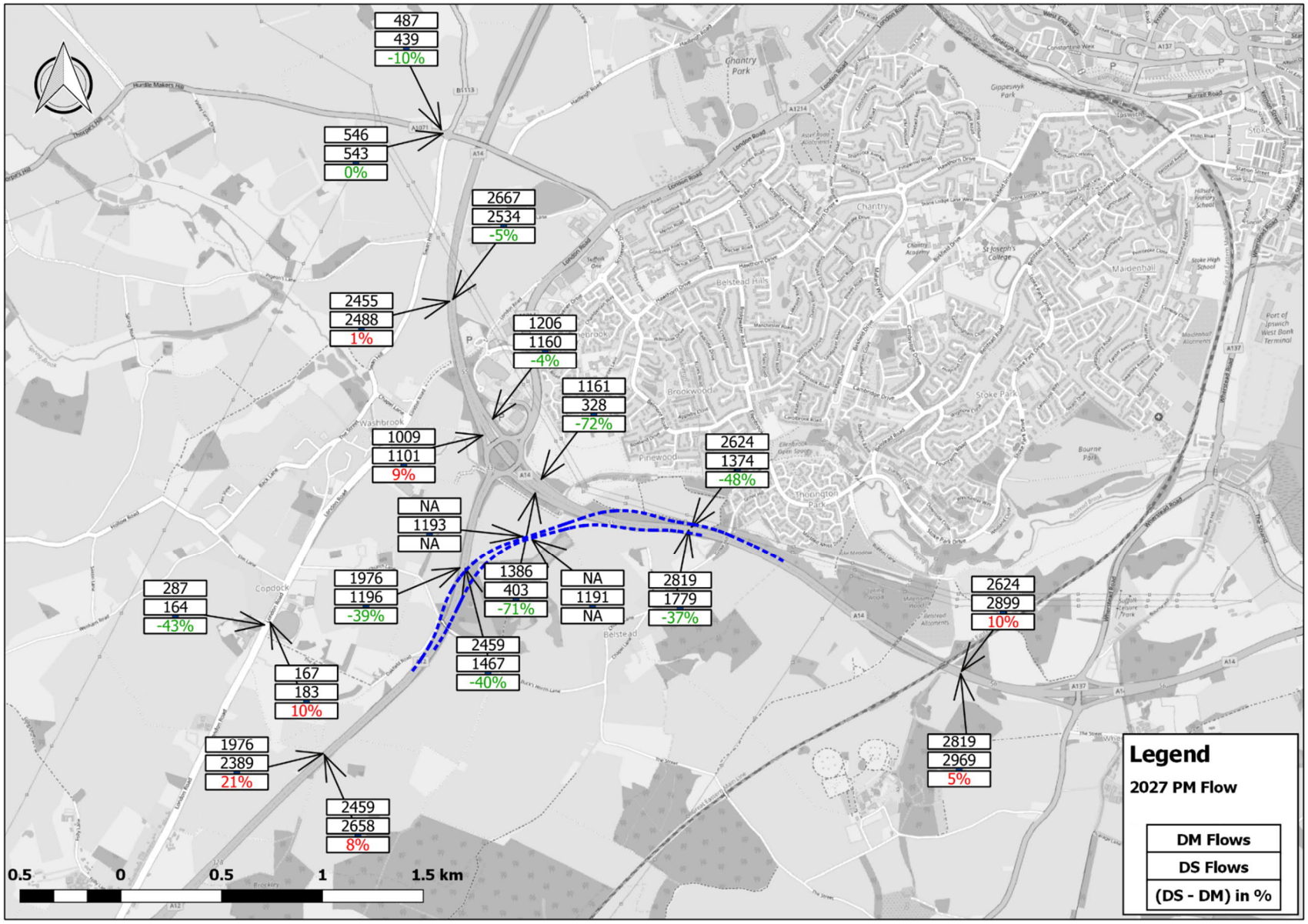

395
368
-7%
439
432
-2%
2080
2041
-2%
2034
1994
-2%
980
979
0%
1140
343
-70%
932
931
0%
2239
1062
-53%
NA
948
NA
1745
992
-43%
1047
289
-72%
NA
807
NA
2148
1352
-37%
162
102
-37%
2239
2352
5%
1804
1068
-41%
99
118
19%
1745
1939
11%
2148
2159
1%
1804
1875
4%
0.5
0
0.5
1
1.5 km
Legend
2027 IP Flow
DM Flows
DS Flows
(DS - DM) in %

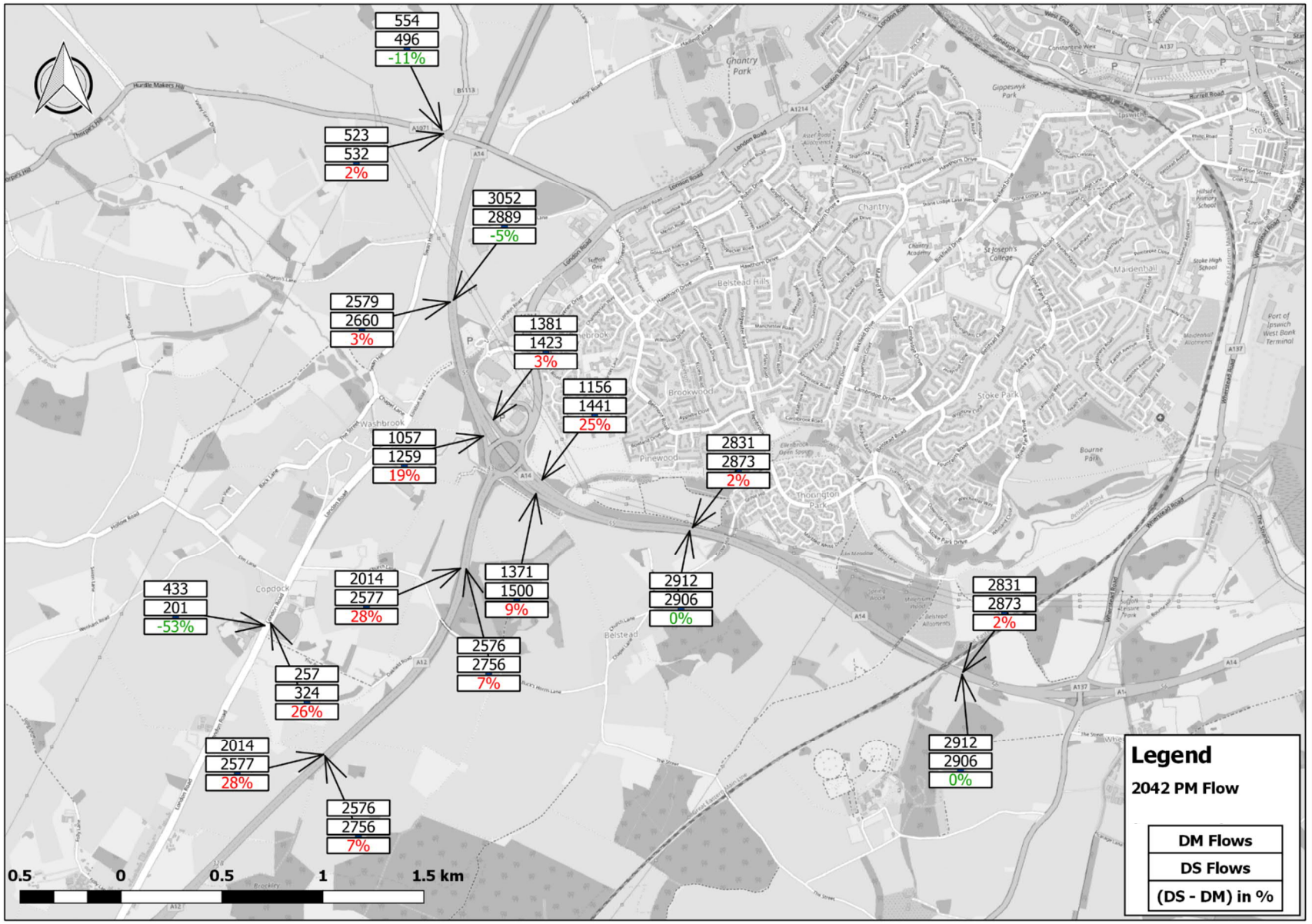

469
429
-9%
466
465
0%
2703
2611
-3%
2478
2564
3%
1169
1166
0%
1222
1376
13%
1027
1165
13%
2756
2821
2%
2766
2747
-1%
1315
1350
3%
1798
2125
18%
311
128
-59%
2182
2244
3%
127
137
8%
1798
2125
18%
2182
2244
3%
2756
2821
2%
2766
2747
-1%
0.5
0
0.5
1
1.5 km
Legend
2042 IP Flow
DM Flows
DS Flows
(DS - DM) in %

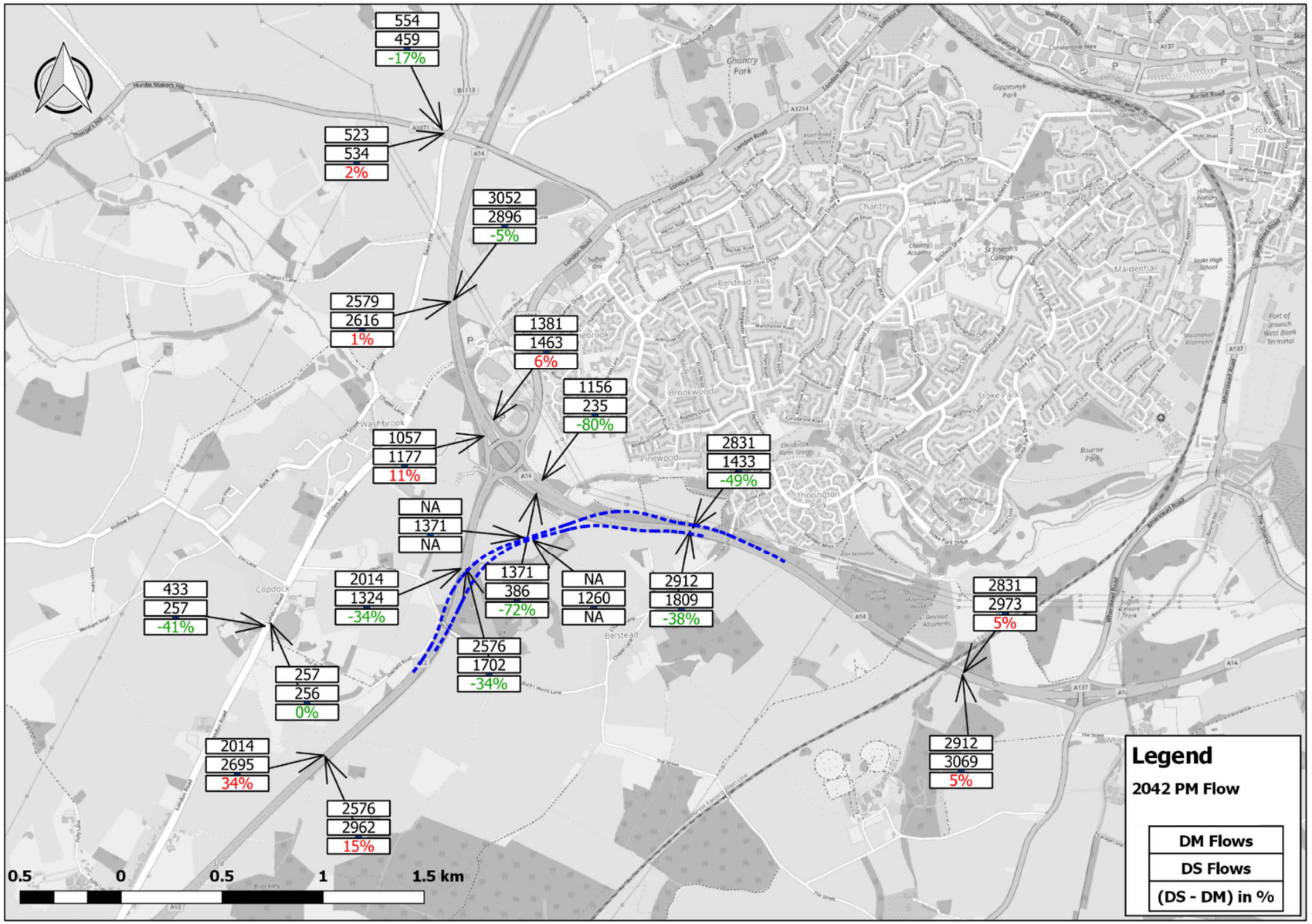

469
408
-13%
466
464
0%
2703
2607
-4%
2478
2560
3%
1169
1166
0%
1222
401
-67%
1027
1140
11%
NA
1033
NA
2756
1441
-48%
311
116
-63%
1798
1173
-35%
1315
392
-70%
NA
986
NA
2766
1811
-35%
2182
1298
-41%
127
154
21%
1798
2206
23%
2182
2285
5%
2756
2871
4%
2766
2797
1%
0.5
0
0.5
1
1.5 km
Legend
2042 IP Flow
DM Flows
DS Flows
(DS - DM) in %

PM FLOWS


487
450
-8%
546
547
0%
2667
2561
-4%
2455
2460
0%
1206
1165
-3%
1161
1433
23%
1009
1107
10%
2624
2830
8%
287
167
-42%
1976
2324
18%
1386
1554
12%
2459
2588
5%
2819
2891
3%
2624
2830
8%
167
182
9%
1976
2324
18%
2459
2588
5%
2819
2891
3%
0.5
0
0.5
1
1.5 km
Legend
2027 PM Flow
DM Flows
DS Flows
(DS - DM) in %


487
439
-10%
546
543
0%
2667
2534
-5%
2455
2488
1%
1206
1160
-4%
1161
328
-72%
1009
1101
9%
NA
1193
NA
2624
1374
-48%
287
164
-43%
1976
1196
-39%
1386
403
-71%
NA
1191
NA
2819
1779
-37%
2624
2899
10%
167
183
10%
2459
1467
-40%
1976
2389
21%
2459
2658
8%
2819
2969
5%
0.5
0
0.5
1
1.5 km
Legend
2027 PM Flow
DM Flows
DS Flows
(DS - DM) in %


554
496
-11%
523
532
2%
3052
2889
-5%
2579
2660
3%
1381
1423
3%
1156
1441
25%
1057
1259
19%
2831
2873
2%
2912
2906
0%
433
201
-53%
2014
2577
28%
1371
1500
9%
2576
2756
7%
257
324
26%
2831
2873
2%
2912
2906
0%
2014
2577
28%
2576
2756
7%
0.5
0
0.5
1
1.5 km
Legend
2042 PM Flow
DM Flows
DS Flows
(DS - DM) in %


554
459
-17%
523
534
2%
3052
2896
-5%
2579
2616
1%
1381
1463
6%
1156
235
-80%
1057
1177
11%
NA
1371
NA
2831
1433
-49%
433
257
-41%
2014
1324
-34%
1371
386
-72%
NA
1260
NA
2912
1809
-38%
2831
2973
5%
257
256
0%
2576
1702
-34%
2014
2695
34%
2576
2962
15%
2912
3069
5%
0.5
0
0.5
1
1.5 km
Legend
2042 PM Flow
DM Flows
DS Flows
(DS - DM) in %

Appendix F. Appraisal Summary Tables (AST)

Appraisal Summary Table

Date produced:	08/06/2021

Name of scheme:	A14 J55 (Copdock)
Description of scheme:	The A14 Junction 55 Copdock Interchange is the key Strategic Road Network (SRN) junction serving Ipswich. It is the junction between the A14, the A12 and the A1214. The A14 is a key strategic route connecting the Port of Felixstowe on the east coast with the Midlands and beyond via connections with the M6 and M1. The A14 has wider national and international importance as it is also part of the Trans-European Transport (TEN-T) Network. The A12 provides access to Colchester, Chelmsford, London, the M25 and Stansted Airport to the south and the Suffolk and Norfolk coast to the north-east. The A1214 is a key route for accessing Ipswich.

Contact:	
Name	James Ballantyne
Organisation	Highways England
Role	Promoter/Official

Impacts		Summary of key impacts	Assessment					
			Quantitative				Qualitative	Monetary	Distributional
								£m (NPV)	7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Economic benefits / disbenefits for business users and transport providers were calculated using DfTs TUBA software (version 1.9.14) which incorportates the latest economic parameters published in TAG databook (July 2020). Overall there will be benefits from business users from reductions in journey times.	**Value of journey time changes (£m)**		£36.400		N/A	£36.4	N/A
			Net journey time changes (£m)						
			0 to 2min	2 to 5min	> 5min				
			£14.3	£22.8	-£0.7				
	Reliability impact on Business users	Improved journey time reliability through increased network resilience	407171				N/A	£0.4	
	Regeneration	Data not available	N/A				N/A	N/A	
	Wider Impacts	Wider economic impacts arise as a result of market failures in the economy. Agglomeration impacts have been qualitatively assessed	N/A				Moderate benefit	N/A	
Environmental	Noise	As the A1214 is not subject to any physical changes to the alignment as a result of Option 1, any changes in road traffic noise are unlikely to be of a magnitude that would require mitigation. Due to the proposed widening of the existing A14 carriageway south of the Copdock Interchange, the receptors located along this stretch of Option 1. Therefore, this section of road could require one or more of the acoustic mitigation measures	N/A				N/A	N/A	N/A
	Air Quality	The air quality modelling results for Option 1 show that there are no predicted exceedances of the AQS objectives for NO2 or PM10 at any worst-case receptor locations in either the do-minimum or do-something scenarios for the opening year	N/A				N/A	N/A	N/A
	Greenhouse gases	Increased level of Greenhouse Gas emissions due to further distances travelled and higher volumes of traffic	Change in non-traded carbon over 60y (CO2e)		188,425		N/A	-£8.1	
			Change in traded carbon over 60y (CO2e)		N/A				
	Landscape	Construction and Operation of Option 1 would result in fewer significant effects than Option 4.	N/A				N/A	N/A	
	Townscape	Data not available	N/A				N/A	N/A	
	Historic Environment	Construction and operation of Option 1 would not result in any significant effects	N/A				N/A	N/A	
	Biodiversity	Sufficient uncertainty remains in relation to the potential for significant effects upon Stour and Orwell Estuaries Ramsar, SPA and SSSI. A detailed assessment of potential effects upon Belstead Brook will be required once detailed survey information, detailed hydrological assessment/modelling and species survey information becomes available.	N/A				N/A	N/A	
	Water Environment	Option 1 construction areas are adjacent to the Belstead Brook floodplain and could cause temporary loss of floodplain during construction. However, with appropriate mitigation the impact is unlikely to be significant. This option also includes A14 realignment and this could intercept an existing overland flow path and potentially temporarily obstructing or altering existing surface water flow, thereby increasing flood risk. Additionally, construction activities for the proposed embankment directly south (associated with an existing highway drainage channel) and north (associated with Unnamed Watercourse 2) of the A14 slip road convergence (400m south-east of Junction 55) could disrupt existing surface water flow paths, potentially altering or obstructing these, increasing flood risk. However with appropriate mitigation like temporary drainage, impact is unlikely to be significant.	N/A				N/A	N/A	
Social	Commuting and Other users	Economic benefits / disbenefits for commuting and other users were calculated using DfTs TUBA software (version 1.9.14) which incorportates the latest economic parameters published in TAG databook (July 2020). Overall there will be benefits from business users from reductions in journey times.	**Value of journey time changes (£m)**		£17.900		N/A	£17.9	N/A
			Net journey time changes (£m)						
			0 to 2min	2 to 5min	> 5min				
			-£3.8	£21.7	N/A				
	Reliability impact on Commuting and Other users	Decreased journey time reliability through reduced network resilience	-170170				N/A	-£0.2	
	Physical activity	Option 1 are unlikely to cause significant effects on users of PRoWs within the vicinity of the development boundary.	N/A				N/A	N/A	
	Journey quality	Data not available	N/A				N/A	N/A	
	Accidents	Change in accidents as a result of road layout changes and traffic flow	-620000				N/A	-£0.6	N/A
	Security	Data not available	N/A				N/A	N/A	N/A
	Access to services	Option 1 are unlikely to cause significant effects on land use and accessibility receptors within the study area	N/A				N/A	N/A	N/A
	Affordability	Data not available	N/A				N/A	N/A	N/A
	Severance	Data not available	N/A				N/A	N/A	N/A
	Option and non-use values	Data not available	N/A				N/A	N/A	
Public Accounts	Cost to Broad Transport Budget	The impact on the budget for Transport	38489958				N/A	£38.5	
	Indirect Tax Revenues	Wider public finances	4728537				N/A	£4.7	

Appraisal Summary Table

Date produced: 14/06/2021

Name of scheme:	A14 J55 (Copdock)
Description of scheme:	The A14 Junction 55 Copdock Interchange is the key Strategic Road Network (SRN) junction serving Ipswich. It is the junction between the A14, the A12 and the A1214. The A14 is a key strategic route connecting the Port of Felixstowe on the east coast with the Midlands and beyond via connections with the M6 and M1. The A14 has wider national and international importance as it is also part of the Trans-European Transport (TEN-T) Network. The A12 provides access to Colchester, Chelmsford, London, the M25 and Stansted Airport to the south and the Suffolk and Norfolk coast to the north-east. The A1214 is a key route for accessing Ipswich.

Contact:	
Name	James Ballantyne
Organisation	Highways England
Role	Promoter/Official

Impacts		Summary of key impacts	Assessment		
			Quantitative	Qualitative	Monetary	Distributional
					£m (NPV)	7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Core business journey time benefits for Option 4 total £66.2 as a result of reduced journey times. Total user benefits are £77.9m.	**Value of journey time changes (£m)** £66.200 **Net journey time changes (£m)** 0 to 2min: -£0.7; 2 to 5min: £65.6; > 5min: £1.3	N/A	£77.9	N/A
	Reliability impact on Business users	Improved journey time reliability through increased network resilience	N/A	N/A	£1.0	
	Regeneration	Data not available	N/A	N/A	N/A	
	Wider Impacts	Wider economic impacts arise as a result of market failures in the economy. Agglomeration impacts have been qualitatively assessed. The likely improvements to the accessibility and therefore effective density of the nearby conurbation of Ipswich makes it likely the scheme will have some agglomerative impacts. The business specialisations around Ipswich are not of sufficient type and scale to expect large agglomeration impacts and therefore moderate agglomeration impacts are expected.	N/A	Moderate benefit	N/A	
Environmental	Noise	There are two NIAs identified within the study-area (Highways England- NIA 4799 and Suffolk County Council NIA 4798). There is a larger number of Noise Sensitive Receptors affected by Option 4 (than Option 1) within 300m of the Proposed Scheme alignment, as a result of moving the road closer to the areas of Thorington Park and Pinewood, north of the existing A14 and Belstead south of the existing A14. Due to the proposed widening of the existing A14 carriageway south of the Copdock Interchange, the receptors located along this stretch of the A14 would be closer to the alignment of Option 4, which may result in an increase in road noise and would require some level of accoustic mitigation measures. The proposed alignment for Option 4 also moves the road closer to a number of sensitive receptors along the existing A12, east of Copdock and may result in an increase in road noise. Furthermore, Option 4 proposes a new link closer to Belstead with the potential to impact 43 sensitive receptors. This would present the potential to change the road traffic noise contribution in Belstead and could require one or more of the acoustic mitigation measures. Option 1 is likely to be preferable with regards to noise impacts, although both the proposed Options may result in a positive change at some locations and a negative change at others. It is not possible at this stage to confirm whether there would be an overall improvement or worsening, but this would be quantified at the next stage of scheme development.	N/A	NA	N/A	N/A
	Air Quality	There are no AQMAs within 1km of the Proposed Scheme. The modelled human receptors to experience the highest predicted increase in annual mean NO2 and therefore having the potential to be impacted from Option 4, are located on London Road and the A137. However, the air quality modelling results for Option 4 shows that there are no predicted exceedances of the AQS objectives for NO2 or PM10 at any worst-case receptor locations in either the do-minimum or do-something scenarios for the opening year. However, it should be noted that the change in N deposition at Spring Wood/Millennium Wood is close to 1% of the Lower Critical Load for option 4. At this stage it cannot be concluded with reasonable confidence whether there is a likely overall improvement or worsening of local and regional air quality at this stage. This would be quantified at the next stage of scheme development.	N/A	NA	N/A	N/A
	Greenhouse gases	Increased level of Greenhouse Gas emissions are anticipated due to further distances travelled and higher volumes of traffic..	Change in non-traded carbon over 60y (CO2e): 82,725 Change in traded carbon over 60y (CO2e): N/A	N/A	-£3.6	
	Landscape	It is envisaged that the changes associated with the proposed Option 4 would have impacts on landscape character of the area, and would result in visual effects. The overal loss of vegetation required is likely to be higher, and would be more impactful compared to Option 1. The removal of vegetation, reduction in tranquility, and landscape pattern will all impact on the localised landscape character within the project area. The Option will also result in visual effects on a number of receptors within the project area, including the edges of residential areas (including Copdock, Washbrook and Belstead) and PRoW users. Mitigation or compensatory planting has not been consideredat this stage,, as a landscape design has not been produced (to date). However, it has been assumed that any losses of mature vegetation could not be easily replaced, as replacement planting would take time to establish. There is a potential for further localised impacts on character within Suffolk Coast and Heaths AONB and Rolling Valley Farmland LLCA, however this will be considered at future stages of scheme development.	N/A	Slight Adverse	N/A	
	Townscape	Townscape has been scoped out due to no effects on urban areas.	N/A	Neutral Effect	N/A	
	Historic Environment	Overall, Option 4 would have an adverse effect on the historic environment due to detrimental impact on eight non-designated assets due to permanent, physical impact; the assets include a prehistoric flint scatter and a findspot of iron age pottery. In terms of buildings, the construction of Option 4 would result in temporary adverse effects to two grade II* Listed Buildings and temporary adverse effects to five grade II Listed Buildings, due to potential impacts on their settings. In terms of sites, there would be a permanent adverse effect to two non-designated archaeological sites. As for areas, construction of Option 4 would also result in a permanent adverse effect to one non-designated historic landscape unit and permanent effects to two designated historic landscape units.	N/A	Moderate Adverse	N/A	
	Biodiversity	Option 4 is anticipated to have more adverse impacts than Option 1, on ecological features within the study area, due to its larger Proposed Scheme extents and requiring modifications to existing culverts and channels of Belstead Brook. However there are a number of various habitats existing within the scheme development boundary and construction of the scheme has the potential to cause permanent loss of some of these habitats. No adverse effect is expected on the Stour and Orwell Ramsar, SPA and SSSI ((Statutory Designated) due to best practice pollution and run-off control during construction and operation. Some regional and local statutory and non statutory designated sites may experience an adverse effect from the Proposed Scheme due to changes in air quality, however this would be confirmed following future stages of scheme development. There are no expected impacts on Ancient Woodland. A detailed assessment of potential effects on habitats and species will be required once detailed survey information with respect to habitat types and protected species, detailed hydrological assessment and species survey information becomes available.	N/A	Moderate Adverse	N/A	
	Water Environment	WFD is summarised as low/insignificant significance; groundwater is also low/insignificant. Flood risk is summarised as high significance/low significance due to potential impact on properties. Appraisal of all water discipline functions as concluded that there would be adverse impacts, predominatly due to flood risk (high significance) which would lead to adverse impacts overall. However, with mitigation the level of adversity will be reduced. Option for mitigation (such as measures included in the CoCP and potentially floodplain compnsation (should the scheme encroach into the floodplain)) will be outlined in the next stages of scheme development.	N/A	Moderate Adverse	N/A	
Social	Commuting and Other users	Core commuter and other journey time benefits for Option 4 total £43.6 as a result of reduced journey times. Total user benefits are £33.2m.	**Value of journey time changes (£m)** £43.600 **Net journey time changes (£m)** 0 to 2min: -£16.6; 2 to 5min: £58.9; > 5min: £1.3	N/A	£33.2	N/A
	Reliability impact on Commuting and Other users	Improved journey time reliability through increased network resilience	N/A	N/A	£0.3	
	Physical activity	Data not available	N/A	N/A	N/A	
	Journey quality	Data not available	N/A	N/A	N/A	
	Accidents	Change in accidents as a result of road layout changes and traffic flow. Casualties saved are as follows Fatal: 0.9, Serious: 10.7, Slight: 72.5.	N/A	N/A	£3.1	N/A
	Security	Data not available	N/A	N/A	N/A	N/A
	Access to services	Data not available	N/A	N/A	N/A	N/A
	Affordability	Data not available	N/A	N/A	N/A	N/A
	Severance	Data not available	N/A	N/A	N/A	N/A
	Option and non-use values	Data not available	N/A	N/A	N/A	
Public Accounts	Cost to Broad Transport Budget	The impact on the budget for Transport	N/A	N/A	-£109.2	
	Indirect Tax Revenues	Wider public finances	N/A	N/A	£4.3	