Appendix B - The Combined TAR and SAR Report

M11 Junction 7a

Essex County Council (ECC)

Technical Appraisal Report (TAR) & Scheme Assessment Report (SAR)

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Report Preface

This report is a Project Control Framework (PCF) Technical Appraisal Report combined with the Scheme Assessment Report (TAR & SAR). The standard allows the TAR and SAR to be combined where a single option is being considered. It has been combined with SAR and produced at stage 2 because of the previous work on the scheme and public engagement which makes this option a single option scheme.

The report summarises information from the technical reports produced during stage 2 option selection the main ones being;

- Traffic forecast report (TFR)
- Options Assessment report (OAR)
- The Environment Assessment Report(EAR)

In the scheme history section, the report summarises the previous options that have been considered and presented for information at the Public Information Exhibition events held during the development of the option in 2014 and 2015. It shows that various options to develop a connection to the M11 were considered and presented to the public at the Public Information Exhibition event in January 2014.Feedback from this event and further engagement with the public resulted in a more strategic single option that takes into account the future development of the Northern Bypass. It also mentions the high-level options detailed in the OAR that were evaluated against the option being taken to the formal public consultation during its development.

The report also highlights the environmental, engineering, planning, traffic and economic effects/impacts and constraints on the option put forward for consultation within the limitations of the detail in the technical studies that have been carried out to date.

It concludes that the option scheme currently considered is fit-for purpose and has sufficient value for money (VfM) to be developed subject to funding being secured and necessary environmental mitigation measures that may be required being put in place.

1. INTRODUCTION

1.1 Purpose of report

The Technical Appraisal Report (TAR) is a summary and appraisal of the technical and engineering information relevant to the proposed M11 J7a scheme. In this report it is combined with the Scheme Assessment Report (SAR), following the guidelines in the Highways England (HE) Project Control Framework (PCF), taking the particular characteristics of this scheme into consideration.

This report will focus on bringing together the traffic, economic, safety, operational, technical, maintenance and environmental assessment and validating the scheme option as fit-for purpose. The TAR will primarily:

- Describe the existing roads and traffic conditions in the area of Harlow and the surrounding districts;
- Identify and evaluate the proposed scheme option route with regards to the current engineering design, traffic assessment ,economic appraisal, safety and effect on social and environmental factors;
- Recommend that the route, as summarised in the Scheme Context below, satisfies the desired objectives and is to be taken forward to the next stage of development.

1.2 Scheme context and objectives

1.2.1 The proposed M11 Junction 7A (M11 J7A) is located between Junction 7 and 8 of the M11 motorway and includes a grade separated junction and a link road joining the M11 to the B183 Gilden Way east of Harlow. The current option includes two lanes in a westerly direction into Harlow and one lane in an outbound direction onto the M11 Motorway. See Appendix A

1.2.2 Since the original proposal, the design has been adjusted to show the intent to develop the future Northern Bypass. This has been possible by incorporating a new roundabout between the motorway and the B183 to allow the outbound link to merge onto the northern bypass via a grade separated crossing. Gilden Way is also now being widened to include two lanes westbound into Harlow and one lane outbound from Harlow. This is to accommodate the increase of traffic coming through the new junction

1.2.3 The objectives of the scheme are as follows:

- Improve accessibility of Harlow;
- Reduce congestion on the A414 corridor.
- Ensure the infrastructure is adequate to meet the future traffic growth and the need for the Northern Bypass.
- To meet the housing and Job growth across Harlow
- In addition to the above objectives the scheme will also meet operational and safety objectives as defined in the DMRB and the scheme safety report.

1.3 Scheme history

1.3.1 In order to meet the objectives of the scheme listed in section 1.2 the scheme development went through a series of iterations to reach the current option being recommended for consultation and the preferred route announcement.

1.4 Options considered at Public Information Exhibition (PIE) January 2014

1.4.1 Three options of M11J7A, all variants of the methods to connect to the local network from the M11 Grade Separated Junction (GSJ) were developed and taken through the Public Information Exhibition in January 2014.

Figure 1.1 Option 1

1.4.2 Figure 1.1 shows the then proposed option 1 which followed on from the GSJ, the proposed link road would have run westwards on a horizontal 720m radius, a 1 step relaxation when considered under a 120kph design speed for dual carriageways, and desirable minimum standard for a 100kph design speed for single carriageway. Though the link was to be signed as 40mph It would have been designed to a 100kph (60mph) standard to allow for future upgrading. For a 100kph design speed the 720m horizontal radius was within standard and would require 5% super-elevation.

1.4.3 The vertical alignment would have required the link road to run down from the junction height to the local road network height, which would have been accommodated within standards requiring a maximum vertical grade of 6%.

1.4.4 This link flared to 4 lanes wide at the roundabout approaches (2 in each direction), narrowing to a three lane carriageway for the majority of the link. The central lane was to be hatched out and the link would have operated as a single lane carriageway in each direction. The hatched central lane would provide space for traffic management in the case of breakdowns, and would have also allowed future enhancement in the event of the Northern Harlow Bypass being constructed.

1.4.5 This would have connected to the next scheme roundabout which provided another spur to provide future access to the development lands, and the connection to the existing local road network. This roundabout would have an inscribed circle diameter of 56m. A link from this roundabout would have tied into Gilden Way. This link would have been a single lane carriageway in each direction, flaring to two lanes on the roundabout approach.

1.4.6 The Sheering Road would have been intercepted by a new link which would meet the new Gilden Way link at a signal controlled junction.

1.4.7 The properties fronting Gilden Way would have either be provided with a local access road which would separate their access from Gilden Way, or maintain direct access based on the final road layout. If provided with their own local access road, they would be able to access Sheering Road from this access road. This road would have also provided access to the Campions.

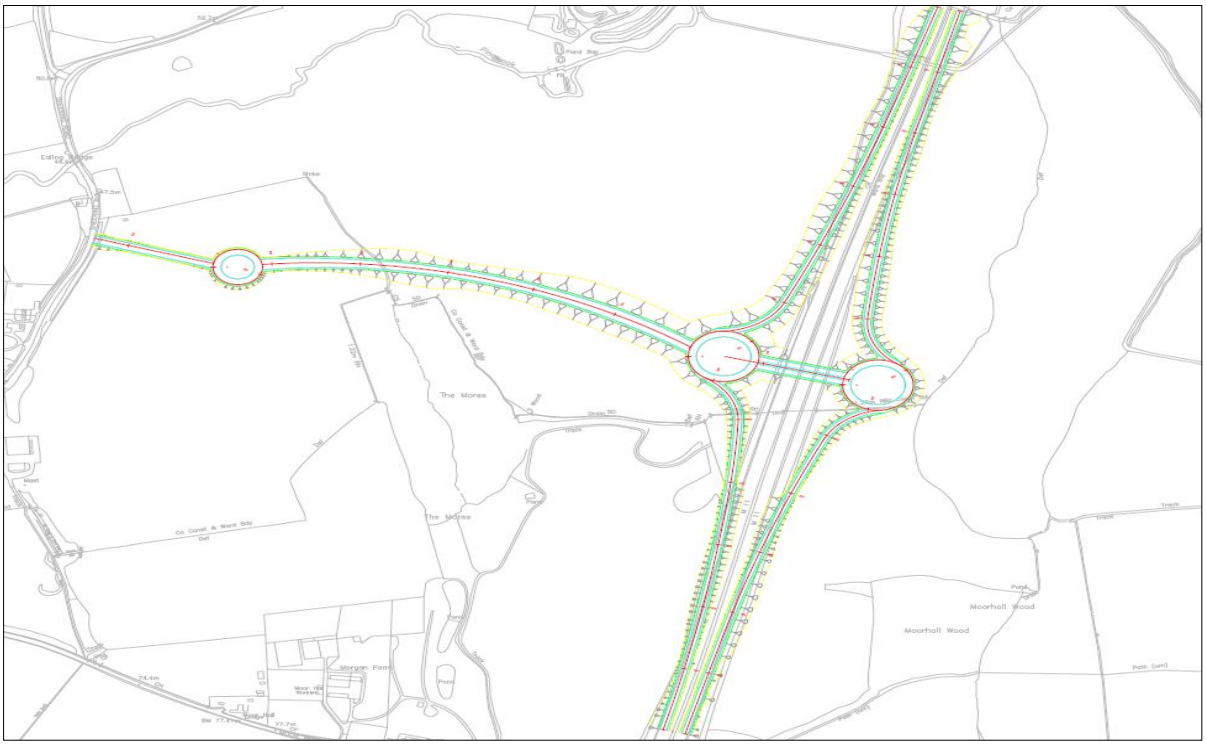

Figure 1.2 Option 2

1.4.8 Figure 1.2 shows option 2 following on from the grade separated junction; this Option was very similar to Option 1 (Figure1.1), though the third scheme roundabout was located slightly closer to the M11. The link carriageway widths and roundabout ICD were the same.

1.4.9 At the third roundabout, the connection to the local road network was provided via a short link bearing to the northwest which tied into Sheering Road with a T-junction. This would have potentially been signalised depending on traffic flows. This layout would have allowed traffic from the M11 to turn either north or south onto Sheering Road, and for traffic on the local road network to access the M11 from either north or south.

1.4.10 The existing road network would not be altered beyond the new T-junction, whereby Sheering Road would run directly into Gilden Way, access to the Campions would remain unchanged, and the properties along Gilden Way would retain their direct accesses.

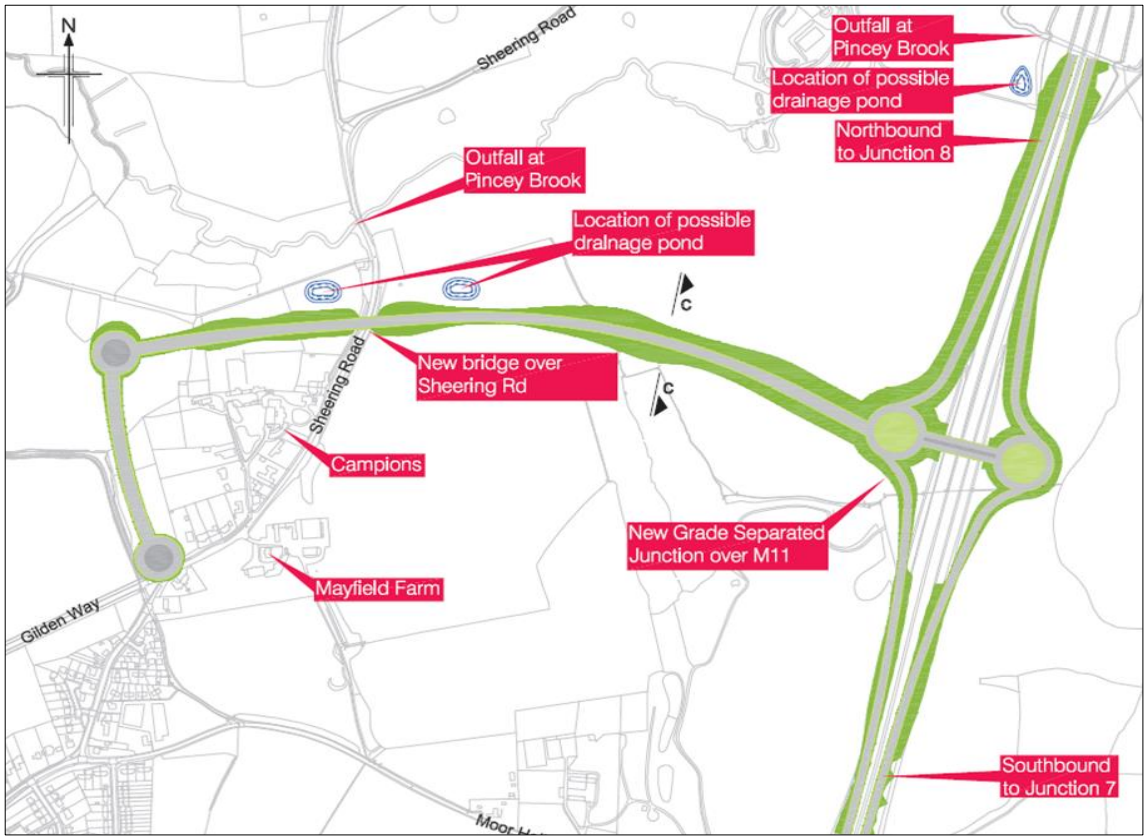

Figure 1.3 – Option 3

1.4.11 Figure 1.3 shows the option proposed as Option 3. This Option differed from the previous two in that it did not provide the third scheme roundabout on the potential development lands. It was proposed to run the link from the grade separated junction over Sheering Road on a structure, pass behind the Campions to the north, then tie into Gilden Way to the west of the Campions. This Option would not affect the local road network apart from the tie in at a roundabout to the west of the Campions.

1.4.12 Feedback from the Public information Exhibition in 2014 and further public stakeholders engagements indicated that there was need to consider a more strategic scheme which is future proofed for the development of the Northern Bypass. This resulted in the earlier version of the current scheme showing a more northerly alignment and future proofed for the Northern Bypass (Figure 1.4).

Figure 1. 4 Version of the Option presented at the PIE 2015

1. 4.13 Comments from the Public Information Exhibition in July 2015 and further elaboration of the design has resulted in the current version of the scheme shown below Fig1.5. This scheme is fully described as the scheme Option in chapter four of this report including the Gildenway improvements required to accommodate the increased traffic flows coming through the new M11J7A Junction. For a full version of the scheme Option including the Gildenway improvements see Appendix A.

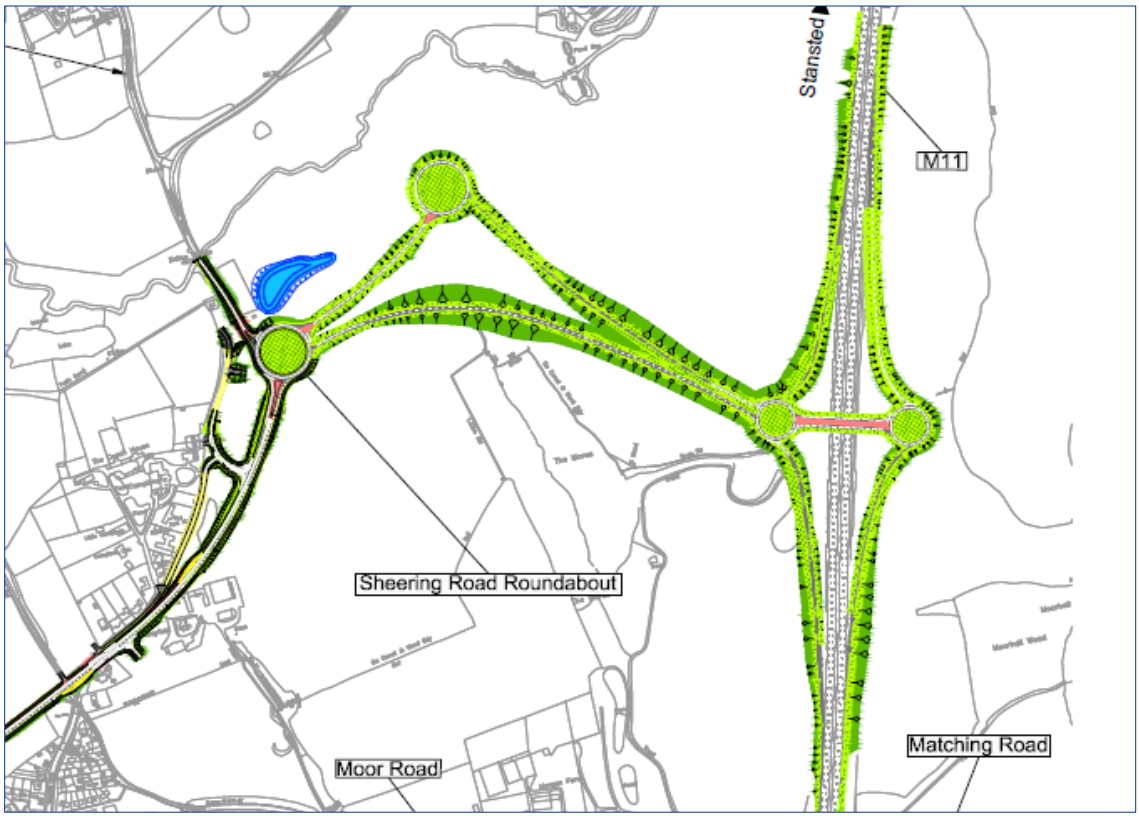

Figure 1.5 Current option (for a full version which Includes Gildenway improvements see appendix A)

1.5 High level options

1.5.1 During the development of the current scheme option it was also evaluated against other high level options using the following

- Highway assignment modelling of options;
- Economic appraisal to estimate BCR and VfM;
- EAST evaluation and weighting

1.5.2 The high level options considered are as follows;

Option 1: New M11 junction to east of Harlow, J7a, with local link to B183 Gilden Way;

Option 2: Improved M11 J7;

Option 3: Both Option 1 and Option 2;

Option 4: 'Northern Bypass', which includes a dual carriageway, link from J7a through to A414 at Eastwick, and an additional single carriageway access into Harlow via River Way;

Option 5: 'Northern Northern Bypass', which comprises a dual carriageway link from A414 at Eastwick, aligned to the south of Gilston, and then to the west of Sawbridgeworth, connecting with the M11 via a new junction south of Little Hallingbury;

Option 6: 'Southern Relief Road', which comprises a dual carriageway link from the A414 east of Roydon, skirting the western and southern edges of Harlow, and connecting with J7 via the B1393. Please note that the capacity improvement required at J7 in conjunction with this scheme has not been modelled or assessed.

- *The M11J7 option considered at this high level was a previous scheme option developed by Mouchel and is not part of the current options being considered by the Highways England. The result of this assessment bears no impact on the new assessments being carried out by Highways England*.

1.5.3 The Evaluation of the high-level options is considered in detail in the Options Assessment Report (OAR) here it suffices to say that the M11J7A was considered to be the most economical advantageous scheme of the high level options

2. PLANNING BRIEF

2.1 Planning Policy Framework

2.1.1 National Planning Policy - At the heart of the National Planning Policy Framework (NPPF) is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking. The 12 Core Principles set out in the NPPF includes the need to:

- Proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs. Every effort should be made objectively to identify and then meet the housing, business and other development needs of an area, and respond positively to wider opportunities for growth. Plans should take account of market signals, such as land prices and housing affordability, and set out a clear strategy for allocating sufficient land which is suitable for development in their area, taking account of the needs of the residential and business communities;

- Take account of the different roles and character of different areas, promoting the vitality of our main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it;

2.1.2 Paragraph 90 of the NPPF also defines types of development in the Green Belt which are not inappropriate in policy terms, subject to certain criteria being met. This includes local transport infrastructure.

2.1.3 The M11 Junction 7a project is regarded as a local transport infrastructure scheme and not a Nationally Significant Infrastructure Project and therefore it does not need to be covered by national policy, however, it is worth noting that national policy supports transport infrastructure which addresses traffic congestion. The National Policy Statement for National Networks states:

2.1.4 Traffic congestion constrains the economy and impacts negatively on quality of life by:

- Constraining existing economic activity as well as economic growth, by increasing costs to businesses, damaging their competitiveness and making it harder for them to access export markets. Businesses regularly consider access to good roads and other transport connections as key criteria in making decisions about where to locate.

- Leading to a marked deterioration in the experience of road users. For some, particularly those with time-pressured journeys, congestion can cause frustration and stress, as well as inconvenience, reducing quality of life.

- Constraining job opportunities as workers experience difficulties accessing labour markets.

- Causing more environmental problems, with more emissions per vehicle and greater problems of blight and intrusion for people nearby. This is especially true where traffic is routed through small communities or sensitive environmental areas.

2.1.5 County Planning Policy - The South East Local Enterprise Partnership identifies the need for growth in Harlow and recognises that the capacity of the existing access onto the M11 and the lack of an alternative access is a significant barrier to housing and economic growth.

The Essex Growth Strategy 2012 sets out prioritised transport investment across the County and identified the need for an additional junction on the M11 to support economic and housing growth in Harlow.

2.1.6 Essex Local Transport Plan 2011 states as a list of priorities for the West Essex area:

- Improving access to and from the M11 corridor;
- Tackling congestion and improving the management of traffic in Harlow town centre; and
- Providing the transport improvements needed to support housing and employment growth;

2.1.7 The Local Transport plan also recognises that connectivity between the main towns in Essex is good but that the connectivity to the strategic transport network running through Essex is less satisfactory especially at peak times.

2.1.8 The Essex Local Transport Plan has 15 policies of these; Policy 2 highlights the connection between growth and transport planning.

2.1.9 Policy 3 focusses on the need to improve the resilience of the transport network, to improve reliability and prioritise investment on the parts of the network that give the greatest economic and quality of life improvements.

Policy 5 identifies the framework for the delivery of improved connectivity within the transport network to support sustainable growth.

Policy 6 of the Local Transport Plan identifies the need for the strategic highway network to support economic growth, recognising the importance of freight movements to and along the strategic road network and into the County. Specific reference is made to the need for improved access to the strategic network in particular access to the M11 from the West Essex area.

Policy 9 of the Local Transport Plan recognises the need to deliver transport improvements while minimising the impact of development on the natural, historic and built environment.

2.2 Priorities for West Essex

2.2.1 West Essex borders more of Essex's neighbouring authorities than any of the other planning areas. The character of the area is diverse, encompassing the edge of the London commuter-belt, the "new town" of Harlow, as well as historic rural towns and villages. The priorities for the area therefore reflect the importance of cross-boundary movements and the differing needs of local communities.

2.2.2 With significant housing and employment growth to be delivered in West Essex, particularly within and around Harlow, it will be essential to ensure that this is accompanied by measures which support access and promote the selection of sustainable travel choices.

2.2.3 Links to London are vital, particularly to the south of the area, with much of the local economy closely tied to that of the Capital. Priorities therefore include working with Transport for London to improve the journey experience of Essex residents using the Central Line underground services, and lobbying government for improvements to West Anglia rail services.

2.2.4 With much of the area rural in character, access to employment and services for those is an important issue. Providing access to the local centres, to Harlow, and to essential services from rural areas and improving choices for travel between the centres are priorities.

2.2.5 The Hertfordshire Local Transport Plan 2011 makes no mention of the opportunity for an additional Junction on the M11; the plan therefore has a neutral stance on the proposed development.

2.3 Local Plan Policy

2.3.1 The Adopted Harlow Local Plan 2006 is silent on the issue of an additional Junction on the M11. However, the Emerging Strategy and Options for the Harlow Local Development Plan 2014 sets out a vision for the area to 2031 which states:

2.3.2 The town's land use and transport policies would have been coordinated to ensure the maximum possible increase in passenger transport, walking and cycling. Major investment would also be underway to address a number of specific transport capacity issues across Harlow which is currently restricting growth and investment. This would have included a new junction on the M11 and substantial improvements to the internal road network in Harlow.

2.3.3 Furthermore, the growth scenarios proposed illustrate the constraint caused by the lack of capacity and access to the motorway network and the need for an additional junction to the M11, with all scenarios requiring improved access to the M11 and identifying a preferred option of an additional junction recognising the limited potential to significantly increase capacity at Junction 7.

2.3.4 The Epping Forest Combined Local Plan 1998 and 2006 contains no proposals relating to the M11 because it also contains no strategic housing allocations as the Structure Plan target for housing has been exceeded. However, the Epping Forest Emerging Local Plan Consultation 2012 identifies the opportunities for growth around Harlow provided the necessary infrastructure is provided including a new junction onto the M11 between Junctions 7 and 8.

2.3.5 The East Herts adopted Local Plan 2007 is silent on the issue of an additional junction onto the M11, however, The East Herts Preferred Options Consultation 2014 recognises the need for improved transport infrastructure in order to bring forward housing and employment growth in the Gilston area near Harlow.

2.3.6 The Uttlesford Adopted Local Plan 2005 makes no mention of the need for additional access to the M11 and the emerging local plan has been withdrawn. There is no new document published on their website currently.

2.4 Other planning policy context

2.4.1 The application site is partially in Epping Forest DC and Harlow Council. Planning policy for both councils therefore needs to be taken into account.

2.4.2 The aims of the Harlow Local Plan 2006 are set out below, they highlight the need to balance growth in homes and jobs with protecting the environment and ensuring that local infrastructure can accommodate increased demand.

a) Sustainable Development

b) Housing

c) Economic Regeneration

d) Transport

e) Leisure and Culture

f) The Natural Environment

g) The Built Environment

h) Regenerating the Town Centre and Shopping

i) Community Facilities and Public Utilities

j) Implementation and Resources

k) The proposed junction is located within Epping Forest District Council area. Therefore policies within the adopted Epping Forest Combined Local Plan 1998 and 2006 apply.

l) Policy CP1 - Achieving sustainable development objectives

m) Policy CP3 – New development

n) The proposed Junction with the M11 is located in the Metropolitan Green Belt and therefore Policy GB2A – Development in the Green Belt applies.

o) The proposed junction will be located in the open countryside and on the edge of Harlow; therefore Policy LL1- Rural landscape will apply.

p) Policy LL2- Inappropriate rural development also applies.

q) Policy LL3- Edge of settlement relates to this proposed development on the edge of Harlow.

r) Policy LL13- Highway/ motorway schemes, is particularly relevant to the proposed development.

s) The provision of new and improved highway infrastructure is accepted but must comply with Policy ST7 – New roads and extensions or improvements to existing roads.

2.5 Need /Justification for the scheme

2.5.1 Harlow is ideally placed, being close to the M11 and M25, on the West Anglia mainline and close to Stansted Airport. Access to Harlow is, however, somewhat restricted with only one link to the strategic road network (via Junction 7 of the M11) and two railway stations located on the edge of the town.

2.5.2 The primary means of road access to the town, the A414, also serves as an important through route. With high levels of traffic using this one route, congestion is common with its impacts often felt across the town's wider road network. A significant intervention is required to address the capacity challenges alongside some road improvements.

2.5.3 Furthermore, having largely been constructed in the 1950s and 1960s, much of the town's transport infrastructure is now ageing and was originally designed for a time of lower levels of car ownership and mobility.

2.5.4 The town centre is identified as an area for regeneration, two Local Enterprise Zones have been designated for employment growth and the area is proposing a further increase in housing in both Harlow District and Epping Forest District.

2.5.5 In order to facilitate and support this growth it is essential to improve access to the M11 and improve the transport flows in and around Harlow. This proposal to create an additional junction onto the M11 will not only relieve the congestion at Junction 7 but also improve traffic flows in and around Harlow by providing an alternative route to the north of the town.

2.5.6 The project is for the provision of a new motorway Junction 7A on the M11 between Junctions 7 and 8 and is supported by the proposed widening of Gilden Way.

2.5.7 Initial modelling work has shown that the existing Junction 7 is now at capacity. An increase in road network capacity is needed to support the level of committed and proposed new housing, and jobs required to meet future needs and support economic development and regeneration in Harlow and the surrounding areas. Without an improved link to the motorway, the town and surrounding districts will not be able to realise their full potential.

2.6 Planned future Growth

2.6.1 Harlow is situated in the centre of the West Essex area and is the primary economic and growth centre, with between 12,000 and 15,000 new homes and 8,000 to 12,000 new jobs planned in the next 20 years (Current growth is identified in the adopted Local Plan/Core Strategy documents for each district and revised growth proposed in their emerging Local Plans).

2.6.2 Planning permission has been granted and housing units are under construction for Harlowbury; planning permission reference HM/PL/00055 granted outline planning permission in November 2012 for 1,200 dwellings, a new primary school, community buildings and commercial/retail/live work accommodation. Reserved Matters approval has been granted for Phase 1 of 716 homes and a community building under planning permission reference 15/00006.

2.6.3 The development of the New Hall Farm site is also underway with outline planning permission reference HW/PL/04/00302 granted in June 2012 for 2,300 dwellings including parkland and recreation, employment and a neighbourhood centre. Reserved Matter approval for Phase 2 parcel 2 was granted in March 2014 under planning permission reference HW/PL/13/00482.

2.6.4 Harlow has 3 identified Enterprise Zones with associated Local Development Orders (LDO) to facilitate economic development, these are:

- London Road South; 20,000m^{2}of 'Grade A' office space as well as a Data Centre development.
- London Road North; 14 hectare greenfield site available for design and build opportunities with a focus on the Med Tech, Life Science and ICT sectors.
- Templefields; existing industrial estate offering SME manufacturing space and longer term re-development opportunities. A condition of the LDO is that additional employment growth at this site cannot be brought forward without the provision of Junction 7a on the M11.

These developments will add to the existing traffic congestion issues in and around Harlow.

2.6.5 Further growth is proposed in the emerging planning framework documents for Harlow and the surrounding area; current estimates for 2033 put growth in Harlow and surrounding area at 45,000 homes, and 29,000 jobs.

3. EXISTING CONDITIONS

3.1 Locality

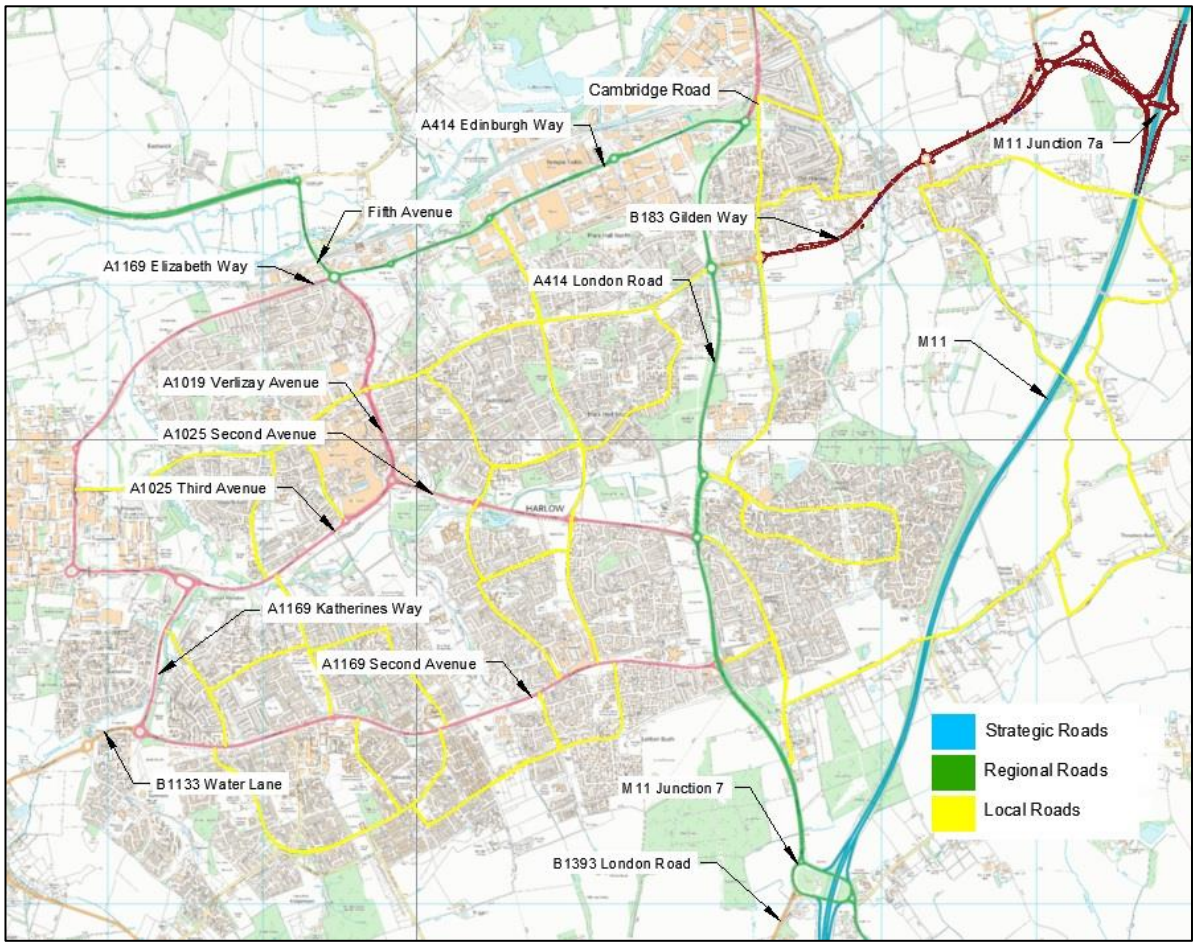

Figure.3.1 Scheme within the existing road network.

3.2 Existing highways network

3.2.1 Strategic Roads - Figure 3.2 below shows the strategic network around Harlow. Currently Harlow has only one connection to the Strategic Road Network (SRN), which is the M11 Junction 7 (J7), located to the south-east of the town.

3.2.2 The M11 is a north-south route linking London and Cambridge, which passes Stansted airport. In the south the M11 connects to the M25 London Orbital and on the west the A1 (M) via A414 which is a primary route.

3.2.3 The traffic from Harlow currently access M11 at Junction 7 via A414. With high levels of traffic needing to access this one junction, congestion on the A414 is common. Minor incidents; often have major impacts and cause severe congestion across the town's wider road network.

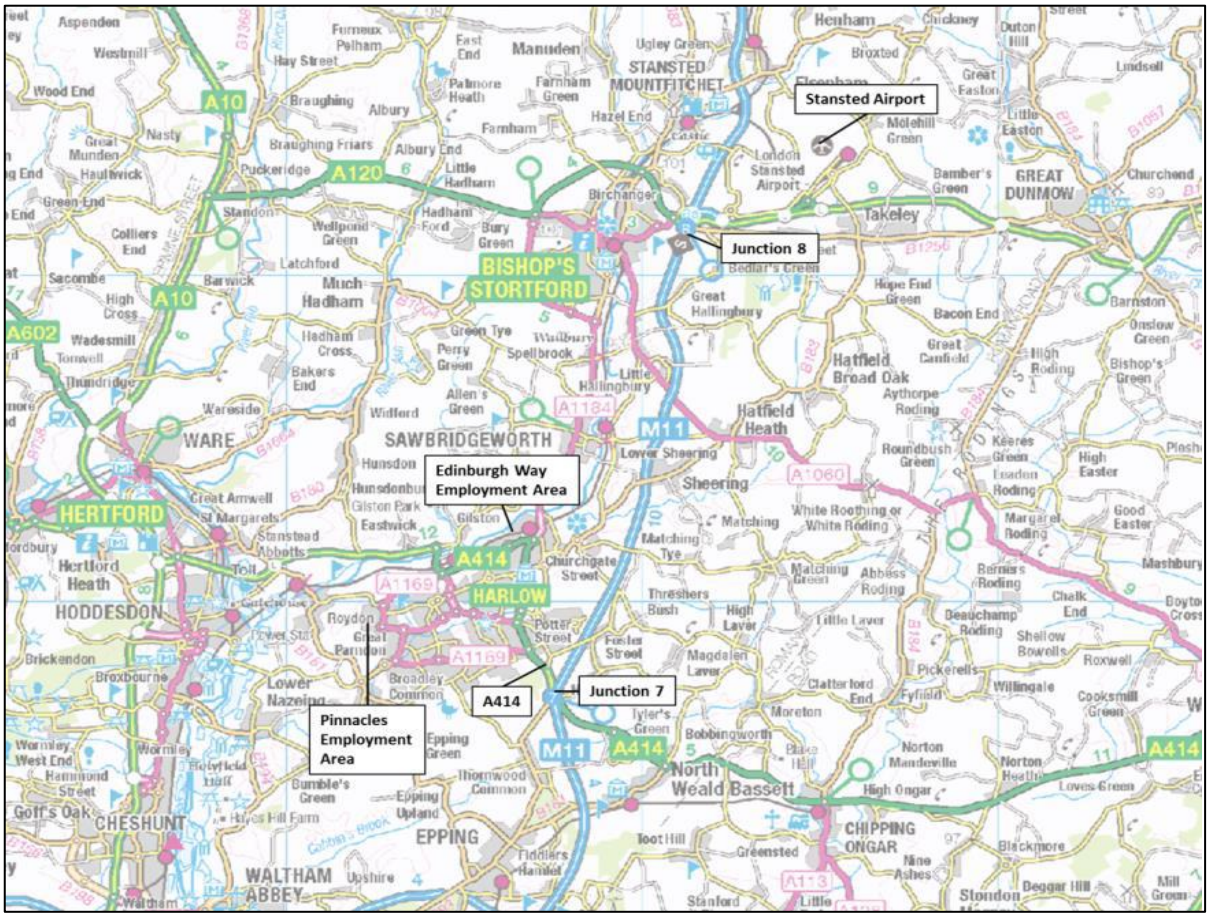

Figure 3.2: Strategic Road Network

3.3 Local and Regional roads

3.3.1 Figure 3.1 highlights local roads within the area of interest. The local roads form an interconnecting network of A, B and C class roads. The current congestion on M11J7caused by capacity issues has major impact on local roads especially the A414, Second Avenue and Third Avenue, Gilden Way and Sheering Road. With the lands to the east of Sheering Road earmarked for development, the pressure and congestion on the local roads is likely to increase if the M11J7A is not built.

3.3.2 The new junction would relieve congestion on local and regional roads, and increase capacity at Junction 7. Additionally the new junction would also provide better access from North Harlow to Stansted airport without the need to travel through Harlow to Junction 7, or north to Junction 8 along local roads.

3.4 Traffic

3.4.1 Studies were undertaken from two viewpoints:

The 'wider Harlow road network' to assess usage and flow of traffic in the Harlow area; this was done through the Harlow Transport Model. The local road network operational assessment of link flows and the junction capacity has been carried out by Vissim micro-simulation. The local road network traffic operational assessment has focussed on three key junctions. These are:

- A414 London Road / B183 Gilden Way
- London Road (South) / B183 Gilden Way
- B183 Gilden Way / Sheering Road (Churchgate Roundabout)

3.4.2 Key findings on the existing traffic are summarised below:

3.4.2.1 Currently, limited access and connection from Harlow to and from the M11 increases traffic and consequently causes congestion on local roads. This is a major problem for the town and its surrounding districts, especially during the morning (AM) and afternoon (PM) peak hours.

3.4.2.2 Repercussion of extreme congestion during the AM/PM peaks increases the likelihood of traffic related incidents which results in further journey time delays and frustration to the general public. The bulk of the congestion occurs on the A414, which is a primary distributor that runs through the town and its main industrial site and Junction 7 of the M11. With high levels of traffic needing to access this one junction, as well as pass through it, congestion is common.

3.4.2.3 Preliminary evaluation work for Uttlesford District Council's next Local Plan has also highlighted concerns for M11 Junction 8 (J8), with committed and planned growth from Stansted Airport, East Herts and Uttlesford likely to result in additional peak period pressure at this junction, too.

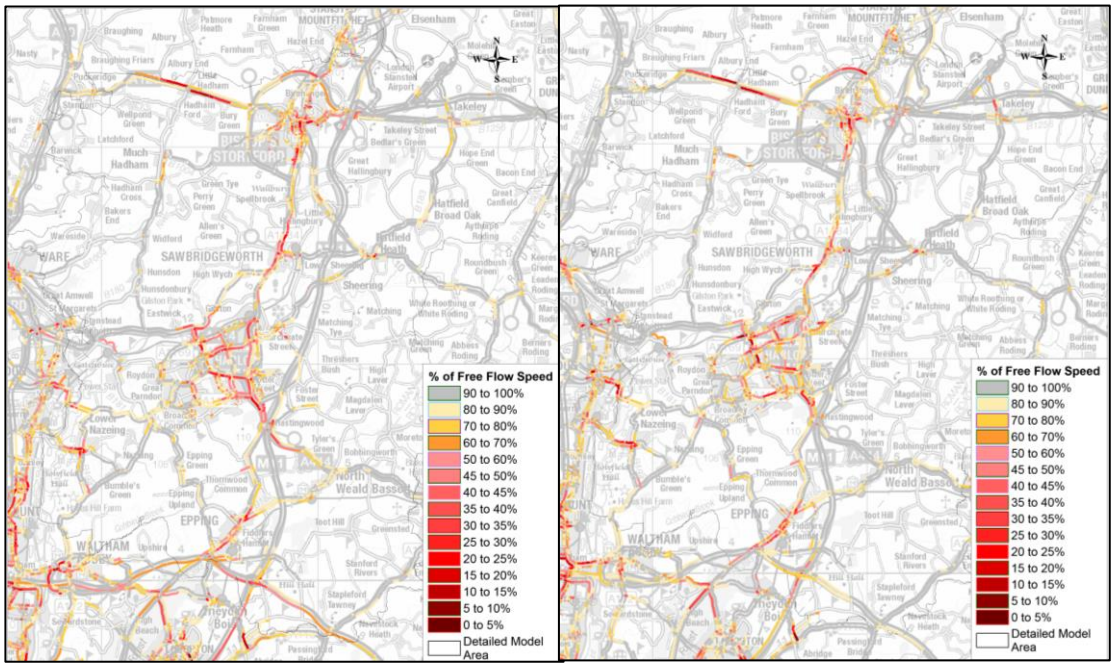

Figure 3.3 AM and PM peak hour congestion plot (Existing)

3.4.3 Figure 3.3 shows current levels of congestion in the local and strategic network. The current congestion levels highlighted above are already at a critical level.

3.5 Traffic flows with minimal upgrades - wider Harlow road network

3.5.1 Without the proposed M11 J7a option, traffic modelling shows that Harlow would be heavily congested in 2021 and this would be mainly centred on:

- Key growth sites such as the committed developments at Harlowbury and New Hall, and the potential Local Plan Development sites at Latton Priory and The Pinnacles; and
- Key routes, for example the A414 and B183 Gilden Way, caused by the extra trips to these developments.

3.6 Traffic flows with minimal upgrades - in local roads

3.6.1 At the A414 London Road / B183 Gilden Way junction in 2021 traffic should flow through the junction without any issues. However, in 2036 traffic is likely to experience significant delays with queuing on the A414 northbound approach to the junction.

3.6.2 At the London Road / B183 Gilden Way junction in 2021 traffic should flow through the junction without any issues. However, in 2036 traffic is likely to experience significant delays with queuing on the B183 Gilden Way westbound approach to the junction.

3.6.3 At the B183 Gilden Way / Sheering Road (Churchgate) Roundabout in 2021 traffic should flow through the junction without any issues. However, in 2036 traffic is likely to experience significant delays with queuing on the B183 Gilden Way westbound and eastbound approaches to the junction respectively.

Typical Existing Traffic Flows (Veh/hr) at Key Sections / Junctions

	B183 Gilden Way E	B183 Sheering Rd S	B183 Gilden Way W
B183 Gilden Way E	0	46	774
B183 Sheering Rd S	70	0	137
B183 Gilden Way W	515	128	0
Harlowbury Site Access	0	0	0

Table 3.1 Traffic Counts AM

A414 London Rd / B183 Gilden Way				
	A414 N	Gilden Way	A414 S	First Avenue
A414 N	0	157	351	248
Gilden Way	370	0	420	521
A414 S	547	568	0	117
First Avenue	125	215	99	0

Table 3.2 Traffic Counts AM

A414 London Rd / B183 Gilden Way			
	B183 Gilden Way East	B183 Sheering Rd South	B183 Gilden Way West
B183 Gilden Way E	0	51	526
B183 Sheering Rd S	75	0	89
B183 Gilden Way W	693	135	0

Table 3.3 Traffic Counts PM

A414 London Rd / B183 Gilden Way				
	A414 N	Gilden Way	A414 S	First Avenue
A414 N	0	129	555	175
Gilden Way	224	0	396	244
A414 S	428	514	0	82
First Avenue	146	562	293	0

Table 3.4 Traffic Counts PM

3.7 Accidents journey times and reliability

3.7.1 M11 collision analysis: The collision data analysis carried out identified that 115 Personal Injury Collisions (PICs) occurred on the M11 within the study area shown in figure 3.4 and figure 3.5 between 1st June 2010 and 31st May 2015 (5 years).

Figure 3.4: Northern extent of PIC data search area

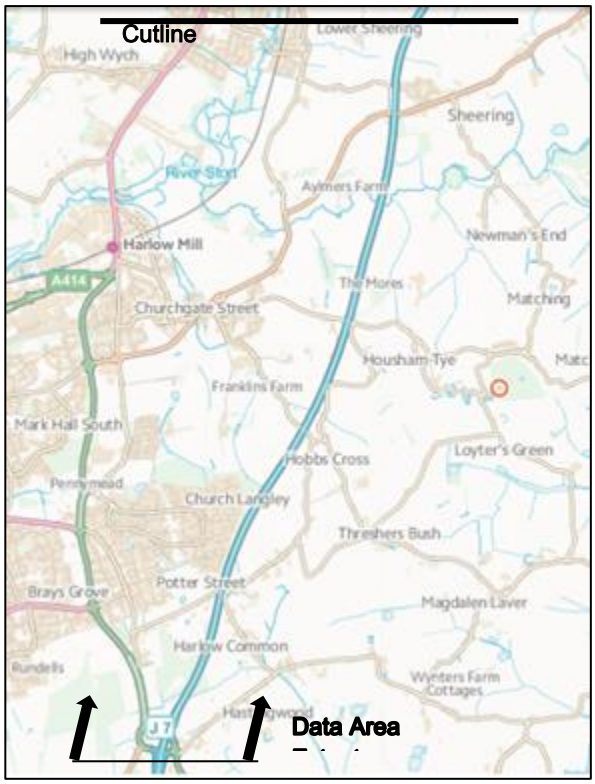

Figure 3.5 : Southern extent of PIC data search area

Table 3.5 details the collisions analysed by year and severity. It should be noted that the data period includes incomplete years in 2010 and 2015.

Year	Slight	Serious	Fatal	Total	Annual equivalent
2010 (7 months)	14	2	0	**16**	**27**
2011	12	4	0	**16**	**16**
2012	19	2	0	**21**	**21**
2013	26	3	0	**29**	**29**
2014	20	5	1	**26**	**26**
2015 (5 months)	6	1	0	**7**	**17**
Total	**97**	**17**	**1**	**115**	**-**

Table 3.5: M11 Collisions by year and severity

3.7.2 The data shows a 'step change' reduction in collision numbers in 2011, and in 2012 the collisions numbers started to rise again. A more accurate measure for future comparison is the collision rate per billion vehicle kms. This takes into account the annual average number of collisions, allowing a calculation for incomplete years of data, and annual average daily traffic flow (AADT) and the length of the carriageway over which the PICs are taken. Table 3.6 shows the collision rates calculated for each year of data.

3.7.3 The collision rate figures in the table 3.6 show that the number of collisions fluctuates between 15 and 30 per year, averaging at 23 collisions per year (per billion vehicle kms) between 2010 and 2015. If the scheme does not result in a net increase in the collisions on this section of the network, and traffic flow increases as forecast, the collision rate will be consistent with the objective of not reducing road user safety performance.

Year	No of PICs	PIC Yearly Average	Combined two way traffic flow – Average Annual Daily Traffic	PIC Rate – Per billion vehicle kms (1000,000,000)
2010	16	27	82344	**29**
2011	16	16	95035	**15**
2012	21	21	90398	**21**
2013	29	29	84217	**30**
2014	26	26	86872	**26**
2015	7	17	86872*	**17**

Table 3.6 : M11 Collision rates per year

*2015 is not available and so 2014 data has been used again in 2015.

3.7.4 In addition, from these figures the annual collision rate over the whole five year period (June 2010 – May 2015) has been calculated at 23 PICs per billion vehicle kilometres. This compares to the national average for motorways of 54 PICs per billion kilometres in 2014. Upon completion of the scheme, this figure can be used as a measure to gauge if the changes to the network have a positive or detrimental effect on collision rates. The collision data has been analysed and categorised into types and severity; this is detailed in Table 3.7.

Collision type	Slight	Serious	Fatal	Total
Lost control	32	5	0	**37**
Other	2	2	0	**4**
Overtaking	3	1	0	**4**
Nose to Tail	28	3	1	**32**
Side swipe	29	6	0	**35**
Slip road diverge	1	0	0	**1**
Sudden breaking	2	0	0	**2**
Grand Total	**97**	**17**	**1**	**115**

Table 3.7: M11 Collision types and severity

3.7.5 Table 3.7 show that loss of control, side swipe and nose to tail type collisions are most prominent along the section of the M11 between Junctions 7 and 8. Upon further investigation it was not possible to identify any defining patterns of collisions. Nose to tail collisions occurred in close proximity to the junctions, at merges and diverges, and on the slip roads at both Junctions 7 and 8. The high number of nose to tail collisions may be partly attributed to the heavy congestion at both junctions.

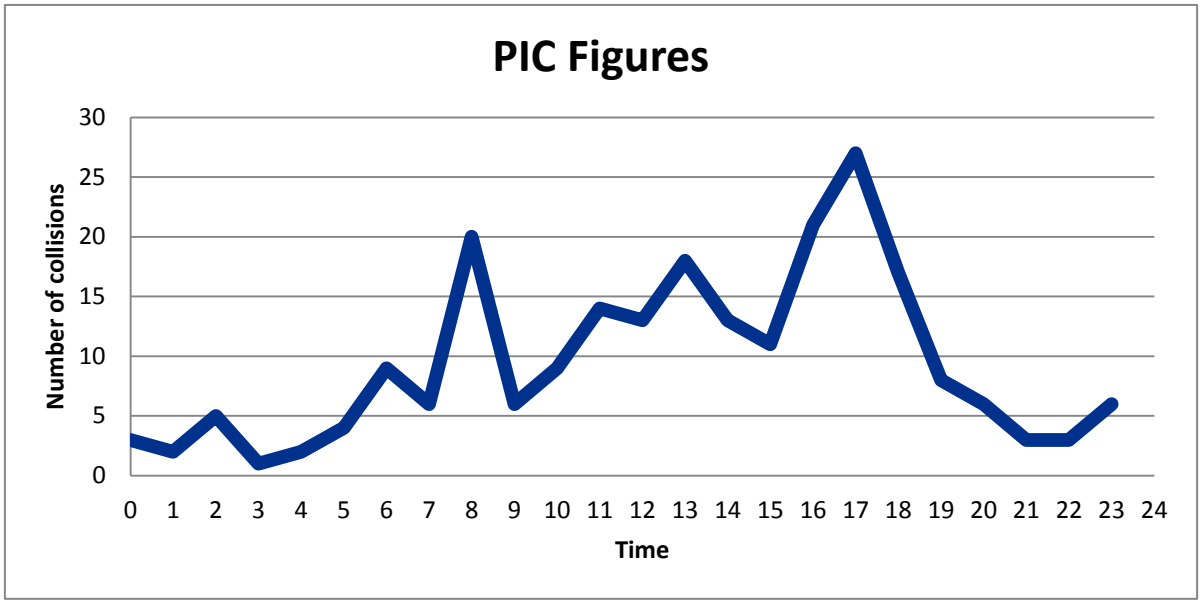

Figure 3.6: M11 Hourly PIC numbers

3.7.6 Figure 3.6 suggests that the number of PICs occurring is related in some way to peak traffic flows. The morning and evening peaks correspond to the times of day where the highest frequency of collisions is occurring. This substantiates the belief that the reduction in congestion will reduce the number of PICs.

Year	Light	Dark	Total	% Dark
2010	11	5	**16**	31.3%
2011	14	2	**16**	12.5%
2012	14	7	**21**	33.3%
2013	16	13	**29**	44.8%
2014	21	5	**26**	19.2%
2015	5	2	**7**	28.6%
Total	**81**	**34**	**115**	29.6%

Table 3.8: M11 Collisions by lighting conditions

3.7.7 Collisions occurring in particular conditions should also be monitored and measured to ensure that these are not made worse by the implementation of the scheme. The baseline data has been analysed and details are given in table 3.8 and table 3.9 regarding the number of collisions that have occurred during the hours of darkness and those that have occurred on a wet or damp road surface. The figures above show that 29.6% of the collisions occurred during the hours of darkness. This is comparable to the national average of 29.7% for all (both lit and unlit) motorways in Great Britain in 2014. The section of the M11 between Junction 7 and Junction 8 is currently mainly unlit with lighting being present from approximately 1 mile south of Junction 8.

Year	Dry	Frost/Ice	Wet/Damp	Total	% Wet/Damp
2010	9	1	6	**16**	37.5%
2011	14	0	2	**16**	12.5%
2012	15	0	6	**21**	28.6%
2013	19	0	10	**29**	34.5%
2014	18	0	8	**26**	30.8%
2015	6	0	1	**7**	14.3%
Total	**81**	**1**	**33**	**115**	28.7%

Table 3.9: M11 Collisions by road surface conditions

3.7.8 The figures above show that 28.7% of all the collisions occurred on a wet, damp, flooded or icy road surface. This compares favourably to the national average of 32.2% in these conditions for all motorways in Great Britain in 2014. Both of these figures can be used as a comparison once collision data is available after completion of the scheme to measure if the collisions in these specific conditions have increased or decreased.

3.8 Local network collision analysis

3.8.1 It is predicted that the scheme will contribute to a reduction in collisions on the existing local road network due to the redistribution of traffic that the new motorway junction will create. The existing road network leads to vehicles accessing the north of Harlow via local roads, increasing the traffic flow levels and therefore leading to congestion.

3.8.2 This in turn can also have a detrimental effect on the attitude of drivers who get frustrated at long delays and are more prone to making misjudgements or try to make up time once on less congested roads, leading to possible collisions.

3.8.3 For the purpose of this scheme and to provide the most accurate levels to which the schemes success can be measured, the collision data provided for the local road network has been split into two categories and analysis and tables will be provided for both. The two categories are:

1. Local roads accessing the existing motorway junctions, and
2. Local roads accessing the tie in points on Gilden Way / Sheering Road.

3.8.4 The proposed motorway junction will be located between the existing Junction 7 and Junction 8. The following analysis takes into account all the collisions that occurred on approximately 100m of all the local roads leading to both motorway junctions, over the 5 year period between 31st May 2010 and 31st May 2015. **Error! Reference source not found.**3.10 details the all of these collisions by year and severity. It should be noted that the data period includes incomplete years in 2010 and 2015

Year	Junction 7				Junction 8				Combined Total	Annual equivalent
	Slight	Serious	Fatal	Total	Slight	Serious	Fatal	Total		
2010	1	0	0	**1**	4	0	0	**4**	**5**	**9**
2011	7	0	0	**7**	5	0	0	**5**	**12**	**12**
2012	4	0	0	**4**	1	1	0	**2**	**6**	**6**
2013	1	0	0	**1**	2	0	0	**2**	**3**	**3**
2014	3	0	0	**3**	7	0	0	**7**	**10**	**10**
2015	3	0	0	**3**	0	0	0	**0**	**3**	**7**
Total	**19**	**0**	**0**	**19**	**19**	**1**	**0**	**20**	**39**	

Table 3.10: Local road junction collisions by year and severity

3.8.5 Table 3.10 show that there is a similar amount of collisions occurring around Junction 7 and Junction 8 of the M11. Collision data for different elements of this scheme should be analysed as part of the Stage 4 Road Safety Audit process and the Safety Report for this scheme to identify if there have been any changes to the number and type of collisions occurring before and after implementation of this scheme.

Collision type	Junction 7				Junction 8				Combined Total
	Slight	Serious	Fatal	Total	Slight	Serious	Fatal	Total	
Head-on	0	0	0	**0**	1	0	0	**1**	**1**
Lost control	2	0	0	**2**	3	0	0	**3**	**5**
Other	0	0	0	**0**	1	0	0	**1**	**1**
Pedestrian	0	0	0	**0**	0	1	0	**1**	**1**
Nose to Tail	16	0	0	**16**	13	0	0	**13**	**29**
Side swipe	1	0	0	**1**	0	0	0	**0**	**1**
Unknown	0	0	0	**0**	1	0	0	**1**	**1**
Grand Total	**19**	**0**	**0**	**19**	**19**	**1**	**0**	**20**	**39**

Table 3.11: Local road junction collision types and severity

3.8.6 Table 3.11 identifies the types of collisions that have occurred and their severity for each junction. The most common collision type is nose to tail shunts which account for 74% of all the collisions at both junctions.

3.8.7 As with the overall collision figures in Table 3.12 it is predicted that the implementation of the scheme will reduce the traffic volume at Junction 7, as a proportion of traffic approaching the junction from the north may be expected to exit early directly at Junction 7A, and a proportion of traffic approaching from the south will continue beyond Junction 7 (where they would previously have exited) to use Junction 7A, and therefore reduce the number of collisions occurring. When reviewing the ‘after’ data attention should be paid to not only the overall collision numbers but also to the number of collisions per type to ensure that no particular type of collision has risen in number, even if the overall number has decreased.

Year	Junction 7				Junction 8				Total	% Dark (all)
	Light	Dark	Total	% Dark	Light	Dark	Total	% Dark		
2010	1	0	**1**	0.0%	3	1	**4**	25.0%	**5**	20.0%
2011	6	1	**7**	14.3%	3	2	**5**	40.0%	**12**	25.0%
2012	3	1	**4**	25.0%	2	0	**2**	0.0%	**6**	16.7%
2013	1	0	**1**	0.0%	2	0	**2**	0.0%	**3**	0.0%
2014	3	0	**3**	0.0%	6	1	**7**	14.3%	**10**	10.0%
2015	2	1	**3**	33.3%	0	0	**0**	0.0%	**3**	33.3%
Total	**16**	**3**	**19**	**15.8%**	**16**	**4**	**20**	**20.0%**	**39**	**17.9%**

Table 3.12: Local road collisions by lighting conditions

3.8.8 In addition to the above measures, collisions occurring in particular conditions should also be monitored and measured to ensure these are not made worse by the implementation of the scheme. The baseline data has been analysed and details are given in Table 3.12 and Table 3.13 showing the number of collisions that have occurred during the hours of darkness and those that have occurred on a wet or damp road surface.

3.8.9 Table 3.12 shows that seven collisions occurred during the hours of darkness during the five year data period, this equates to 17.9% of all the collisions. This is below the national average of 25.9% for all non-built up roads in Great Britain in 2014. Once sufficient collision data is available after completion of the scheme, the number of PICs occurring during the hours of darkness should be reviewed to identify whether there have been any changes to the proportion of collisions occurring in dark conditions.

Year	Junction 7				Junction 8				Total	%Wet/ Damp (all)
	Dry	Wet/ Damp	Total	% Wet/ Damp	Dry	Wet/ Damp	Total	% Wet/ Damp		
2010	1	0	**1**	0.0%	3	1	**4**	25.0%	**5**	20.0%
2011	6	1	**7**	14.3%	1	4	**5**	80.0%	**12**	41.7%
2012	2	2	**4**	50.0%	2	0	**2**	0.0%	**6**	33.3%
2013	1	0	**1**	0.0%	2	0	**2**	0.0%	**3**	0.0%
2014	2	1	**3**	33.3%	6	1	**7**	14.3%	**10**	20.0%
2015	3	0	**3**	0.0%	0	0	**0**	0.0%	**3**	0.0%
Total	**15**	**4**	**19**	**21.1%**	**14**	**6**	**20**	**30.0%**	**39**	**25.6%**

Table 3.13: Local road collisions by road surface conditions

3.8.10 Table 3.13 shows that 10 collisions occurred on a wet or damp road surface during the 5 year data period; this equates to 26%. This is considerably lower than the national average of 36.8% for non-built up roads in Great Britain in 2014. As stated above this should be reviewed once collision data is available after the scheme has been completed to identify whether there have been any changes to the proportion of collisions occurring on wet or damp roads.

3.9 Local roads accessing Gilden Way/Sheering Road

3.9.1 A summary of the PICs that have occurred along Gilden Way and Sheering Road, within the vicinity of the proposed tie in points for the new link road, are shown in table 3.4.4.1. This data search area includes the B183 Gilden Way and Sheering Road from its junction with the A414 to Hatfield Heath, Sawbridgeworth Road and Sheering Lower Road, and covers a 5 year period between 1st June 2010 and 31st May 2015. It should be noted that the data period includes incomplete years in 2010 and 2015

Year	Slight	Serious	Fatal	Total	Annual equivalent
2010	5	3	1	**9**	**15**
2011	12	4	0	**16**	**16**
2012	17	0	0	**17**	**17**
2013	10	3	1	**14**	**14**
2014	11	2	0	**13**	**13**
2015	3	1	0	**4**	**10**
Total	**58**	**13**	**2**	**73**	

Table 3.14: Local road collisions by severity

3.9.2 Table 3.14 details the number of collisions by type and identifies that the most common collision type is side impact collisions, accounting for 31.5% of all the collisions. 20.5 % were attributed to single vehicle loss of control collisions and 19.2% were attributed to nose to tail type collisions.

3.9.3 The next most frequent collision type, with 8.2% of the collisions involved pedestrians, then 1.4% for both Head On and Overtaking collisions. 17.8% were attributed to other collision types.

Collision Type	Slight	Serious	Fatal	Total
Head-on	0	1	0	**1**
Lost control	11	3	1	**15**
Other	11	2	0	**13**
Overtaking	1	0	0	**1**
Pedestrian	3	2	1	**6**
Rear End Shunt	13	1	0	**14**
Side Impact	19	4	0	**23**
Grand Total	**58**	**13**	**2**	**73**

Table 3.15: Local road collision types and severity

3.9.4 It can be seen in table 3.15 above that six collisions involved a pedestrian being in conflict with a vehicle. Four of these collisions involved the pedestrian trying to cross the road, including one pedestrian who emerged to cross from behind a bus. One PIC involved two pedestrians arguing on the footway, when one of the pedestrians stumbled into the path of an oncoming vehicle, and two PICs involved pedestrians being struck by a vehicle after the vehicle left the carriageway.

3.9.5 The pedestrian collision resulting in fatal injuries involved the pedestrian emerging from behind a bus to cross the carriageway and walking into the path of an oncoming vehicle.

3.9.6 The other collision resulting in a fatal injury occurred when a driver lost control of their vehicle, left the carriageway and hit a tree stump. Impaired by alcohol was listed as a contributory factor in this collision. Table 3.16 shows that 24.7% of all the collisions occurred during the hours of darkness, this is below the national average of 26.0% for all non-built up roads in Great Britain in 2014.

Year	Light	Dark	Total	% Dark
2010	7	2	**9**	22.2%
2011	12	4	**16**	25.0%
2012	15	2	**17**	11.8%
2013	10	4	**14**	28.6%
2014	10	3	**13**	23.1%
2015	1	3	**4**	75.0%
Total	**55**	**18**	**73**	**24.7%**

Table 3.16 Local road collisions by lighting conditions

3.9.7 Table 3.17 shows that 27.4% of all the collisions occurred on a wet or damp road surface, this is lower than the national average of 40.0% for all non-built up roads in Great Britain in 2014.

Year	Dry	Frost/Ice	Wet/Damp	Total	% Wet/Damp
2010	5	0	4	**9**	44.4%
2011	12	0	4	**16**	25.0%
2012	11	2	4	**17**	23.5%
2013	8	0	6	**14**	42.9%
2014	12	0	1	**13**	7.7%
2015	3	0	1	**4**	25.0%
Total	**51**	**2**	**20**	**73**	**27.4%**

Table 3.17: Local road collisions by road surface conditions

3.10 Topography and Land Use

3.10.1 The ground along the existing M11 motorway generally falls from the south to the north. Ground level ranges from approximately 83m AOD in the south to approximately 48m AOD in the north. It is proposed that this area will comprise new slip roads in cuttings and on embankments and a new grade separated junction.

3.10.2 Ground level in the area of the proposed link roads generally falls from the east to the west. Ground level ranges from approximately 70m AOD at the existing motorway to approximately 50m AOD in the general area of the B183 link road roundabout. Ground level then rises to approximately 64m AOD in the general area of Mayfield Farm adjacent to the existing B183 Gilden Way.

3.10.3 Ground level along the B183 Gilden Way falls from approximately 63m AOD to 59m AOD, before it rises to 66m AOD. Whilst the proposed works along the B183 Gilden Way are significantly at grade, the outbound and inbound links from the B183 will mostly be constructed on embankment.

3.10.4 The main topographical features within the study area include:

- The existing M11 motorway is located to the east of the study area. It is orientated north to south.
- The existing B183 is located to the west of the main study area. It is orientated approximately north east to south west.
- Pincey Brook watercourse is located to the north. It is orientated approximately east to west.
- The majority of the land surrounding the existing motorway consists of agricultural land and woodland.
- Mayfield Farm is located to the west of the motorway adjacent to the B183 Gilden Way/Sheering Road.
- The town of Harlow is located to the west of the study area.

3.11 Location and geology

3.11.1 The Study Area is largely within Epping Forest District, with two small areas on the southern edge within the Harlow District boundary. The area is roughly bounded by Moor Hall Road to the south; a strip of land directly to the east of the M11 motorway; a line approximately 200m to the north of Pincey Brook; and a line approximately 250m to the west of the Campions residential area. The M11 is sited on the higher ground within the Study Area, with the land sloping to the north and west to the Pincey Brook and the Stort Valley. The geology consists of Boulder Clay, with head deposits and alluvium in the valley sides and floor of the Pincey Brook.

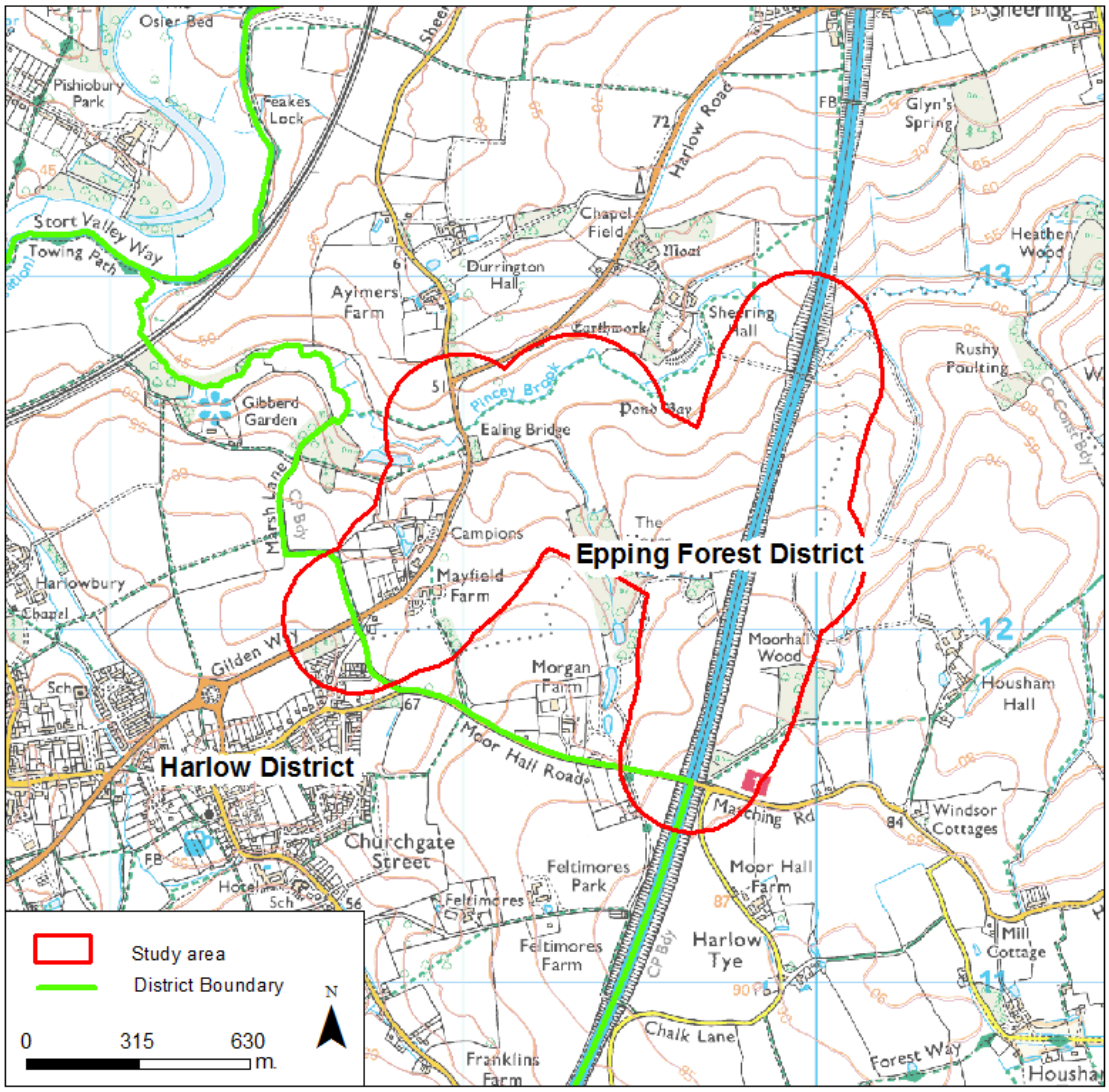

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Figure. 3.7 Location map of study area

3.12 Land use

3.12.1 Historical land use has been assessed by review of historical Ordnance Survey (OS) mapping using an Envirocheck report from Landmark. A summary of the identified relevant land uses is presented in Table 3.18 below:

Date	On-Site	Off-Site
1881	The site comprised mainly of agricultural/undeveloped land. Sheering Road runs through the far west side of the site, and to the south are woods.	Predominantly agricultural/undeveloped land with farms. Moorhall Woods lie to the east. A brickfield is located to the north east. Piper's mill is 550m to the west. Two farms are to the south of the site. The 'Campions' is to the north.
1887/ 1898	No significant change	Gravel pits 50m and 350m to the south east of the site. Brick field 50m north of site boundary, and 'old clay pit' 300m to the north.
1923	Mayfield farm appears on the western side of the site.	The 'old clay pit' has gone and the area is now woodland. The brickfield has gone and a gravel pit is in the location.
1938/ 1950	No significant change	No significant change
1947	No significant change	To the south of the site there is a development with houses and allotments.
1951	No significant change	The 'Campions' appears redeveloped as housing.
1960	No significant change	No significant change
1982	The M11 runs northwards through the eastern side of the site.	The gravel pit to the north no longer appears on the map. The housing development to the south has extended westwards to join with the main development.
2006	No significant change	Morgan Farm appears 250m to the south of the site.
2013	No significant change	A farm is shown to the north next to Sheering Hall.

Table 3.18 Review of historical ordnance survey maps and aerial photography

3.13 Summary of site history

3.13.1 The historical land use of the surrounding area can be summarised as follows:

- The area surrounding the site has predominantly been agricultural/undeveloped land since at least 1881;
- Between 1881 and 1887 gravel and clay pits and a brickfield are shown to the north and south of the site. These are no longer shown by 1982 and appear to have been infilled;
- Between 1947 and 1982 housing developments have expanded and redeveloped to the north and south of the site; and

- The site remains largely unchanged with the exception of the addition of two new farms to the south and east of the site;

3.13.2 Potential sources of contamination apparent from the historical plans are:

- Agricultural use of land on and around the site;
- Farms;
- Filled in gravel and clay pits; and
- Made ground (roads);

3.14 Agriculture land classification (ALC)

3.14.1 The proposed Scheme would cross agricultural fields associated with Mayfield Farm (on Sheering Road) and Morgan Farm (on Moor Hall Road). The farming within this area is predominantly arable. To the west of Sheering Road (B183), there are several horse paddocks surrounding the Campions residential area.

3.15 Property

3.15.1 The closest residential area to the proposed Scheme is the Campions, which is a small hamlet on the west side of Sheering Road (B183) consisting of approximately a dozen properties. Other nearby residential properties include 163 Sheering Road, a stand-alone residential property just south of Pincey Brook, and Sheering Hall, which is located just north of the Pincey Brook. The Environmental Impact Assessment will cover the residential areas within Old Harlow and Churchgate Village.

3.16 Industry

3.16.1 There are a few small businesses within the Study Area including Mayfield Farm bakery and café, and Churchgate sausage shop which are both within the Mayfield farm buildings. Quinton Associates are located within the Campions residential area on the west side of Sheering Road and Gardencare Tree Services is located within Sheering Hall to the north of Pincey Brook. IDS Consultants, specialising in architectural and engineering services, are also located within Morgan Farm on Moor Hall Road.

3.17 Development land

3.17.1 A corridor of land between the east of Harlow urban area and the M11 is a possible future development site for employment and housing. In addition, Harlowbury (north of Gilden Way) is a planned development of 1,200 dwellings, with community facilities, employment and public open space due to be constructed between 2013 and 2018. This site is directly to the west of the Study Area for the proposed Scheme.

3.18 Land used by the community

3.18.1 There are several public footpaths in the vicinity of the proposed Scheme which are used by local walkers and residents. The Mayfield Farm bakery, café and sausage shop are also well used areas by the local community. There is also a craft shop and dance school associated with the Mayfield Farm property. Gibberd Garden (a Registered Park and

Garden) is a public area accessed via Marsh Lane, and includes a sculpture collection, a wild garden, and an arboretum of young trees.

3.19 Climate

3.19.1 Harlow is located within the East of England which is the part of the UK closest to continental Europe and as such can be subject to continental weather influences that bring cold spells in winter and hot, humid weather in summer. It is also furthest from the paths of most Atlantic depressions, with their associated cloud, wind and rain. Relative to other parts of the UK the climate for the region can be less variable.

3.19.2 According to the data published by Met office for the period of 1981 to 2010, the area in question receives less rainfall than the national average and rarely experiences heavy snow or ice. The mean annual temperature is 13.8°C compared with a UK mean annual temperatures range of about 12.4°C in the far north to over 10.5°C in Cornwall and the Channel Islands.

3.19.3 The area experiences annual averages of 47.9 days of air frost which is lower in comparison to the annual average days of air frost in UK. Over the UK the number of days of air frost varies from less than 10 at the very tip of Cornwall to over 120 in the highlands of Scotland while ground frost for the UK as a whole ranges from less than 40 to over 150 days for the same geographical area.

3.19.4 According to the data from 1971 to 2000, the annual average snow fall in the study area is between 20 to 24 days with 9 to 11 days of lying snow. In comparison, parts of the Scottish Highlands average over 70 days of snowfall whilst around the coasts of southwest England there are less than 10 days of snowfall per year.

3.19.5 Eastern England is one of the more sheltered parts of the UK in so far as wind strength is concerned. The windiest areas of the UK are located in western and northern Britain - closer to the Atlantic. The average mean wind speed in the project area is 8.1 knots. A summary of the climate data is presented in table 3.19 below.

Climatic Indicator	Annual Average for Study Area	District East Anglia	Region England South	UK 1981 - 2010
Maximum temperature	13.8°C	14.2	14.0	12.4
Minimum temperature	6.1°C	6.2	6.2	5.3
Annual Average Rainfall	613.0	624	793.9	1154.0
Annual Average Days of Rainfall	112.1	115.5	126.7	156.2
Days of Air Frost	47.9	46.8	46	54.6
Average Climate 1981-2010				

Table 3.19 –Harlow Climate Data

3.19.6 In summary, Harlow has its own unique microclimate but with no perceivable harsher conditions outside the normal levels observed in the UK. The proposed scheme do not therefore require special measures for the mitigation of ice in winter, control of excessive surface water runoff in the event of a storm or any acute pollution episode that could result from extreme climatic factors.

3.20 Drainage

3.20.1 The existing drainage on the M11 is a piped system with concrete surface water collector channels. There are no identifiable attenuation ponds in the location proposed for the slip roads and grade separated junctions.

3.20.2 Land to the west of the M11, extending to the B183 is an agricultural field. The link roads go across this land. Recent Ground Investigation undertaken to inform the design suggests agricultural filter and mole drains are present in the cropped areas.

3.20.3 From surveys and reconnaissance site visits, it is understood that the existing drainage of this section of the M11 currently discharges to the Pincey Brook watercourse, with pipework integral with the nearby box culvert underpass providing an east to west cross-over point before also discharging to the west of the motorway. The indications are that the M11 drainage and its associated accessories are in a poor condition.

3.20.4 Highways drainage on Gilden Way comprises predominantly a kerb and gully system. The proposed works are within the sub-catchment of Pincey Brook and Harlowbury Brook, which are tributaries of River Stort.

3.20.5 The baseline study area for drainage assessment extends between approximately 1km north of the scheme and the junction of the B183 with the A414.

3.21 Surface water

3.21.1 The nearest main watercourse to the site is Pincey Brook located approximately 300m to the north of the site. Several ditches and ponds are located in the vicinity of the site and one crosses the proposed route running north from ponds near to Morgan Farm. Ponds are also indicated on the mapping in Campions. Pincey Brook is classified by the Environment Agency (EA) as being of 'poor' (ecological) water quality. The ecological water quality within this watercourse is predicted to change to 'moderate' by 2015.

3.22 Flooding

3.22.1 EA mapping indicates that the site is not located in a Flood Risk Zone (associated with fluvial flooding). A Strategic Flood Risk Assessment was completed by the Harlow District Council (HDC) and Epping Forest District Council (EFDC) in 2011, providing high level information on the water environment (e.g. flood zones, groundwater and surface water) which covers the Scheme area.

3.22.2 The Scheme lies within a Flood Zone 1, which has a low probability of flooding. The National Planning Policy Framework (NPPF) requires all developments within a Flood Zone 1 area that are over one hectare in size, to produce a Flood Risk Assessment.

3.22.3 The Scheme lies just south of both a Flood Zone 2 and Flood Zone 3a area, which originate from the Pincey Brook (EA, 2013). A Flood Zone 2 is an area at risk from between 1 in 100 and 1 in 1000 year flood events (between 1% and 0.1% annual probability), whilst a Flood Zone 3a is an area where events less than or equal to a 1 in 100 year event (greater that 1% annual probability) are likely to occur (EA, 2013). Severe flood events were recorded in this area in 1947, 1978 and 2000.

3.22.4 The Pincey Brook water body and the two unnamed watercourses are in a 1 in 30-year flood risk area (EFDC/HC, 2011). The EFDC have identified a number of Flood Risk Assessment Zones (FRAZs) which are catchments of ordinary watercourses that either contribute to a 'Main River' or are a known historical area of flooding. The unnamed watercourse 1 adjacent to the Mayfield Farm is a FRAZ, as specified by the EFDC, and as a result any development application is required to be accompanied by a Flood Risk Assessment. The detail of the assessment depends on the size of the development. The ordinary watercourse located adjacent to Mayfield Farm is also known to have EFDC/EA managed storm grilles, for high rainfall events.

3.22.5 Table below contains flow data for the Pincey Brook gauge station at Sheering Hall, which is located at TL495127 in the Scheme footprint. The records at the gauging station are dated between 1974 and 2012. The base flow index is 0.37, which is the proportion of the river runoff that is derived from groundwater and stored sources. The higher the base flow, i.e. closer to 1, the more sustained the watercourse will be during dry periods. The western extent of the Scheme lies above the North Mymms Tertiaries groundwater body, which is reported as a sensitive Drinking Water Protected Area (pers comm., Environment Agency). This groundwater body is currently classified as being of 'Poor' Chemical Status under the WFD.

Measured	Flow (m^3/s)
Mean Flow	0.313
95% Exceedance (Q95)	0.025
70% Exceedance (Q95)	0.059
50% Exceedance (Q95)	0.133
10% Exceedance (Q95)	0.670

Table 3.20 Flow data for the Pincey Brook (source: Centre for Ecology and Hydrology)

3.23 Geology and soils

3.23.1 The assessment of potential impacts on geology and soils was undertaken at stage 2 in accordance with the Design Manual for Roads and Bridges (DMRB), adapted to take account of current legislation and guidance. With respect to geology and soils, there is limited formal guidance on the assessment of impacts within the DMRB. Therefore, an element of professional judgement has been applied to this section of the assessment.

3.23.2 The assessment of potential on-site contamination sources has been made using the following information sources:

- Review of historical Ordnance Survey mapping from two Envirocheck reports from Landmark: M11 Junction 7A, 48621199_1_1 dated 22/08/13 and Gilden Way, 73748199_1_1 dated 15/10/15.
- Web-based information sources including: the British Geological Survey, the Environment Agency and Cranfield Soilscapes websites;
- Correspondence with Harlow District Council, Epping Forest Direct Council, Essex County Council; and
- Site specific geology and hydrology data gathered from a ground investigation (GI), undertaken from late-2015 through to early-2016.

3.24.1 The desk-based assessment is based on a number of information sources that are assumed reliable. The assessment is based on data available, and observations made during the Ground Investigation (GI). At the time of writing this report, the factual report from the GI has not yet been made available, and ground gas monitoring is still ongoing (a review of available laboratory chemical analysis results has been used). The assessment of potential geology and soils impacts would be updated with further interpretation of ground conditions encountered and a ground gas risk assessment once the factual report is available.

3.24 Ground Conditions

3.8.2.1 The majority of the scheme is underlain by superficial deposits of the Lowestoft Formation (Diamicton), with head deposits in a narrow band in The Campions area, towards the existing M11, and in the central section of Gilden Way. In addition, there is a band of glaciofluvial deposits in the western section of Gilden Way. The area in the vicinity of M11, to the east of Gilden Way, is underlain by the London Clay Formation, which thins towards the west, before it is entirely absent (where it has been eroded away in geological times) in the centre of Gilden Way. Where the London Clay is absent, there is underlying (older) Thanet Sand Formation and Lambeth Group (undifferentiated clay silt and sands) and then (even older) Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated), which are shown to subcrop beneath the superficial deposits. Made ground is expected in areas of existing roads, in addition to some areas of reworked ground, infilled pits and demolished buildings. The soils underlying the western section of the proposed scheme (including Gilden Way and Sheering Road) are classed as “freely draining slightly acid but base rich soils”, and the soils underlying the eastern section of the proposed scheme (including the existing M11) is classed as “lime rich loamy and clayey soils with impeded drainage”.

3.25 Environmental Sensitivity

3.25.1 The proposed scheme study area is underlain by both superficial and bedrock aquifers. The head deposits are classified as Secondary ‘Undifferentiated’ aquifers, with the glaciofluvial deposits and the Thanet Sand Formation classified as Secondary A aquifers and the Lewes Nodular Chalk Formation and Seaford Chalk Formation classified as a Principal aquifer. The Lowestoft Formation and the London Clay Formation are classified as ‘Unproductive Strata’.

3.25.2 The proposed scheme is not in a Source Protection Zone and there are no abstractions for potable water. There are, however, two groundwater abstractions and one surface water abstraction within 250m of the proposed scheme (all for spray irrigation). There are also two primary rivers within 500m of the proposed scheme route (the Pincey Brook and the Harlowbury Brook).

3.25.3 The soils underlying the western section of the proposed scheme are broadly classed as “Soils of Intermediate Leaching Potential”; these soils have the potential to transmit a range of pollutants. The soils in the eastern area are not classed in terms of groundwater vulnerability as this area is underlain by unproductive strata, however their impeded drainage could potentially cause overland flow where soils are compacted.

3.25.4 In terms of agricultural soil quality, the eastern area of the proposed scheme is classified as high grade agricultural land. This high grade land is likely to be considered a High Sensitivity receptor.

3.26 Soil and Groundwater Contamination

3.26.1 The GI and soils assessment has not identified substantially elevated concentrations of contamination in the soils. The groundwater assessment identified some elevated metal

concentrations. However all results were below the drinking water guidelines indicating that contamination is not likely to be substantial.

3.26.2 In summary the GI identified no substantial contamination within either the soil or groundwater samples tested. If mitigation measures are to be implemented, potential impacts during construction and operation of the proposed scheme have been assessed to be predominantly Neutral or Slight. The potential impact to soils in terms of loss of high grade agricultural land has been assessed as Moderate to Large adverse without mitigation. The loss of this land could be reduced with appropriate mitigation measures. This could be developed with a more detailed soil quality assessment and implementation of a soil management plan. With implementation of mitigation measures, the significance of residual impact of this loss has been assessed (at this stage) as Slight.

3.26.3 It is assumed that all works would be undertaken using appropriate PPE and the application of appropriate working practices. The presence of proposed hardstanding in many areas across the site post development, and the implementation of mitigation measures, would minimise the risk of exposure of potential contaminants to future site users and the environment. The assessment of potential geology and soils impacts would be updated with further interpretation of ground conditions encountered, and a ground gas risk assessment, at the next stage when the GI factual report is available.

3.27 Public utilities

3.27.1 A summary of the public utilities are presented in the in table 3.21 below:

Company	Location	Description
UK Power Network	South east verge of Gilden Way at junction with Mulberry Green, plus adjacent LV supplies to properties	Sub-station & HV and LV underground cables, with HV heading North and twin circuits head West along Mulberry Green.
	Crossing Gilden Way to South east verge, from Central Nursery to Gilden Way Pump Station.	HV underground cables
	East and West verges of London Road (south of roundabout). Crossing roundabout and west into Mandela Avenue.	LV and HV underground cables.
	West and south of central roundabout (junction with Sheering Road)	HV cables crossing Gilden Way to the west of the roundabout and Sheering Road to the south of the roundabout.
	South verge of Matching Road, up to Motorway overbridge.	LV underground cable and feeder pillar.
	Verges of Sheering Road adjacent to Mayfield Farm, continuing South West into Gilden Way.	LV underground cables
	East verge of Sheering Road (north of Mayfield Farm to Campions).	HV underground cables (substation located in Mayfield Farm).
	West of Sheering Road north of Campions to Ealing Bridge and further North.	HV overhead cables with some sections of LV in the verge.
BT Openreach	Underground ducts located on both sides of London Road, crossing the roundabout. Underground ducts in north verge of Gilden Way from the roundabout at London Road to Mulberry Green junction / Oxleys and around junction. Supply connections crossing Gilden Way in various locations. Underground cables (plus some overhead) in Gilden Way leading into Sheering Road (east and west verges) to the southern boundary of The Red House. Overhead cables located in the east verge of Sheering Road from Mayfield Farm crossing Ealing Bridge and continuing north. Underground cables located in the southern verge of Matching Road where it crosses the M11.	Further information required from BT Openreach as to the number of ducts and type/routes of all cables
Virgin Media	Duct route in east verge of London Road crossing east side of roundabout within verges, with spur heading east along Gilden Way north verge (dead end). Also continues west in north verge.	Further information required from Virgin Media as to number of duct s and type/routes of cables.

	Duct route in north verge of junction with Mulberry Green and Gilden Way. Duct also continues south to Central Nursery.	
Genesys	Cables located in the west verge of the northbound carriageway. Feeds cross to the southbound carriageway (east verge) to supply comms equipment.	Further information required from Genesys as to the exact type/routes of all cables.
Mobile Phone Masts	Mayfield Farm	3 & T Mobile - Mobile Phone Base Station.
	Matching Road at junction with Chalk Lane	Orange - Mobile Phone Base Station.
National Grid (Gas)	West verge of London Road crossing through middle of roundabout. Also in north verge of Mandela Avenue.	4" CI LP Gas Main London Rd 180mmPE LP Mandela Ave
	North verge of Mulberry Green crossing Gilden Way. Spur in south verge of Gilden Way to the Central Nursery.	10" CI LP and 6" CI LP (part with 125mm PE inserted within) in North Verge. 125mm PE LP Gas Main in Gilden Way verge to Nursery.
	North of the proposed overbridge, crossing the proposed north on slip and south off slip and close proximity to new connector road.	600mm LHP Gas Main
	West verge of Sheering Road from the junction with Gilden Way to Ealing Bridge and continues North.	6" Cast iron LP Gas Main
Thames Water (Sewers)	Crossing Gilden Way at the Central Nursery.	375mm dia surface water sewer, depth not given on TW sewer records.
	Crossing Gilden Way to the north of the junction with Mulberry Green.	300mm dia foul water sewer, depth approx 1.3m
	From 129 Sheering Road to junction with Gilden Way within the carriageway.	150mm dia foul sewer falling in a southerly direction, approx 2m deep
	No thames Water Surface Water Drainage within scheme area.	
Affinity Water (Potable)	East verge of London Road crossing through centre of roundabout.	7" & 9" CI mains, plus 225mm HPPE main located in the east verge to the south of the roundabout.
	West verge of London Road to the north of the roundabout	12" CI/SI main
	South east verge of Gilden Way from the Central Nursery to Mulberry Green.	1 1/2" PVC main
	North & South verges of Mulberry Green crossing Gilden Way	9" CI/SI main North verge 5" CI/SI main South verge
	Crossing Gilden Way to the north of Mulberry Green junction.	TBC - dia & pipe material not shown.
	Matching Road crossing the M11.	4" PVC/CI/SI Water Main
	Located within Sheering Road from junction with Gilden Way to Ealing Bridge and beyond.	5" CI / SI and 250 MOPVC /180mm MDPE

Table 3.21 Summary of public utilities

3.27.2 The proposed road scheme will require the diversion of the existing 600NB High Pressure Gas pipeline, replacing the existing pipeline with heavy wall (proximity pipe) to comply with the requirements of IGEM/TD/1 Edition 5 and T/SP/P/10. The pipeline works are expected to be undertaken during the summer of 2017 or 2018 (subject to scheme approval).

3.27.3 The existing pipeline is currently non-compliant with IGEM/TD/1 Edition 4 or 5 with regard to the requirements for High Density Traffic Routes (HDTR), constructed in 1967 with the M11 motorway section constructed in 1975. The pipeline required modifications in 1973 to accommodate the motorway construction. It is assumed that due to the presence of stopple tees and vent connections located on either side of the motorway that the previous diversion was undertaken without decommissioning the pipeline.

3.27.4 To ensure the diversion options maintain the appropriate standard of safety, the design shall be undertaken in accordance with IGEM/TD/1 Edition 5, T/SP/TR/18 and T/SP/P/10. The environmental aspects are generally in accordance with T/SP/TR/22. Pipeline routing shall be undertaken in accordance with IGEM/TD/1 Edition 5 and Appendix D of National Grid Specification T/SP/TR/18.

3.27.5 Following a meeting with Jacobs and Essex County Council, three potential solutions were identified. The environmental and physical constraints identified are not insurmountable and provide confidence that the routes reviewed are all feasible. A single option shall be selected to be developed during detail design in accordance with T/SP/TR/24. There are still some technical issues which in the absence of additional studies need to be addressed during detail design, such as the concern over facture toughness and weld quality.

4. THE SCHEME OPTION DESCRIPTION

4.1 Brief Description

The proposed scheme boundary commences at the London Road roundabout on Gilden Way (B183) and involves widening the existing two-lane road to three lanes. Each lane will be 3.3m wide. Double white road marking lines would demarcate the road space for the opposing outbound and inbound traffic. When completed, two of the lanes will take traffic in a westerly direction into Harlow Town and the third lane will take the outbound traffic onto the M11. The widening of the existing carriageway will all be carried out within the existing highway boundary so no land take will be required from private properties.

4.2 Gilden Way Widening and Improvements

4.3.1 The proposals will lead to the widening and upgrade of the existing footway along Gilden Way to accommodate both pedestrians and cyclists. To ensure the safety of vulnerable road users, the design will include standard crossings for non-motorised traffic. Thus, the scheme will not close or sever any existing public right of ways (PRoW). To minimise disruption, Phase 1 of the scheme that covers works predominantly on Gilden Way, tie into existing levels with no need for significant earthworks.

4.3.2 Improvements on Gilden Way include reconfiguration of existing junctions, roundabouts and egress points to improve safety and flow efficiency for the increased traffic. Traffic regulation orders accompanied by appropriate signing will be put in place. These measures will be aimed at preventing rat running through the residential streets, and in particular Mulberry Green, without impacting on existing bus routes. As part of the drive to improve safety, the scheme is committed to reducing the speed limit from 60mph to 40mph on the proposed 3.3m wide traffic lanes.

4.3.3. As Gilden Way becomes Sheering Road it passes Marsh Lane and Mayfield Farm, roughly to the west and east respectively. At Mayfield Farm, the widened carriageway begins to veer offline to the east where a new carriageway is proposed to link the existing Sheering Road with a new roundabout.

4.3.4 The existing Sheering Road will be converted into a local access only road for the Campion residents and a new junction will link the Campions Residents with the realigned Sheering Road. The Campions access road will be separated from the realigned Sheering Road at the most southern part by a 2.5m island which will include screening from the carriageway. The existing access to Mayfield farm will also be re-aligned to tie in with the new alignment. The Campions access road will also become a shared use surface for pedestrians and cyclists. A new crossing will also be included as part of the works and will be located close to Marsh lane joining the existing public right of ways in that area and the bus stops on either side of the Sheering Road.

4.3 Sheering Road to the M11 Junction

4.4.1 The roundabout terminating the Gilden Way works will have an inscribed circle diameter (ICD) of 80m and will join the realigned Sheering Road with the existing Sheering road at the

Pincey Brook Bridge. Two new footways will be created to join the two existing public right of ways either side of Sheering Road (FP 204_29, FP 204_17) and the new Campions shared use access track. The current vertical and horizontal alignment of the existing Sheering Road as it approaches Pincey Brook Bridge is not compliant with current design standards. As part of the option the alignment will be improved but due to a number of constraints including the topography of the area, the wooded area to the south of Pincey Brook, existing properties and the Pincey Brook Bridge, alignment departures from standards will be required. This is an improvement on the horizontal and vertical alignment of the previous version of the scheme taken to the PIE in July 2015.

4.4.1 From the new Sheering Road roundabout, the link continues in a north-easterly direction and passes under the vertical alignment of the future bypass to a second roundabout located south of Pincey Brook. The road then continues on a gradual rising grade to the new motorway roundabout junction on the western side of the M11. This link has been future proofed to allow for the northern bypass. Traffic from this link which serves as the future onslip will merge onto the traffic stream from the Northern Bypass in advance of the proposed grade separated junction, which is at a higher elevation.

4.4.2 A two-lane link will take traffic from the M11 to the new Sheering Road. The new road approaching the motorway will be rising on an embankment to take account of the difference in elevation between Sheering Road and the M11. This section of the link serves as the off slip from the future Bypass.

4.4.3 As the eastbound and westbound links connect to the western dumbbell roundabout the two links join. The cross section of the carriageway at this point will be D2AP in accordance with TD27. To future proof the scheme the eastbound link will have a cross section of MG1C. The westbound link will also be future proofed for a northern bypass and will have a cross section of DG2E.

4.4 Dumbbell Roundabouts

4.5.1 Two new roundabouts will then be constructed on either sides of the M11 with an ICD of 60m and will be connected by a new overbridge to enable free flow access onto the new road from the Motorway and onto the Motorway both northbound and south bound directions. The location of the M11 junction has been specifically chosen to reduce the amount of earthworks required and to allow for any potential northern bypass in the future.

4.5 Public Right of Ways (PRoWs) and Non-Motorised Users

4.6.1 Footpath 204_30 runs southwards from the B183 Sheering Road across a field and through Mayfield Farm to the New Town boundary. From here it continues as footpath 198_42 along a farm track to Moor Hall Lane. The re-aligned B183 Sheering Road will cut across Footpath 204_30 between Mayfield Farm Access and the new junction for the Campions at this point it will be realigned to the new Mayfield Farm access to tie in with the new footway along the realigned Sheering Road.

4.6.2. Footpath 204_35 follows Marsh Lane from the junction with the B183 Gilding Way/Sheering Road. It links with the footpaths to the north west of the Campions. Although the proposed scheme does not cut across Footpath 204_35, the realigned B183 Sheering Road will tie into

the existing highway layout very close to the start of the footpath at the Marsh Lane/B183 Gilden Way junction.

4.6.3 Footpath 204_29 runs through woodland and pasture land in an easterly direction from Footpath 204_35 to the B183 Sheering Road approximately 60 metres south of Ealing Bridge. The eastern end of footpath 204_29 is adjacent to property number 163 close to where the proposed northwest arm of the roundabout would tie into the northern section of the B183 Sheering Road.

4.6.4 Footpath 204_17 runs along Pincey Brook eastwards from Ealing Bridge on the B183 Sheering Road. The realigned B183 Sheering Road will tie into the existing highway layout close to the start of this footpath.

4.6.5 Footpath 204_26 runs westwards from the B183 Sheering Road from a point approximately 40 metres north of Ealing Bridge. This route will be unaffected by the scheme because the alignment of the B183 Sheering Road will not be altered beyond the bridge.

4.6.6 There are no bridleways affected by the scheme.

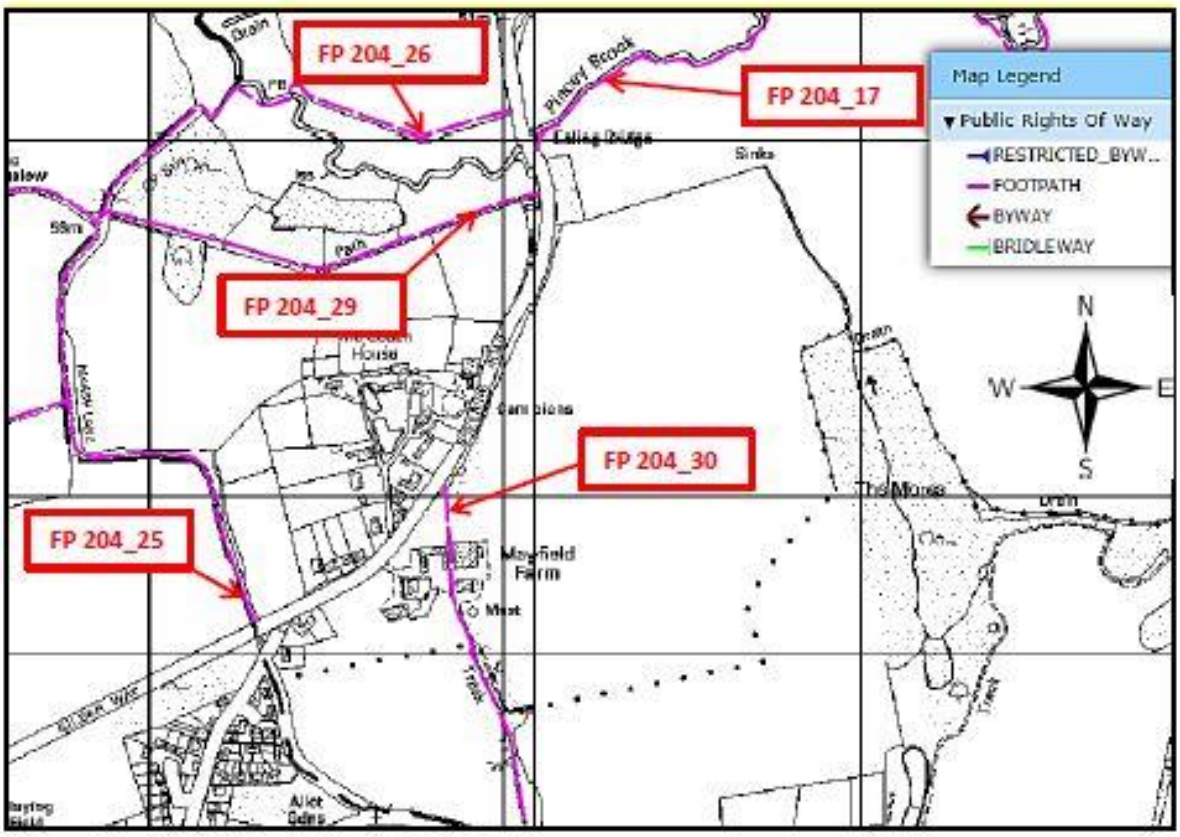


Figure 4. 1: Plan showing PRoW affected by the scheme

4.6 Proposed Drainage

The proposed drainage for the slips and link roads will be a sealed system and incorporate attenuation ponds with flow control devices. Discharges into existing watercourses will therefore be regulated to flows rates no worse than the existing Greenfield run off rates. System capacity with allowance for climate change and pollution control measures will

comply with the DMRB guidelines and the HAWRAT process. The Gilden Way works include a robust drainage solution that will also limit discharges into the receiving streams. Infrastructure for the drainage in this area will utilise limited land currently in the ownership of Harlow District Council along Gilden Way.

5. ENGINEERING ASSESSMENT

5.1 Highways Alignment

5.1.1 Between London Road roundabout and Marsh Lane the scheme alignment design has been confined within the existing highways boundary. The main constraints in this area are the properties that front onto Gilden Way. To asses and achieve operational capacity for the increased traffic flows, a number of options were tested using VISSIM micro simulation. During this operational assessment it was established that the traffic heading towards the M11 was relatively free flowing and there was no major bottlenecks along the route as it approached the M11. Traffic heading towards Harlow slowed down significantly due to traffic on the A414. The A414 first avenue junction was found to be a major traffic constraint along Gilden Way. A three lane carriage consisting of two lanes taking traffic westbound into Harlow and one lane taking traffic eastbound towards the M11 performed optimally during the assessment.

5.1.2 To provide three lanes within the existing highway boundary along Gilden Way, three 3.3m narrow lanes with a double white line was adopted as the cross section. This cross section is not a standard cross-section in accordance with D27 and would be classed as a departure from standard. In mitigation the narrow lanes would visually constrain the space for a driver causing drivers to reduce the speed and in addition the speed limit along the will be restricted to 40mph from London Road Roundabout. Currently the road has unrestricted speed.

5.1.3 On the north side of Gilden Way a 2.5m wide footway cycleway is proposed which will connect the existing footway at London Road Roundabout along Gilden Way with existing PRoW's, Mulberry Green, the proposed Harlowbury development, the Campions properties, and Mayfield Farm. It will terminate at the Pincey Brook Bridge on Sheering Road where it connects to two existing PROW's either side of the carriageway. On the southern side of Gilden Way a grass verge will be provided which will vary in width along the route depending on the highway boundary.

5.1.4 The Mulberry Green junction has been redesigned to tie in with the widened carriage on Gilden Way. It has also been reconfigured to a left in left out only junction. Travelling westbound on Gilden Way there will also be a banned right turn movement into Mulberry Green to avoid rat running through Old Harlow. An exception will be provided for buses as this movement currently forms part of an existing bus route.

5.1.5 Opposite the Oxleys on Gilden Way there is an existing short section of retaining wall due to the level difference between Gilden Way and the Oxleys. At this point the footway in the proposed design will be reduced to 2min width pinch point over a 20m section. On the opposite side of the carriageway the highway boundary is quite restrictive and the verge width has also been reduced to accommodate the three lanes and the footway.

5.1.6 Past Marsh Lane, the new alignment deviates from the existing Sheering Road at Mayfield Farm to continue North West to a new roundabout to the south of Pincey Brook. The location and level of the new Sheering Road roundabout has been optimised to avoid the Pincey Brook flood plain and tie in with the existing Sheering Road.

5.1.7 The existing Sheering Road at the Campions properties will be converted to a local access road. A new junction will link the access road to the new realigned Sheering Road. By creating this access road the Campions residents will have a safe way of joining the new Sheering Road compared to the current direct accesses. It will also be converted to a shared surface linking the NMU routes at either end of the access road.

5.1.8 A new link from the new Sheering Road roundabout will tie back into the existing Sheering Road alignment just before Pincey Brook Bridge. At this location the existing alignment on Sheering Road is substandard. While the current proposals significantly improve the alignment on Sheering Road there will still be departures in the vertical alignment due to the level difference between the existing Sheering Road and the new Sheering Road Roundabout. Due to the constraint of the existing Pincey Brook Bridge, the TPO woodland on the east of Sheering Road and the property fronting onto Sheering Road to the west there is limited scope to meet the required vertical alignment without significant environmental impact The current proposal provided the best benefits in terms of safety while minimising the environmental impact on the surrounding area.

5.1.9 From the new Sheering Road roundabout two new links will take traffic to and from the M11. The southern link which is approximately 600m in length will take traffic westbound from the M11 into Harlow. The northern link which also consists of a second roundabout will take traffic towards M11. The second roundabout is located approximately 230m from the new Sheering Road roundabout. From the second roundabout the link to the M11 is approximately 480m to the new M11 GSJ.

5.1.10 To future proof the scheme a potential northern bypass has been considered as part of the design. The future Northern Bypass will begin at the new GSJ and continue to the west. The two links which will be constructed as part of this scheme will become future slip roads once the bypass is constructed. As A result the cross section for these links will be consistent with a merge and diverge-cross section in accordance with TD27. Previously a loop merge was considered as the future merge onto the bypass but has subsequently been designed out. In its place a more standard layout has been provided but due to the level difference between the existing ground and the new GSJ a gradient of approximately 7.5% is proposed which will be considered a departure in accordance with TD22 when the link will operate as a future merge.

5.1.11 The proposed GSJ on the M11 has been designed using TD22 to a design year of 2036 using traffic flows from the Harlow Transport Model. The GSJ has a Dumb-bell arrangement which consist of a roundabout either side of the M11 connected by an overbridge. The distance between the two roundabouts is approximately 140m and both roundabouts have an inscribed circle diameter of 80m. The span over the M11 will be approximately 40m. The merges and diverges have been designed using IAN149 which allows certain relaxations when designing a junction on an existing motorway. Below is a list of cross sections for the proposed GSJ merges and diverges.

Link	Cross Section	Layout type
M11 northbound diverge	DG1A	Type A
M11 northbound merge	MG1A	Type B
M11 southbound diverge	DG2A	Type A
M11 southbound merge	MG1A	Type A
Note: • Cross sections are derived from TD 27/05 • Layout Types are derived from TD 22/06		

Table 5.1

For the M11 southbound diverge the traffic flows levels required a Type C layout which consists of a lane drop on the M11. Due to the constraints we have on the existing M11 it is not possible to provide a lane drop therefore this layout has been substituted for a type A. The microsimulation which has been carried out also shows that this proposed layout does not cause any significant impacts on the traffic flow on the M11.

5.2 Junction Design

5.2.1 A detailed operation assessment has been carried out for the scheme and the proposed design has been checked to ensure adequate capacity is available in both the opening year of 2021 and the design year of 2036.

5.2.1 The A414 / First Avenue Roundabout assessment has incorporated the proposed improvements which are currently being implemented on site as this will be the base scenario once the M11 J7A scheme comes online. The opening year of 2021 was shown to operate within capacity but the design year of 2036 was shown to be over capacity. As a result an analysis was carried out using a linear interpolation to determine the year in which the junction reached capacity. It was determined that the junction would need intervention works in 2028.

5.2.2 Linsig analysis showed that the intervention would be in the form of traffic signal control on the A414 northbound and southbound entries to the roundabout, and retained priority control on the B183 First Avenue and B183 Gilden Way entries / approaches to the roundabout. This option indicated that all approaches had a modelled Degrees of Saturation below 100% and queue lengths were generally at acceptable levels.

5.2.3 The London Road roundabout located in between First Avenue and Gilden Way. As part of the improvements the roundabout is largely being retained as a priority roundabout. The central island will not be amended as part of the works. The widened Gilden Way will tie into the existing roundabout by amending the entry and exit for Gilden Way. The junction operational assessment has indicated that a short two lanes exit is required for the Gilden Way exit arm to deal with the flows coming off the roundabout and avoid blocking the circulatory carriageway. Overall the roundabout will operate satisfactorily for the design year of 2036.

5.2.4 The Churchgate roundabout is located approximately 1.2km to the north east of London Road Roundabout on Gilden Way. The initial proposal was to retain the existing layout and amend the entries and exists to accommodate the widening on Gilden Way. While this does operate satisfactorily in the opening year of 2021 by providing a 65m flare on the eastbound approach and a two lane exit tapering down to one lane for the eastbound exit, capacity issues were encountered for the design year of 2036. Further analysis showed that the design would reach capacity in 2026 and a Hamburger layout would be required for the 2036 design year. A similar layout has been provided at the junction of the A1169 and the A414 just north of the M11 J7.

5.2.5 The newly designed roundabouts including the Sheering Road Roundabout, the Pincey Brook Roundabout and the two roundabouts which form part of the M11 GSJ have all been designed to cope with the proposed traffic flows. The roundabouts were designed using an iterative process where various proposals were tested in Arcady until a robust solution was found.

5.3 Structures

5.3.1 This scheme consists of a number of both new and existing structures. A structures options assessments report has been written and it details the various structures in the scheme and the options which have been considered where more than one solution was investigated.

5.3.2 The M11 overbridge links the two dumbbell roundabouts either side of the M11. Three options have been considered for this structure. Option one consists of a single span multi - girder composite deck. This option requires a beam length of approximately 40m and will necessitate a site splice connection to be made. The main advantages of a single span bridge is that it will have the lowest superstructure cost and removes the requirement for a central pier in the M11.

5.3.3 Option two consists of a three span continuous multi girder composite deck structure which would be more aesthetically pleasing and would slightly reduce the amount of earthworks required. A single span would be still maintained over the M11 as in option one. The distance of the centre span between the centre lines of the intermediate supports will be approximately 39m.

5.3.4 Option three consists of a Single Span Pre-cast Pre-stressed W17 Beams. A 200mm deep in-situ RC deck slab would be cast on permanent formwork with pre-cast concrete cantilever units. A 38m span is at the higher end of this beams capacity. The primary advantage of this construction over steel is the low maintenance requirements of concrete but this option would require a thicker deck and in turn would increase the amount of earthworks for the scheme.

5.3.5 Further analysis on the above options and engagement with key stakeholders is required before a final option is agreed on.

5.3.6 As the proposed alignment deviates from the existing carriageway at Mayfield Farm a retaining wall is required due to the level difference between the proposed carriageway and the existing levels around Mayfield Farm and the associated buildings. At this location it has been found that the only practicable option is to construct the retaining wall by using permanent sheet piling. Due to the proximity of the existing farm buildings the sheet pile retaining wall will need to be constructed using the press in method so as not to cause damage to the farm building. The sheet piles would also be clad in a brick facing.

5.3.7 Presently a wet ditch is located at Mores Wood to the south of the scheme. It has been found that this drains to Pincey Brook. As a result of the scheme the eastbound and westbound links between the M11 western roundabout new Sheering Road Roundabout will sever this link to Pincey Brook. A culvert is therefore proposed to realign the ditch and take the flow of water under the embankments. The culvert will also be used as a mammal underpass to provide bat flight path. At present it is envisaged that a 1.5m diameter culvert would be sufficient but further discussions with the environmental team is required.

5.3.8 As part of the widening and improvements to Gilden Way the existing Churchgate Subway -- located to the east of Mulberry Green will require improvements to the parapets. A structural inspecting will be carried out and an assessment will be made as to the upgrade required. It is currently not envisaged that major physical work is required to the subway itself. The subway is currently long enough to accommodate the widened Gilden Way carriageway.

5.3.9 There are a number of structures which are considered as constraints in respect to the highways alignment but are not being affected at present. These structures are listed below:

- Pincey Brook Bridge located on Sheering Road where our scheme ties in to the existing carriageway
- Sheering Hall Subway under the M11 located to the north of our slip roads on the M11
- Pincey Brook Culvert under the M11 located to the north of the Sheering Hall Subway
- Matching Road overbridge on the M11 located to the south of the proposed slip roads on the M11

5.4 Geotechnical

5.4.1 The current geological information indicates that the geology in the vicinity of the scheme consists of mainly Lowestoft Formation overlying where present bedrock geology (formerly solid) of the Palaeogene London Clay. Head deposits have also been found in various locations around the scheme but do not pose a significant challenge to the scheme. Alluvium has been found in the flood plain around Pincey Brook. At present the scheme is situated outside the alluvium and the flood plain. As a result there are no constraints to the proposed option with regard to the geology in the area.

5.4.2 All embankments have been currently designed to 1 in 3 slopes. The design of the embankments will be elaborated on as the design progresses and the results of the ground investigation are finalised.

5.4.3 The amount of embankment fill material, the source of it and the transportation has been identified as constraint. The main part of the scheme between the new Sheering Road roundabout and the M11 will be constructed on embankments with an average height of 5m rising to 9m in some locations due to the undulating ground.

5.5 Safety Objectives for the M11 Junction 7A Scheme

5.5.1 A safety Report has been prepared for the scheme. The aim of that report is to demonstrate the due process followed in managing road safety to the standard required by Highways England because elements of this scheme will be adopted by Highways England upon completion.

5.5.2 Following the result of the safety Management System (SMS) selection process it has been considered that the application of a Type A SMS is suitable for this project. This represents a 'low' level of safety management which is consistent with the current advice from Highways England regarding safety management for this type of scheme.

5.5.3 The scheme seeks to ensure that there is no net increase in collisions on the highway network, and all reasonably practicable steps will be taken to promote road worker safety. Upon completion of the scheme the new sections of road can also be compared to national averages as a measure to determine if the level of collisions is tolerable. Any incidents involving road user injury or near miss will be reviewed to identify lessons learnt for future maintenance and operation.

5.5.4 Road Users: The project team is aiming at a provisional target of no increase in the number of casualties or in average severity of injury. Using the Personal Injury data comparisons will be made after one year and three years of completion of the scheme. This will identify any areas where this objective has not been met and if there are any areas on the new roads that collisions are occurring.

5.5.5 Road Workers: There will be no specific quantified safety objectives set for road workers. This risk will be managed in accordance with the requirements of the Health and Safety at Work Act and the SFAIRP principle. This is also consistent with the Highways England 'Aiming for Zero' strategy, which aims to reduce the risk to road workers during maintenance and operation. One part of the strategy aims to eliminate all fatalities and serious injuries to road workers maintaining the Highways England road network.

5.6 Impact during construction and operation

5.6.1 At this stage, no detailed construction and operational impacts have been identified for the M11 Junction 7a scheme. However, these impacts will be comprehensively examined during Preliminary Design at Stage 3 of the Highways England (HE) major projects timeline.

6. ENVIRONMENTAL ASSESSMENT

6.1.1 The Scheme is likely to give rise to a small number of slight adverse environmental impacts which would be required to be managed as the Scheme progresses into detailed design and on through to construction. Full details are provided in the Environmental Assessment

6.1.2 Report and summary are given below:

Impacts	Summary of key impacts
Noise	A preliminary noise assessment has identified the roads likely to be affected by the proposed scheme. The preliminary assessment identifies that the closest properties, i.e. those properties in the Campions estate, are likely to experience perceptible noise benefits from the introduction of the proposed scheme. Conversely, properties in close proximity to affected roads that receive an improvement of traffic conditions are likely to receive a positive effect on noise. The noise impact at sensitive receptors will be assessed and confirmed in the next stage of the assessment. Where perceptible adverse effects are predicted, appropriate mitigation measures will be considered, e.g. use of noise barriers and low noise road surfacing which is gaining credence in recent years.
Air Quality	A preliminary air quality assessment has identified the roads likely to be affected by the proposed scheme. Conversely, properties in close proximity to affected roads that receive an improvement of traffic conditions are likely to receive a positive effect on air quality. The air quality impact at sensitive receptors will be assessed and confirmed in the next stage of the assessment. Where a significant negative effect is predicted, appropriate mitigation measures will be considered, e.g. potential impacts from dust in the construction period would be managed by suitable on-site practices.
Greenhouse gases	Baseline greenhouse gas emissions data specifically for the proposed scheme are not currently available.
Landscape	The proposed scheme would pass through agricultural fields to the north of the Mores woodland and alter the land use and landscape character of the local area. Where views from nearby residential properties and local public rights of way (PRoW) are likely to be changed, mitigation woodland planting and screening would be used to soften this effect.
Townscape	Given the rural/urban fringe context of the proposed scheme, the nearby townscape of Harlow is not expected to be altered.
Cultural Heritage	A number of archaeological remains, historic buildings and historic landscape character types have been identified in the proposed study area for cultural heritage. No world heritage sites, scheduled monuments, conservation areas or registered battlefields have been identified in the cultural heritage study area. No physical impacts on

	designated assets would be predicted for the proposed scheme. There is a risk of possible presence of unknown buried archaeology within the fields that the scheme is proposed to pass through. A geo-physical survey of the scheme footprint, followed by archaeological trial trenching if seen as appropriate based on the survey results, would reduce this risk.
Biodiversity	No sites of special scientific interest (SSSIs) or local nature reserves (LNRs) are located within 2km, and no special areas of conservation (SACs) or special protection areas (SPAs) are located within 5km of the proposed scheme. An extended phase 1 habitat survey showed that the proposed ecological study area has potential for badgers, dormice, and bats, reptiles, breeding birds, great crested newts, riparian mammals and white-clawed crayfish. Detailed protected species surveys are ongoing. If protected species are confirmed to be present, appropriate mitigation measures such as trapping and translocation of these species to other nearby sites and additional habitat creation would be proposed.
Water Environment	The proposed scheme would be located outside of flood risk zones 2 and 3. There would be a slight increase to the risk of runoff to the Pincey Brook and potential for reduced infiltration. Impacts to geomorphology are likely to be minimal.

Table 6.1 Environmental Assessment Summery

7. TRAFFIC ASSESSMENT OF THE OPTION

7.1 Background

7.1.1 For traffic assessment the scheme used the newly constructed strategic Harlow Transport Model. The model covers the urban areas along the M11 from Epping in the south to Bishop's Stortford and Stansted Airport in the north of the modelled area. The model is centred on the town of Harlow which is the focal point of the area of interest. The primary objective of the model development was to assess the impact on the local and strategic road network of an additional access to Harlow from the Strategic Road Network (SRN), specifically on the M11, and to provide a suitable evidence base for a full business case submission. The base model was built following guidance in WebTAG, the details of which can be found in the 'Harlow Transport Model LMVR' .

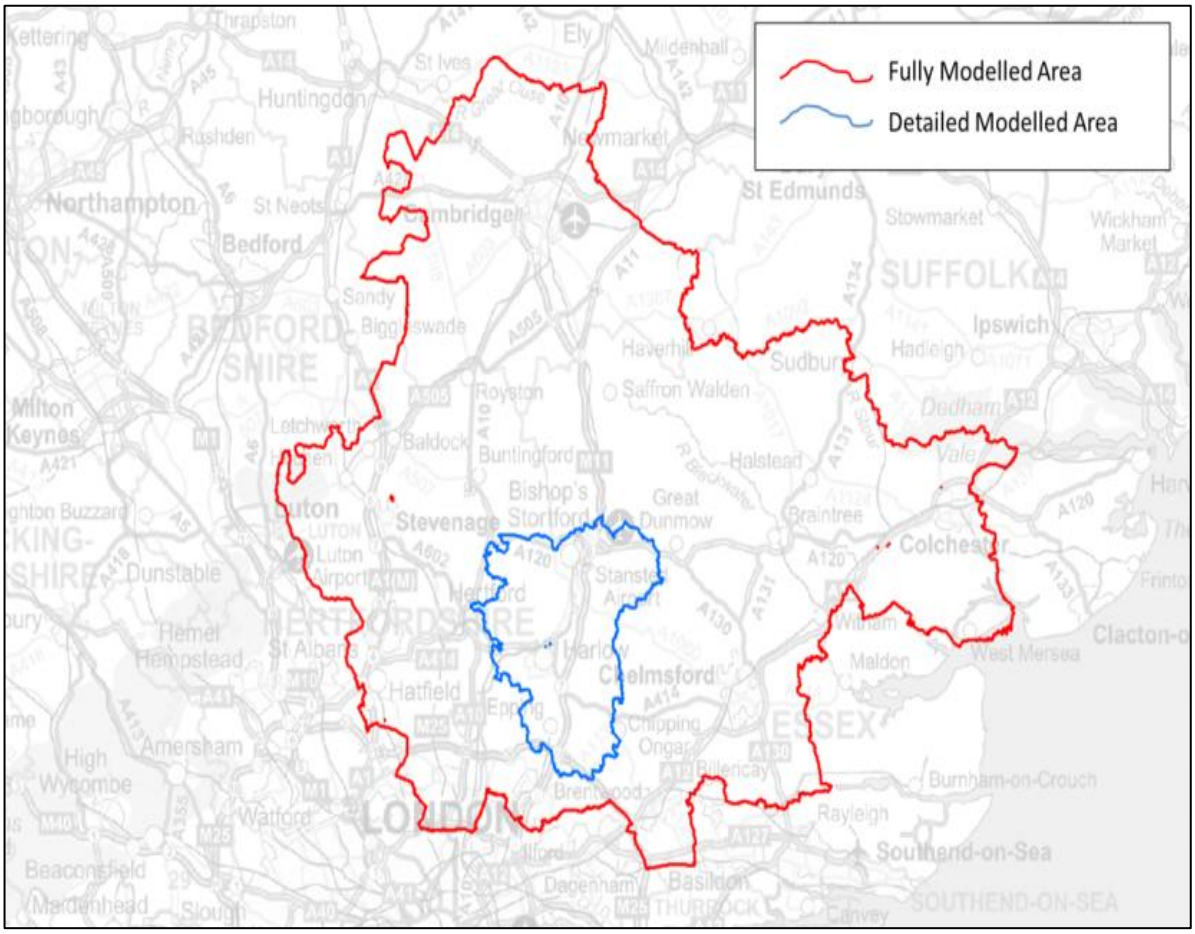


Figure 7.1 Extent of Harlow Transport Model Coverage

7.2 Scenarios Modelled

7.2.1 The forecast models have been produced for two future years: 2021 which is the anticipated opening year of the scheme Option being assessed and a forecast year 2036, in order to be able to complete a full economic appraisal of the scheme. There are three growth scenarios

for which models have been produced covering an NTEM Growth Scenario, a Medium Growth Scenario and a High Growth Scenario.

7.2.2 Two sets of models have been produced, namely the “do-minimum” and “do-something”. The first representing the future year model with additional trips added for planned employment and housing development sites, as well as network changes made to represent planned highway improvements, but without the scheme. The ‘do-something’ situation has been modelled to simulate the future year with the addition of the proposed scheme, namely the M11 J7a and associated improvements along Gilden Way.

7.2.3 It should be noted that the three growth scenarios displayed similar trends, in terms of the impacts of future growth and the scheme. However, there was a difference between models in terms of the magnitude of impacts because of the varied levels of traffic growth anticipated.

7.3 The traffic forecasts output

7.3.1 For the detailed traffic forecasts output of both the Do-Minimum and the Do Something, refer to the M11 J7a Model Forecasting Report. The TAR has summarised the information from that report.

7.3.2 The ‘do-minimum’ models all consistently show that there are large traffic flow increases as a result of the predicted additional housing and employment provided within the modelled area. This is particularly noticeable on the SRN, especially the M11, and within Harlow itself. The A414 through Harlow is an important route for both local and through traffic, it is forecast to experience greater traffic flows. The delay analysis carried out also shows that between the base year and the do-minimum situation in both years the level of congestion is also set to increase. Again, Harlow itself and particularly the A414 see the greatest impacts.

7.3.3 The ‘do-something’ models demonstrate some major impacts of the M11 J7a scheme upon both traffic flow and delays. The main consequences of the scheme are that:

- Traffic re-routes off local roads and onto the SRN, particularly the M11 between J7a and J8;
- There is a large decrease in flow approaching the M11 J7 from Harlow along the A414 London Road, relieving this heavily congested road; and
- B183 Gilden Way experiences a large increase in traffic as a result of the M11 J7a scheme.

8. ECONOMIC ASSESSMENT OF THE OPTION

8.1 Economic Appraisal

8.1.1 The Economic Assessment has been carried out using standard procedures and economic parameters as defined by TAG Unit A1.

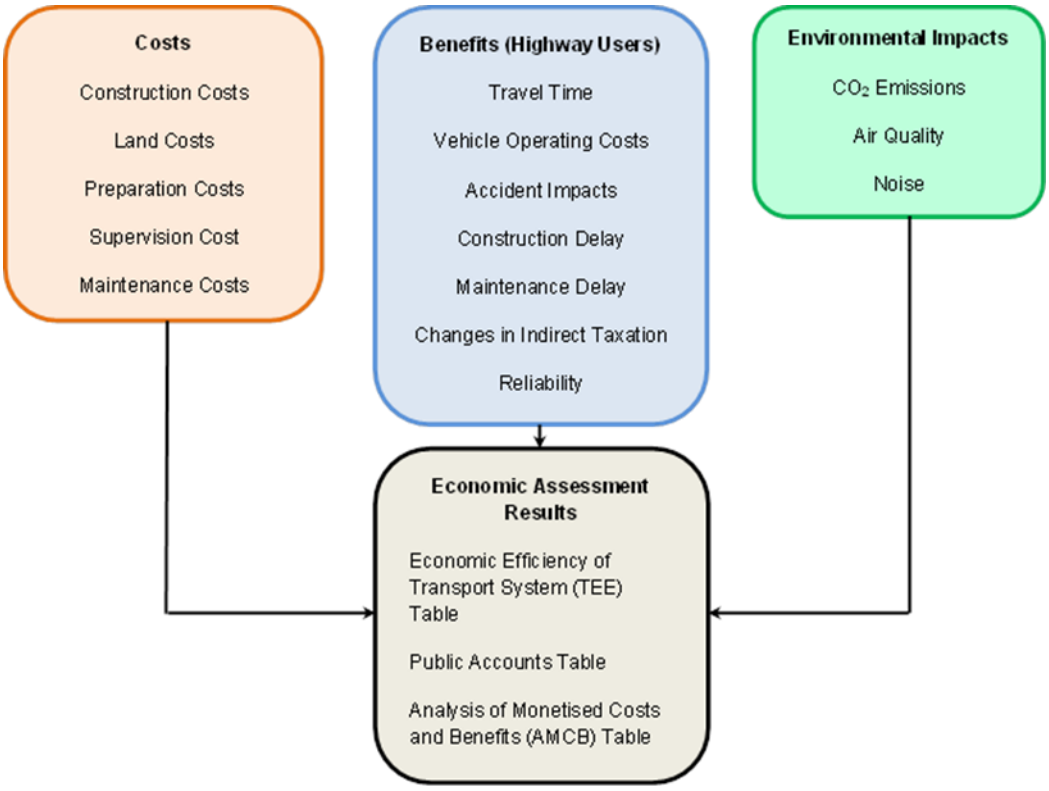


Figure 8.1 Economic Assessment Components

8.1.2 The following elements of the economic assessment have been considered:

- Road user journey time impacts- due to changes in travel time and vehicle operating costs;
- Road user safety impacts- due to changes in the future number and/ or severity of accidents;
- Reliability impacts- due to changes in journey time variability;
- Construction and maintenance impacts – impacts on road user travel time and vehicle operating costs during Scheme construction and future maintenance;

- Indirect tax revenue – due to changes in the amount of fuel and other direct vehicle operating costs purchased and changes in expenditure on transport offsetting changes in expenditure elsewhere in the economy; and
- Greenhouse gas, noise and air quality impacts.

8.1.3 Estimation of Costs: The following costs have been derived

- Investment costs: predominantly construction, land preparation and supervision costs.
- Operating costs: routine non- traffic related maintenance costs.
- Operating costs have not been updated for this submission and are assumed to be identical as the costs reported in the Strategic Outlined Business Case (2015).

8.1.4 The costs are based on cost estimates as at December 2015. The costs have been estimated under the assumption that the works will be procured using a traditional form of procurement with detailed design prepared by the Employer followed by competitive tender utilising a standard form of contract.

8.1.5 The rates used reflect construction projects of similar size and nature and were initially estimated based on prices as at the 4th Quarter of 2015 and no inflation has been added. A 3.5% per annum compound growth has been assumed. The land estimates are as at the first quarter of 2016 . These estimates have been converted to 2010 prices using the GDP-deflator series as published in the December 2015 TAG Data book. The prices have been converted to market prices using 19% indirect tax adjustment as required by TAG Unit A1.2.

8.1.6 A risk allowance of approximately 25% has been included. TAG Unit A1.2 requires optimism bias to be included in the estimation of cost calculations. Optimism bias is the demonstrated systematic tendency for appraisers to be overly optimistic about key parameters. At this Stage 15% has been added to investment costs as an optimism bias allowance.

8.1.7 The costs have been discounted following TAG Unit A1.1 using 3.5% discount rate starting at 2010. The costs have been broken down in three phases with the following schedule:

- Phase 1: Starting in the 3rd Quarter of 2019 and ending in the 4th Quarter of 2020.
- Phase 2A: Starting in the 1st Quarter of 2020 and ending in the 2nd Quarter of 2021.
- Phase 2B: Starting in the 3rd Quarter of 2021 and ending in the 2nd Quarter of 2022.
- Land costs have been assumed to take place from 2018 to 2020 and prorated by year.

8.1.8 Funding and Developers Contribution - At this Stage the sources of funding have not been defined, therefore all costs have been assumed to be covered by Local Government Funding, and a Developer Contribution of £30m discounted has been assumed. These costs are included as a cost to the Business Class in the TEE and a relief to the public funds in the PA, therefore offsetting the total costs.

8.1.9 Benefits TUBA - The calculation of main economic benefits to road users incorporates use of the DfT's Transport Users Benefit Appraisal (TUBA) program. TUBA compares the economic costs for the Do Something (DS) situation with the costs for the Do Minimum (DM) situation to establish the value of forecast savings in travel time and vehicle operating costs. A BCR is calculated by comparing these values, together with those of other relevant costs and benefits, with the construction and operation costs, over a 60 year period for the scheme.

8.1.9 TUBA provides a complete set of default economic parameters in its 'Standard Economics File'. This contains values of time, vehicle operating cost data, tax rates and economic growth rates. TUBA version 1.9.6 reports economic values in 2010 prices, discounted to a present value of 2010.

8.1.10 The following years were used for analysis in line with the traffic modelling:

- Opening year (2021); and
- Horizon year (2036).

8.1.11 As specified in guidance a 60-year appraisal period was used from Scheme opening year of 2021 therefore providing a final appraisal year of 2080. Traffic levels are assumed to remain constant after the Horizon Year of 2036 for the purpose of economic appraisal.

8.1.12 The following analysis was carried out :

8.1.12.1 The accident benefit appraisal was undertaken using the COBA-LT 2013.2 program, a spreadsheet based tool, and WebTAG 2016 parameters file.

8.1.12.2 The delays quantification during construction and the maintenance was undertaken using the DfT program Queues And Delays at ROadwork's (QUADRO) version 4 revision 13.0 (release on 6th February 2015)

8.1.12.3 The Greenhouse gases/ emissions have been calculated under a 'without scheme' scenario and a 'with scheme' scenario to provide the difference and impact of the scheme. These values are then converted into a monetary value, calculating a net present value (NPV) over the appraisal period. The Highway England IAN185/15 and TAG Data Book A1.3.8, 1.3.9 and A3.3 have been used to calculate the greenhouse gas emissions for the Opening Year and Design Year for both the Do Minimum and Do Something scenarios, and projected for 60 appraisal years. The output from the calculation is entered into the TAG Greenhouse Gases Workbook for monetary value4.10.2

8.1.12.4 The air quality approach to assessing local air quality for a scheme is set out in TAG Unit A3 (Environmental Impact Appraisal) and is based on a quantification of the change in exposure at properties in the opening year. The next stage in air quality assessment is monetary valuation of the changes in air quality. The TAG Local Air Quality Workbook has been used to calculate the change in Air Quality; and the TAG Air Quality Valuation workbook has been used for monetary value. Noise assessment has been done in line with the approach for the assessment of traffic-related noise set out in TAG Unit A3. Noise levels have been predicted at all residential properties within the study area for the three traffic growth scenarios. The study area has been defined in accordance with HD213/11 - Revision 1 (DMRB). Predicted

noise level changes at all receptors are then subsequently assessed in terms of a monetary evaluation in to determine the Net Present Value (NPV). The total NPV in terms of noise takes account of the value of impact from noise on sleep disturbance, amenity, heart disease, stroke and dementia.The monetary values are national average values per household per year at 2010 prices. These are increased in line with forecasts of GDP per household and discounted over the appraisal period to give a present value of noise.

8.1.12.5 Journey time reliability has been assessed using the guidance on assessing the reliability given in WebTAG Unit 3.5.7. Annex B. Section 9.1.2 of the guidance states that a model can be used to forecast journey time reliability from journey times and distance. Section 9.1.2 also gives the equation used to estimate the change in journey time reliability.

8.2 The Economic Appraisal Results

8.2.1 Table 8.1 below presents a summary of the BCR for each scenario. All the scenarios present a BCR greater than 4 which means that the scheme is rated as “Very high” value for Money (VfM), the highest category according to the DfT.

Growth Scenario	Present Value of Benefits (PVB)	Present Value of Costs (PVC)	BCR	VfM rating
NTEM	£138.9	£41.3	3.4	High
Medium	£196.2	£41.3	4.8	Very high
High	£171.3	£41.3	4.1	Very high

Table 8.1 – BCR table

9. PLANNING ASSESSMENT OF THE OPTION

9.1 Options constraints

9.1.1 The current site for the new motorway junction and link road is located in the Metropolitan Green Belt where development which has an adverse impact on the openness of the countryside is to be resisted. However, the proposed option is the least intrusive and the emerging design further reduces the impact of the scheme by replacing the looped slip road with a roundabout junction at grade reducing the height of the embankment.

9.1.2 The proposal constitutes local transport infrastructure in the Green Belt and so in itself is not inappropriate development, however, it is necessary to justify the development and its location in the Green Belt in order to satisfy planning policy. The current level of committed development, the planned and emerging growth for the Harlow area indicates that the road network for Harlow is at capacity. In order to realise the ambition for Harlow as a sub-regional employment and housing hub in West Essex it is necessary to address the congestion issues experienced by residents and local businesses today. Any planning application will be accompanied by a statement which sets out the 'very special circumstances' that justify the proposal.

9.1.3 The proposed widening of Gilden Way is required to ease peak hour congestion into and out of Harlow and to serve the New Hall Farm and Harlowbury housing developments. The improvement of traffic flows on Gilden Way together with the already committed improvements on the A414 will ease congestion, however, it will not address the underlying issues for the greater Harlow area nor will it facilitate the regeneration of Harlow town centre or the development of the Enterprise Zones. These proposals are dependent on the delivery of improved access to the M11 and the strategic motorway network.

9.1.4 The Harlow area is predicted to face further planned growth, the current scheme allows for a future northern bypass for Harlow to join the M11 Junction 7a there by providing a comprehensive ring road for Harlow utilising the existing A414 and A1019 providing access to either motorway junctions; Junction 7 if travelling towards London and Junction 7a it travelling north. This allows through traffic from the west to avoid the congested town centre and provides a vital link in the Cambridge-Stanstead-London growth area.

9.1.5 Once the principle of an additional access onto the M11 is accepted, options need to be assessed in terms of the potential locations and design of a link to the M11. The current project has carried out an extensive options assessment and high level consultation with key stakeholders. Options considered included:

- building a new road to the north of Harlow to link to the motorway north of Sawbridgeworth near Hatfield Heath;
- a shorter northern bypass running around the northern edge of Harlow and joining the M11 in the location currently proposed (north of moor Hall Road and Matching Road);
- utilise and widen Gilden Way and Sheering Road leading to a new motorway junction north of Moor Hall Road and Matching Road; and
- Improve the capacity of the existing A414 and Cambridge Road.

10. SCHEME ASSESSMENT SUMMARY

10.1 Traffic and economics

10.1.1 The engineering assessments demonstrate that the M11 J7A scheme will provide considerable benefits with minimal adverse impacts along the route. Areas between the M11 and the B183, including the populated areas along Gilden Way, will experience some adverse effects in addition to the benefits.

10.1.2 A robust mitigation measures will be incorporated in the final engineering details to minimise adverse impacts that will be identified in the Environmental Impact Assessment.

10.1.3 Overall, the M11J7a will provide a high value for money against its actual outturn cost over the 60 year appraisal period. This is principally a result of the benefits indicated by the high Present Value Benefit (PVB) and the BCR of 4.8 for the Medium term Growth Scenario

10.2 Junctions along the B183

10.2.1 Traffic modelling results indicate that the proposed M11 J7a scheme alleviates the congestion issues and achieves the desired objectives up to the design year of 2036. Churchgate roundabout requires a Hamburger junction or intervention in 2026. The current proposal is to design the Hamburger Junction with the Option. The A414 Junction with First Avenue will require Traffic Signals added before 2028.

10.2.2 There would be significant delays at junctions as a result of the committed and planned developments and natural growth in traffic within and around the town of Harlow if the proposed option was not developed.

10.3.1 Thus, without layout amendments, junction capacity checks suggest a number of junctions in the wider Harlow road network, including those on the A414 will not operate satisfactorily in the “Do Minimum” scenarios.

10.3 Landscape and Townscape

10.3.1 Giving the rural location, and with mitigation planting, the scheme is unlikely to significantly alter views of the landscape and townscape. Landscape specialists are considering softer measures as a means of mitigation to ensure the scheme blends into the local environment with least visual intrusion.

10.4 Ecology

10.4.1 A thorough ecological survey is being undertaken and if protected species are confirmed to be present, appropriate mitigation measures such as trapping and translocation of these species to other nearby sites and additional habitat creation would be carried out.

10.5 Land Contamination

10.5.1 Although ground investigations identified substantially elevated concentration of metallic contamination in the soils in the vicinity of the proposed works, these were below the drinking water guidelines, indicating that contamination is unlikely to be substantial.

10.6 Geology

10.6.1 No significant impact on geology and soils are anticipated for the scheme

10.7 Agricultural Land

10.7.1 Parts of the footprint of the scheme coincide with farmlands. Consequently there will be loss of high grade agricultural land. This impact is assessed as “moderate”. Construction of the scheme is unlikely to impact on continual use of the adjoining land for cropping or other agricultural activities.

10.8 NMU and Travellers

10.8.1 No existing Non-Motorised Users (NMU) routes or Public Right of Ways (PRoWs) are severed. The scheme will rather results in improvements of the existing infrastructure with additional crossings. Hence, there should be no adverse effects on Non-motorised Users or community facilities. There would be a beneficial effect with the introduction of additional crossings. Although there will be a ban on some turning movements to prevent rat running, the overall effect would be advantageous.

10.9 Drainage

10.9.1 Archive material so far located and observations through reconnaissance site visits indicate that majority of the existing drainage is in a poor condition and operating under reduced efficiency.

10.9.2 The M11 and the B183 will benefit from the new drainage and its appurtenances with improved flow carrying capabilities. Flow rates are likely to increase but mitigation through the use of attenuation and detention facilities would regulate discharges to levels no more than the existing.

10.9.3 Pollution due to surface water runoff would be mitigated using HAWRAT, a DMRB risk assessment methodology and guidance for pollution control on roads and highways.

10.10 Programme

10.10.1 A scheme option timeline has been prepared for the scheme. The key dates are listed in table 10.1.

Activity	Key Dates
Formal Public Consultation	May 2016
Preferred Route Announcement	September 2016
Planning design	April to September 2016
Full Planning Submission	November 2016
Full Planning Determination	April 2017
Full Funding	Second Quarter 2017
Diversion of HPGM	Summer of 2018
Complete Phase 1 Construction	Second Quarter 2020
Complete Phase 2a Construction	Fourth Quarter 2020
Complete Phase 2b Construction	Fourth Quarter 2021
Notes: Phase 1: Gilden Way advance enabling works Phase 2a: Mainly offline construction of link road Phase 2b: Mainly offline construction of final link road HPGM: High Pressure Gas Main	

Table 10.1 Scheme option timeline

10.11 Conclusion

- The scheme will provide congestion relieve for Harlow, M11 Junction 7, A414 and to some extent, roads and highways in the surrounding conurbation.
- Its design is future proofed for the Northern Bypass.
- The scheme is expected to deliver benefits in terms of reduced journey times and costs to users.
- Auxiliary benefits anticipated through a reduction of traffic volumes on the existing A414 and local roads within Harlow will contribute positively to the townscape.
- There are quantifiable benefits over and above the basic user benefits of the scheme and it has a high benefit to cost ratio.
- It will provide a phased delivery solution to support economic development.
- Improvements on Gilden Way include reconfiguration of existing junctions, roundabouts and egress points to improve safety and flow efficiency for the increased traffic.
- The proposals do not consider the scheme in isolation. Traffic engineering scope includes capacity assessments by preparing local traffic models for junctions in the wider Harlow area and recommending appropriate improvements to eliminate conceivable traffic problems.

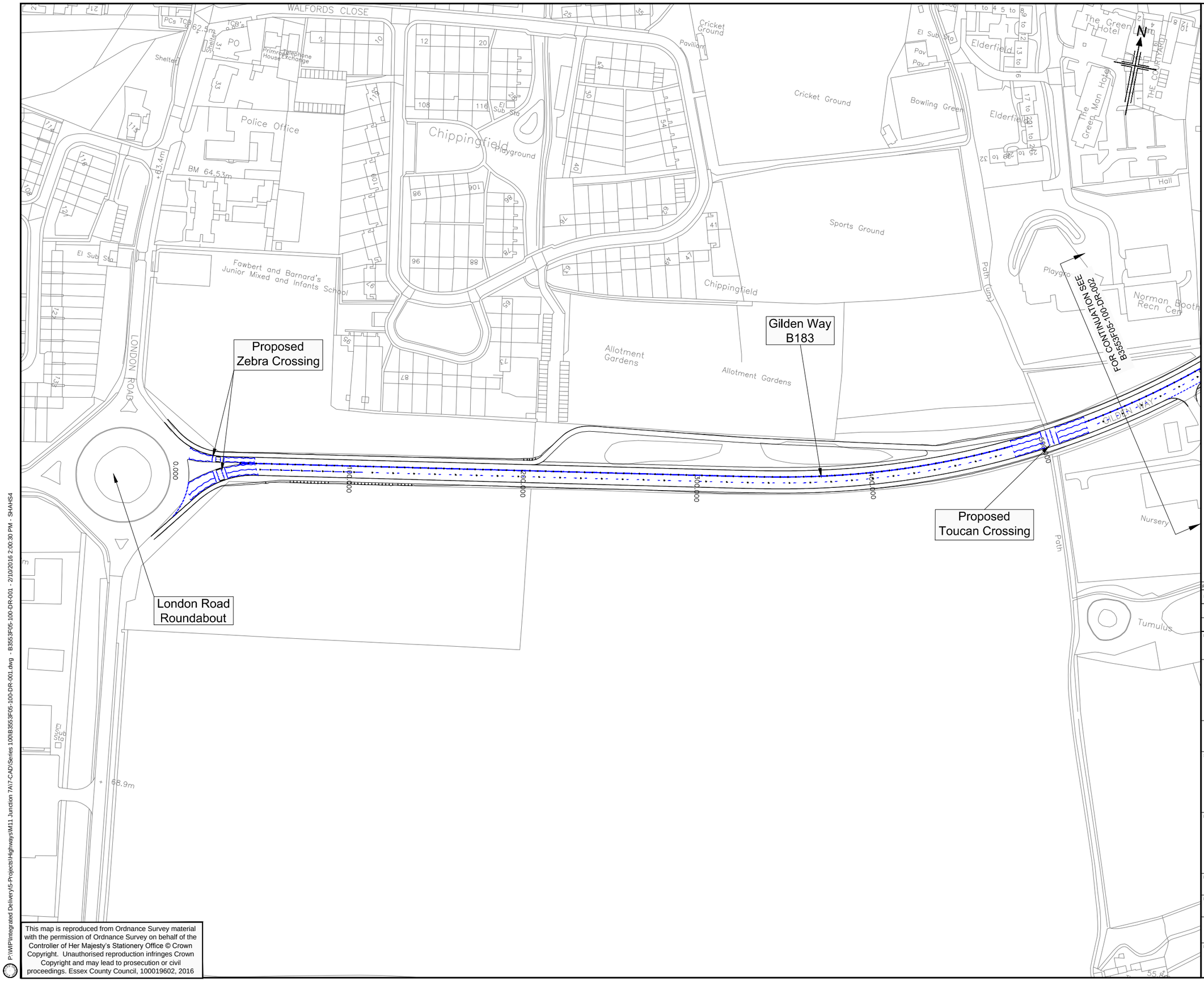
- The scheme will provide continuity and improvements to existing Public Right of Ways (PRoW) within the works corridor and consequently enhance road user experience.
- As well as having positive environmental impacts, there are acknowledged environmental dis-benefits that cannot be ignored.
- A comprehensive environmental statement (ES) will be prepared in support of the planning application with a mitigation strategy for the acknowledged adverse impacts.

10.12 Recommendation

10.12.1 The benefits are considered reasonable in comparison to those of other schemes. By virtue of its proven potential to open up land for residential and industrial developments, job creation, economic growth, improved safety, reliability and journey times of all categories of road users, it is recommended that the scheme goes forward to detailed design and construction.

10.12.2 The route satisfied the technical requirements and the desired objectives but it is however recommended that as the scheme progresses due consideration is given to the constraints identified in this report and all the technical studies.

Appendix A. Scheme Drawings



Notes:

1. All dimensions in meters unless stated otherwise.
2. For Key Plan refer to B3553F05-100-DR-000.
3. For Long Section Plans refer to B3553F05-100-DR-101 to B3553F05-100-DR-108.
4. Road markings have been shown indicatively only to present the developing scheme.

KEY:

Retaining Wall

0 10 20 30 40 50 60 70 80 90 100 m

SCALE 1 : 1000

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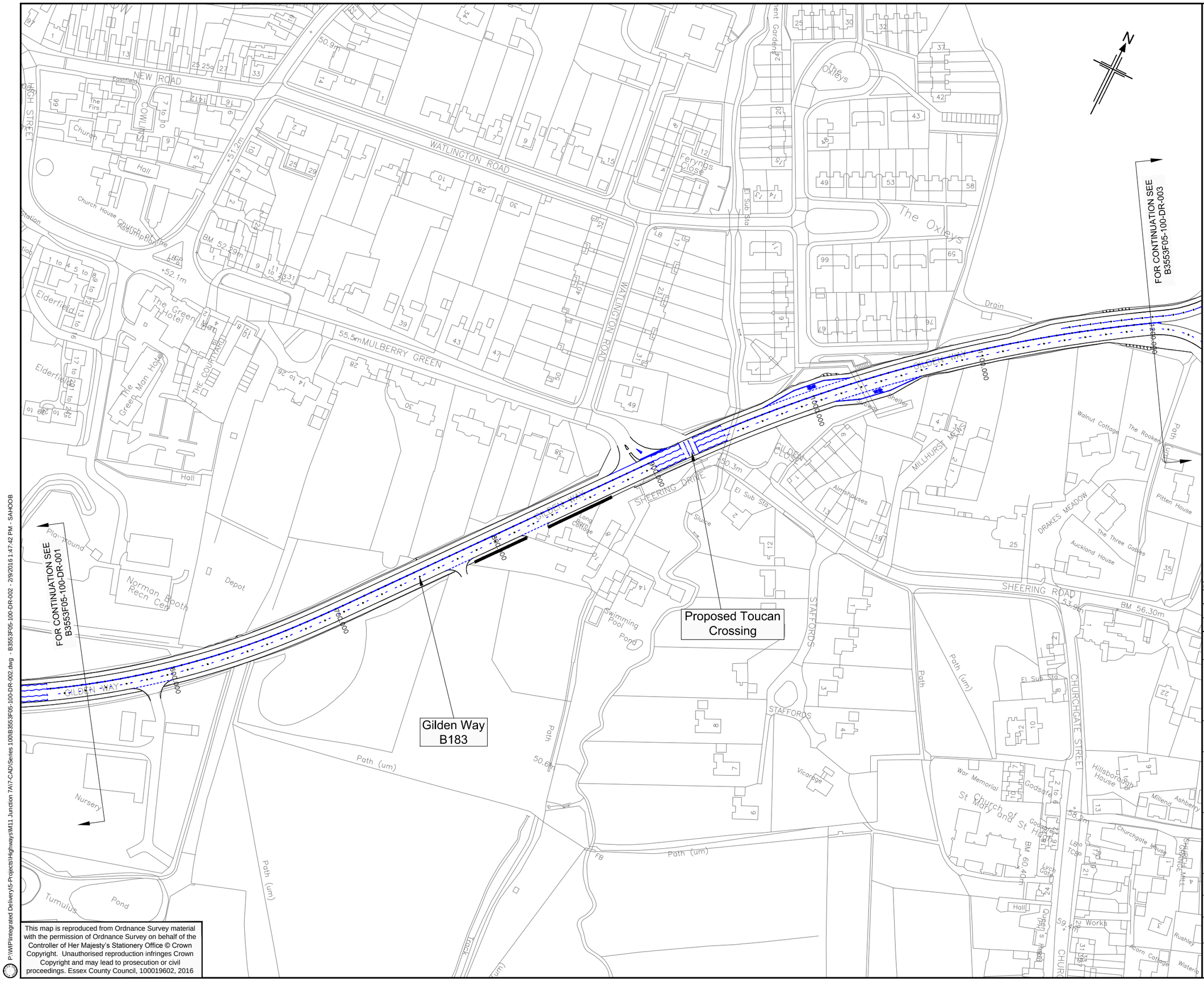
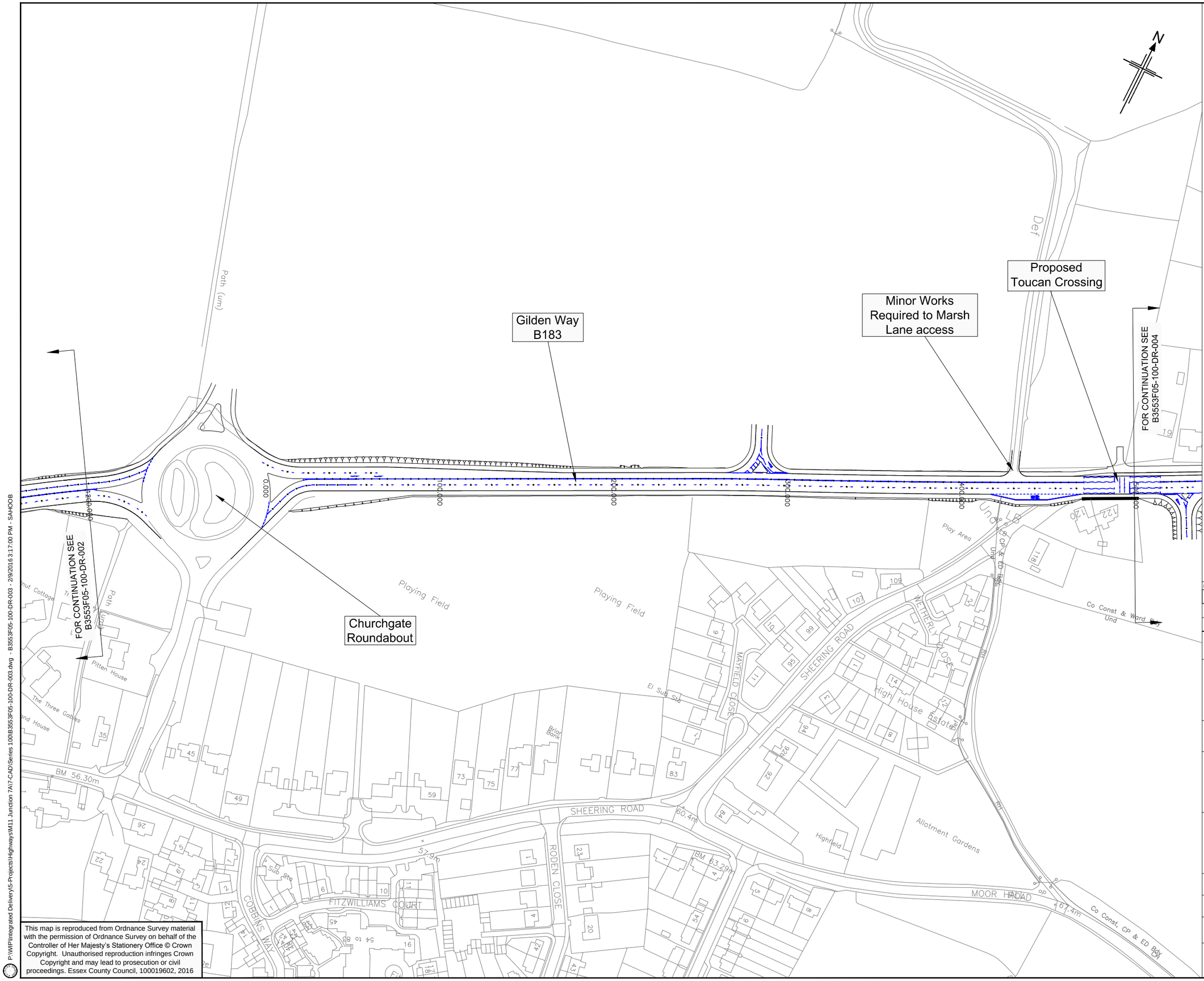

NEW ROAD
WATLINGTON ROAD
MULBERRY GREEN
GILDEN WAY
SHEERING DRIVE
SHEERING ROAD
STAFFORDS
CHURCHGATE STREET
The Oxleys
Ferynos Close
Gilden Close
Millhurst Mews
Drakes Meadow
Church Hall
The Green Man Hotel
Norman Booth Recn Cen
Swimming Pool
Pond
Vicarage
Church of St Mary and St Hugh
Hillsborough House
Proposed Toucan Crossing
Gilden Way B183
FOR CONTINUATION SEE B3553F05-100-DR-003
FOR CONTINUATION SEE B3553F05-100-DR-001
Path (um)
Drain
Depot
Nursery
Turnulus
Pond
Walnut Cottage
The Rookery
Pitten House
Auckland House
The Three Gables
Almshouses
Long Barn Cottage
Church House
Elderfield
Hall
Shelter
Sluice
El Sub Sta
Acorn Cottage
Wisteria
Rushley
Ashberry
Millend
Churchgate House
Godsfield
War Memorial
Works
Lych Gate
Path
Track
FB
BM 52.29m
BM 56.30m
BM 60.40m
50.9m
55.5m
50.3m
53.9m
58.3m
59.4m
50.6m
+51.2m
+52.1m
Playground
Station
Church
Assumption
Eastfield
The Firs
The Courtyard
Footpath
Footway
Footway
Footway



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3. For Long Section Plans refer to B3553F05-100-DR-101 to B3553F05-100-DR-108.
4. Road markings have been shown indicatively only to present the developing scheme.

KEY:

Retaining Wall

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SCALE 1 : 1000

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SHEET 3 OF 7

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DIMENSIONS AND LEVELS IN METRES

SCALE AT A1 (841X594mm)
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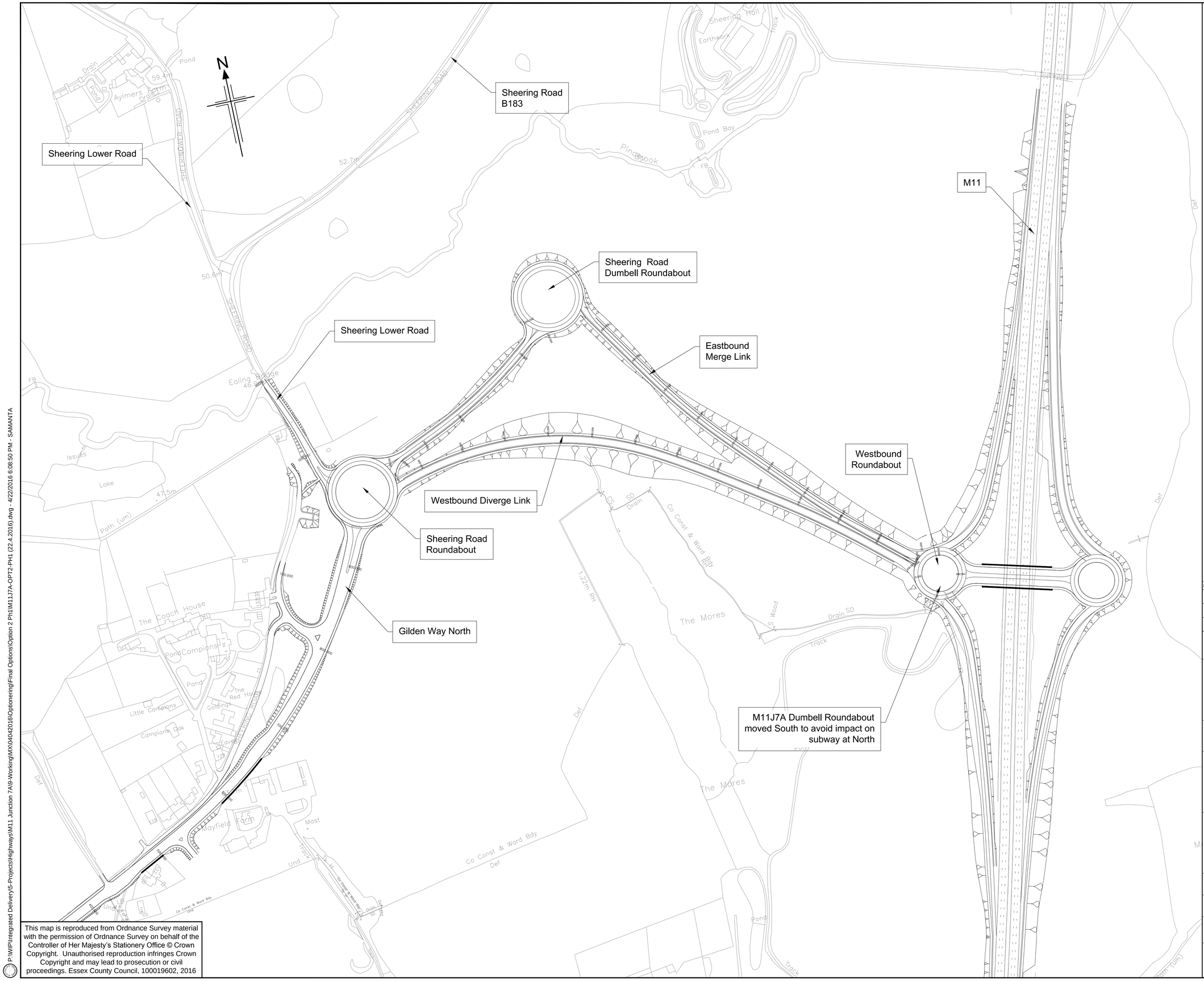

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Notes:

1. All dimensions in meters unless stated otherwise.
2. Departures have been listed between Sheering Road Roundabout & Westbound Roundabout only.

Sl No.	Design Notes
1	A full SSD assessment has not been undertaken.
2	Verges have not been widened for visibility.
3	A full geometric assessment of roundabout geometry/capacity has not been undertaken.

DRAFT

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SCALE 1 : 2000

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Appendix B. Structure Drawings

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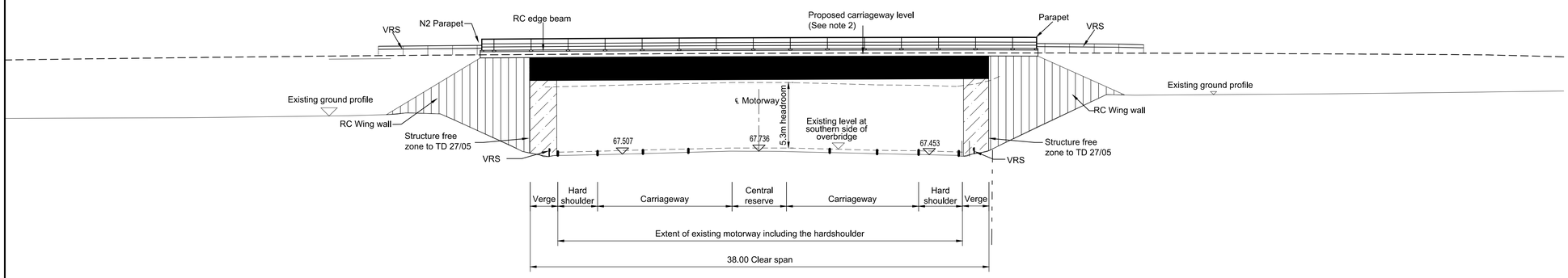

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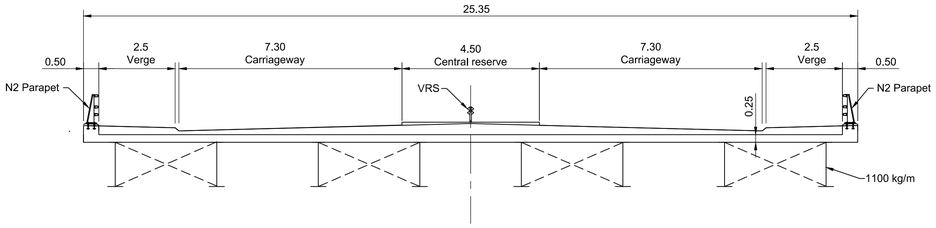

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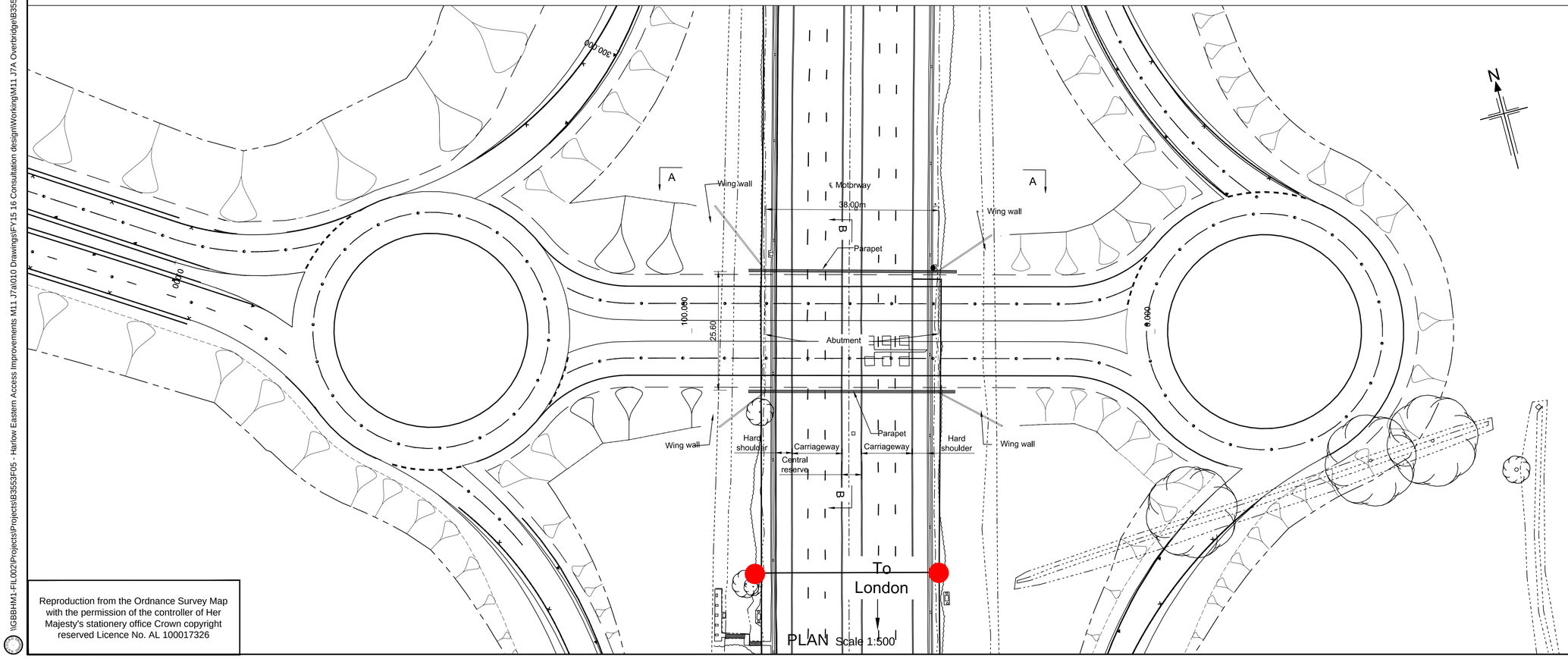

PLAN Scale 1:500

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Notes:
1. All dimensions in meters unless otherwise stated
2. The proposed height between existing motorway level and proposed carriageway level is 5.3m + 1.95m + 0.267m = 7.52m. 0.267m includes live load deflection.

Legend:

Proposed levels

Existing levels

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following :
CONSTRUCTION. None.
MAINTENANCE / CLEANING. None.
DECOMMISSIONING / DEMOLITION. None.
It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

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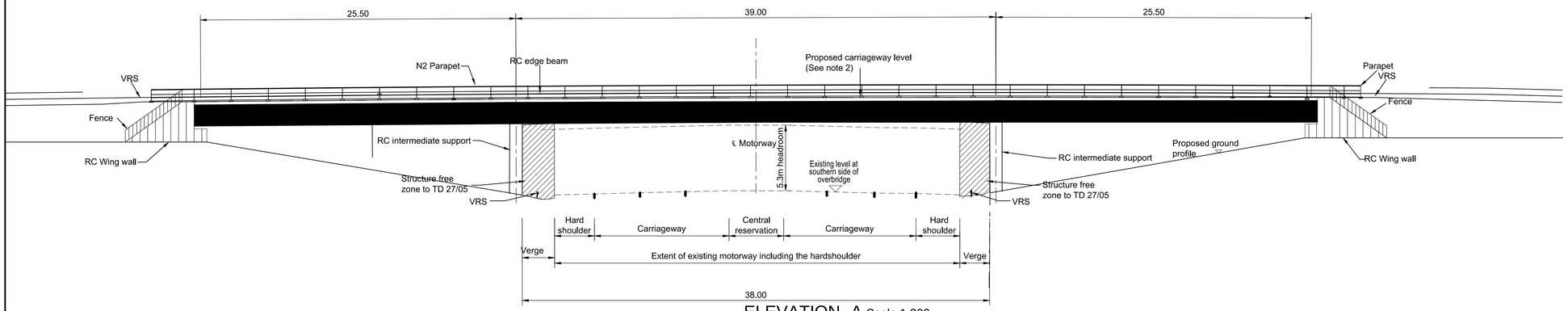

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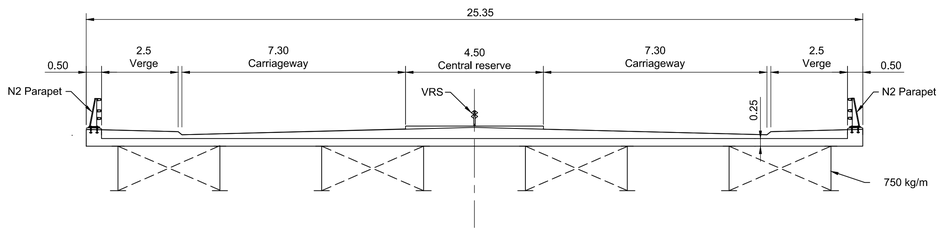

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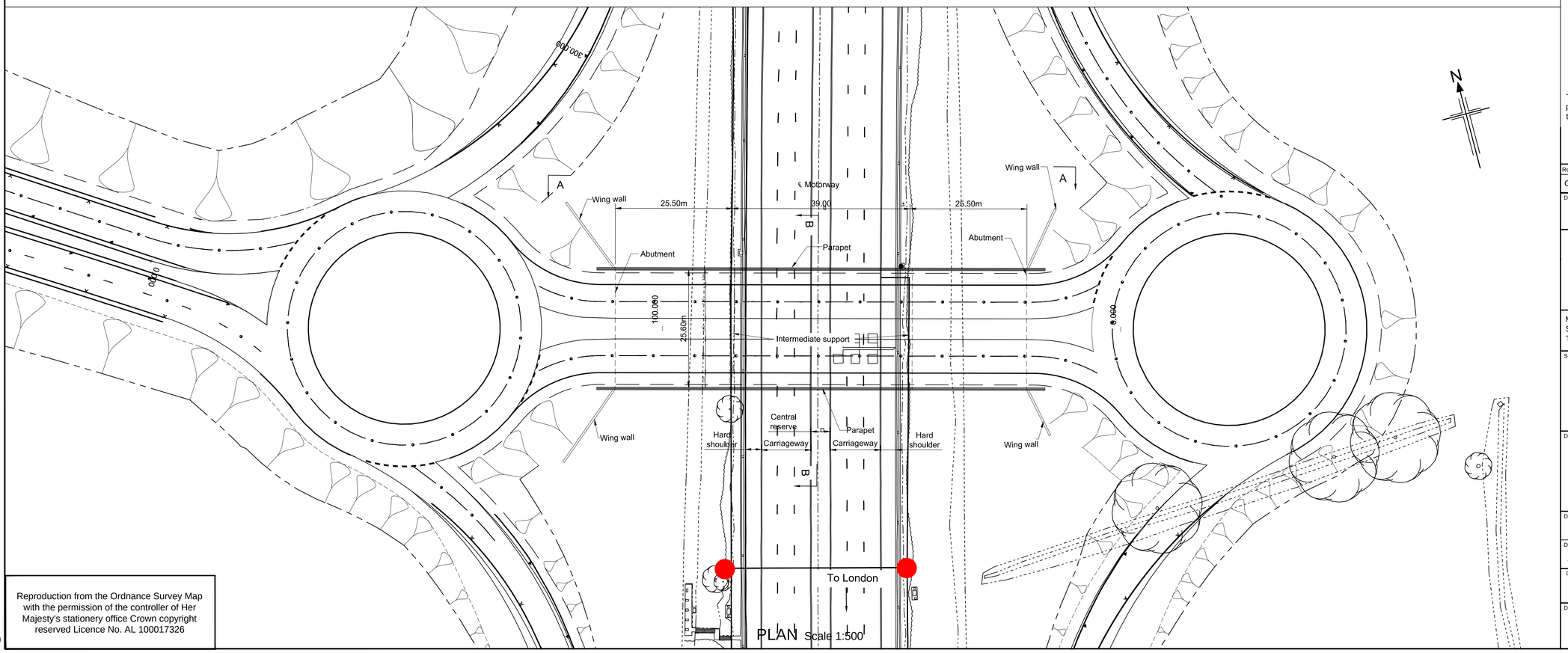

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Notes:
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Legend:
- Proposed levels
- Existing levels

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
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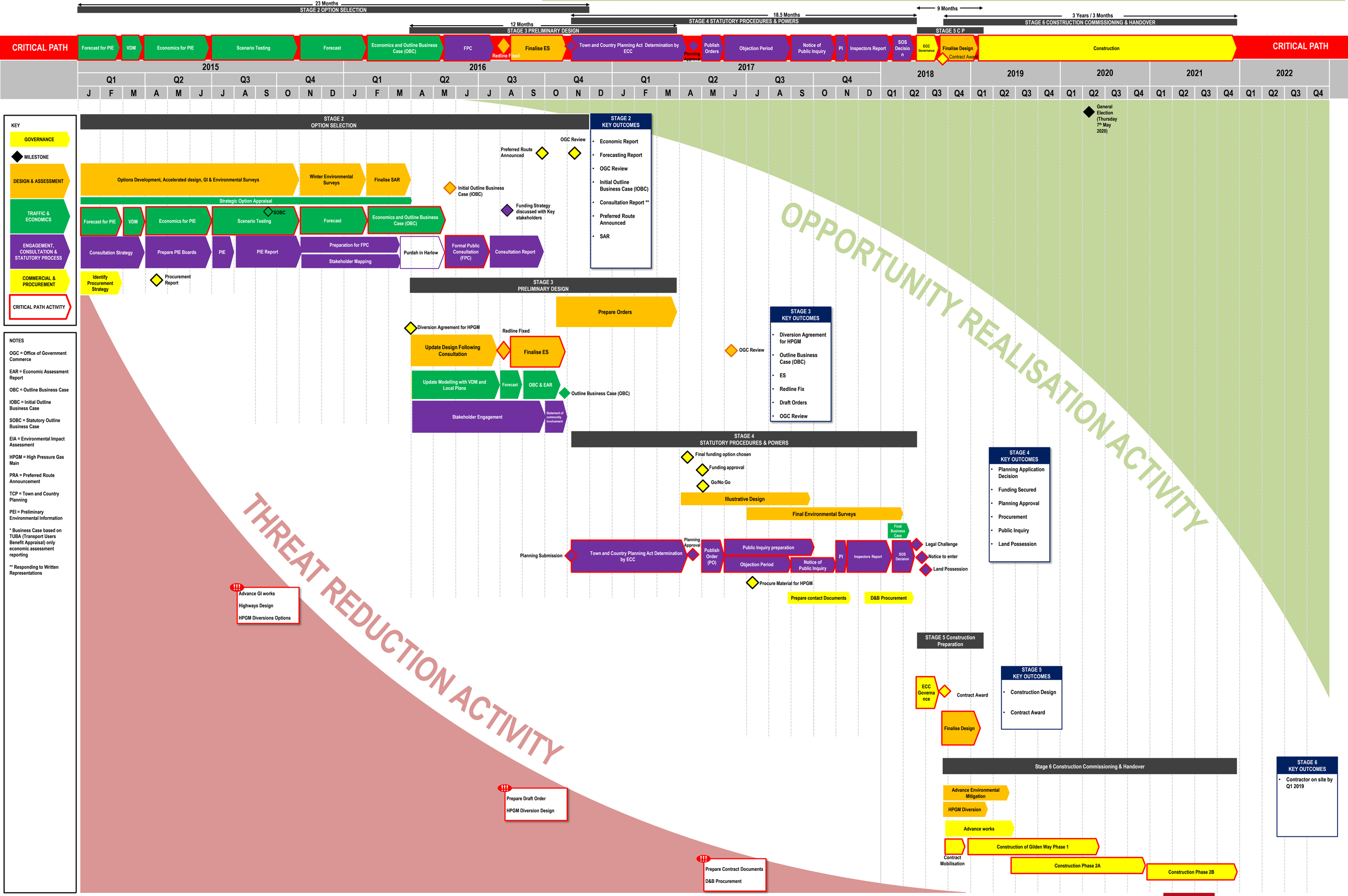
Appendix C. Five years high level programme



REVISION 11

M11 JUNCTION 7A HIGH LEVEL PROGRAMME

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