



# **Road Investment Strategy East Area 6**

## **A47 Guyhirn Junction Improvement Non-Technical Summary Report**

### Document Control

<b>Document Title</b>	A47 Guyhirn Junction – Non-Technical Summary Report
<b>Author</b>	Aaron Douglas
<b>Owner</b>	Tony Davis
<b>Distribution</b>	Non-statutory consultation website / SHARE
<b>Document Status</b>	Final

### Revision History

Version	Date	Description	Author
1.0	08 March 2017	Draft Template	Kurtis Napp
1.1	08 March 2017	Final Template	Tony Wallis
1.2	09 March 2017	Paul Carey Review	Paul Carey
1.3	09 March 2017	Andrew Warwick Review	Andrew Warwick
1.4	10 March 2017	Jon Brittain Update	Jon Brittain
2.0	13 March 2017	Final	Aaron Douglas

### Reviewer List

Name	Role
Tony Davis	Senior Responsible Owner
Dave Masters	Senior Project Manager
Aaron Douglas	Highways England Project Manager
Romeu Rosa	Highways England Project Manager
Paul Carey	Supplier Programme Manager
Nicholas Coombes	Highways England DCO Manager

### Approvals

Name	Signature	Title	Date of Issue	Version
Tony Davis		Senior Responsible Owner	15/03/17	2.0

## Contents

<b>Contents</b>	<b>2</b>
<b>Introduction</b>	<b>3</b>
<b>Liaising with Local Authorities</b>	<b>4</b>
<b>Project Control Framework</b>	<b>5</b>
<b>Timeline to date</b>	<b>6</b>
<b>Traffic and Safety Problem</b>	<b>7</b>
<b>Traffic and Safety Solution</b>	<b>7</b>
<b>Existing Layout</b>	<b>8</b>
<b>Existing Conditions and Constraints</b>	<b>9</b>
<b>Potential Route Options</b>	<b>11</b>
<b>Qualitative Assessment of Potential Junction Options and Sifting</b>	<b>13</b>
<b>Options progressed to PCF Stage 2</b>	<b>15</b>
<b>Early PCF Stage 2 Affordability and Value Management Sifting</b>	<b>15</b>
<b>The Option for Consultation</b>	<b>16</b>
<b>Non Statutory Consultation</b>	<b>16</b>
<b>Further and Ongoing Assessment</b>	<b>18</b>
<b>Preferred Route Announcement</b>	<b>18</b>

## Introduction

During 2014 a feasibility study was undertaken to look at the A47 corridor. The study identified where further work was required and this informed the Government's Road Investment Strategy (RIS) which was issued in December 2014.

A total of twenty-two locations were shown to demonstrate traffic and safety problems either now or in the immediate future. Sifting of these options was completed, and six specific locations were to become the main focus along the A47.

The six improvement schemes were identified as:

- A47 Wansford to Sutton Dualling
- **A47 Guyhirn Junction Improvement**
- A47 North Tuddenham to Easton Dualling
- A47 Thickthorn Interchange improvements
- A47 Blofield to North Burlingham Dualling
- A12 Junction Improvements (now called Great Yarmouth Junctions)

The DfT's *A47 and A12 corridor feasibility study* (published in February 2015) can be located at:  
<https://www.gov.uk/government/publications/a47-and-a12-corridor-feasibility-study-technical-report>

The DfT's *Roads Investment Strategy (2015-2020)* can be located at:  
<https://www.gov.uk/government/collections/road-investment-strategy-post-2020>

## **Planning Context**

The scale of the scheme means that it is likely to qualify as a Nationally Significant Infrastructure Project (NSIP). This means that a Development Consent Order (DCO) will be required to permit construction. DCO applications are determined in accordance with the National Policy Statement for National Networks (NPSNN).

The NPSNN requires the consideration of:

- Potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits
- Potential adverse impacts, including any longer term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts

These environmental, safety, social and economic benefits and adverse impacts should be considered at national, regional and local levels.

In addition to Environmental Impact Assessment, the NPSNN sets specific policy on design, climate change adaptation, pollution, safety, security and health. It also covers the generic impacts of air quality, carbon emissions, biodiversity, waste, aviation, coastal change, nuisance, flood risk, land instability, landscape and visual impact, land use, noise, impacts on transport networks and water resources.

## **Liaising with Local Authorities**

Detailed discussion took place with technical officers from Cambridgeshire County Council in their capacity as highway authority for the local road network surrounding A47. Cambridgeshire were able to comment on the emerging options and provide strategic input and advice.

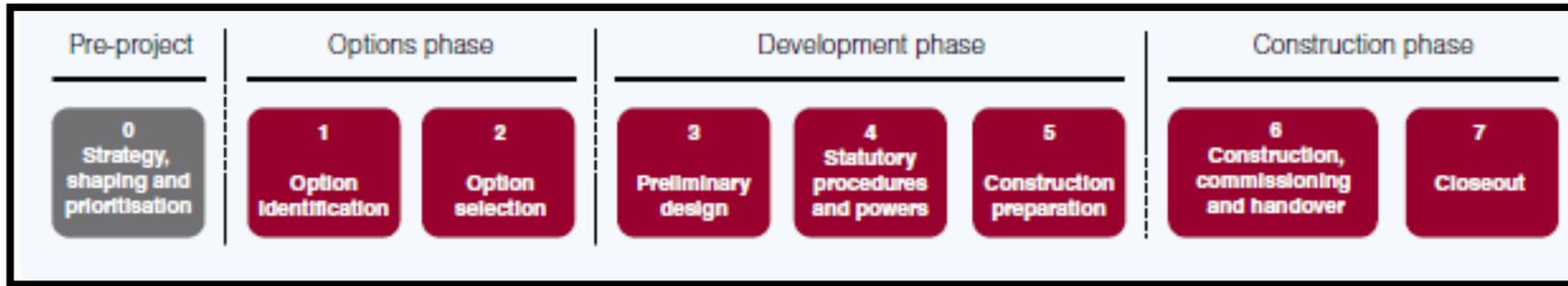
In working towards the non-statutory consultations the project team has increasingly been in discussion with Fenland District Council as well to take on board input on local demographics, planning issues etc. which will help shape a successful consultation exercise.

## Project Control Framework

The scheme identified in the RIS is now being taken forward by Highways England as a major project through the Project Control Framework (PCF).

The PCF sets out how Highways England manages and delivers major projects. It is designed to ensure Highways England deliver road projects that meet their customers' needs in a cost efficient and timely manner.

Figure 1 - Major Projects Lifecycle

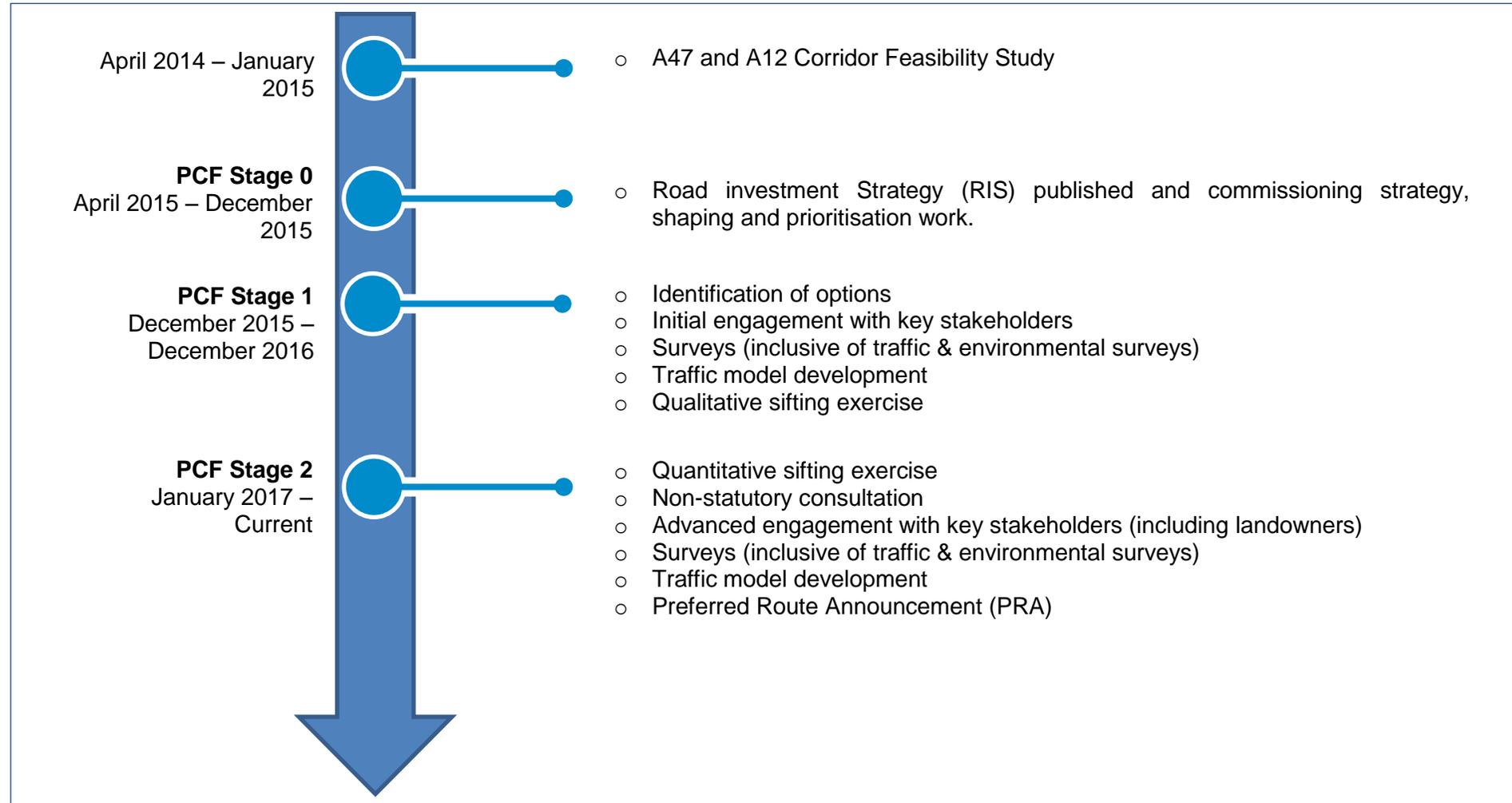


The scheme is currently in PCF Stage 2 Options Selection of the Options Phase. The current project timeline is shown in Figure 2 below.

This report provides a high level summary of the work done in PCF Stage 1 to determine the route options which would be put forward for non-statutory public consultation in PCF Stage 2.

Timeline to date

Figure 2 - Project timeline to date



## Traffic and Safety Problem

### A47 Corridor

The A47 is ranked 2<sup>nd</sup> nationally for fatalities on A roads and the accident severity ratio is above average.

The A47 is a mix of dual carriageway (47%) and single carriageway (53%) and the current traffic flows generally exceed capacity.

Rapid growth is planned in the area. Norwich, Cambridge and Peterborough are amongst the fastest growing cities in the country.

### A47 Guyhirn Junction Improvement

The key problem identified in the Feasibility Study (February 2015) for the Guyhirn junction was as follows: 'Junction capacity assessments completed suggests that the junction is predicted to be over capacity on the A47 approaches. By 2031 this is further exacerbated by future developments in the area'.

This means that the A47 Guyhirn junction is reaching capacity. If nothing is done the peak period congestion currently experienced at the junction will worsen. Traffic is forecast to grow across the country and this, combined with local growth in Peterborough and Norwich, will exacerbate this condition.

## Traffic and Safety Solution

The proposed solution to the traffic issue which is defined in the RIS is;

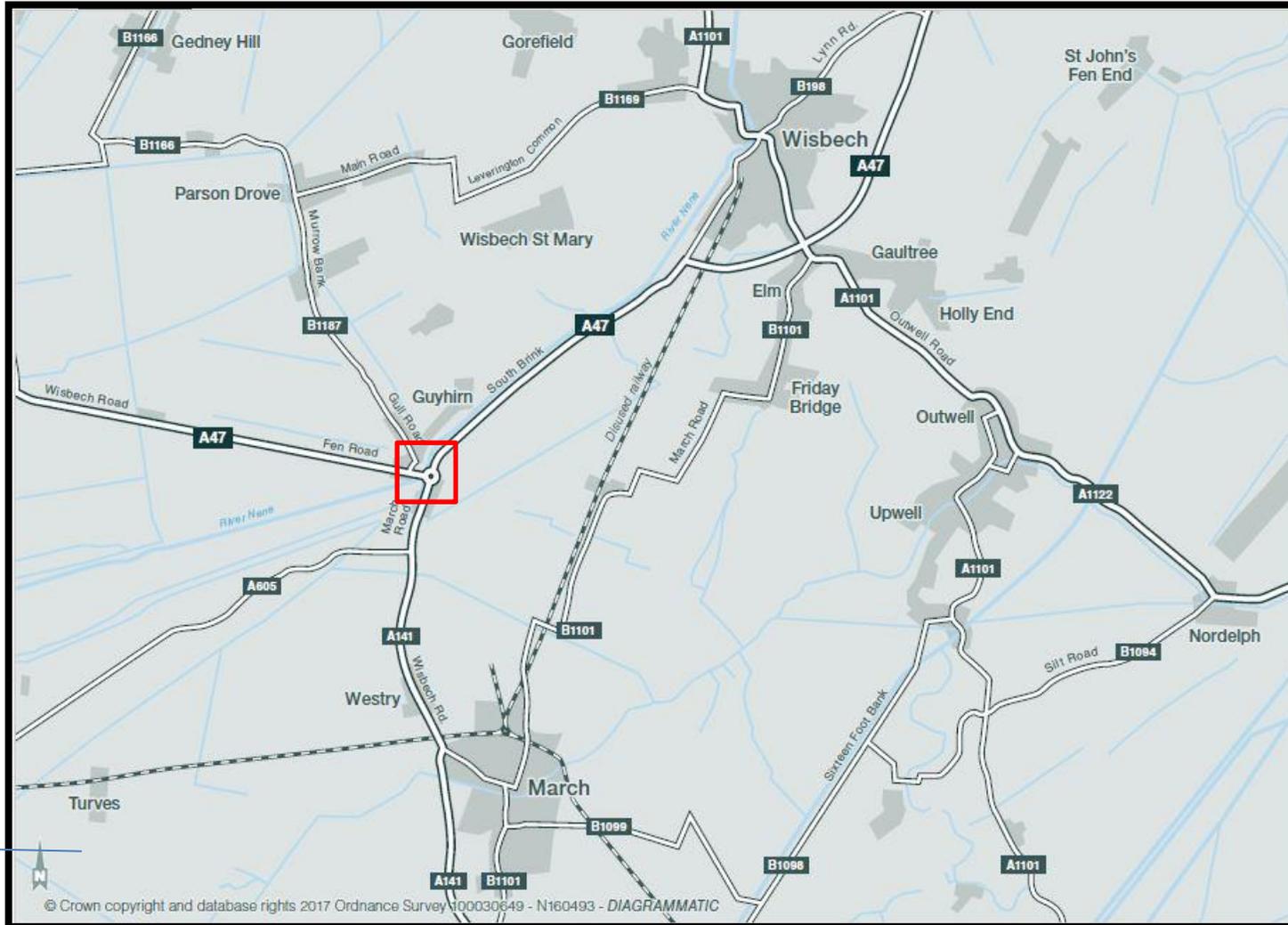
*“the creation of a new, larger junction linking the A47 and A141.”*

Increasing the size and capacity of the junction offers a solution to the congestion will improve journey times and will allow economic growth in the area.

**Existing Layout**

Figure 3 below shows the existing layout of the area of the scheme.

**Figure 3 - Existing Layout of Area (junction highlighted in red box)**



## Existing Conditions and Constraints

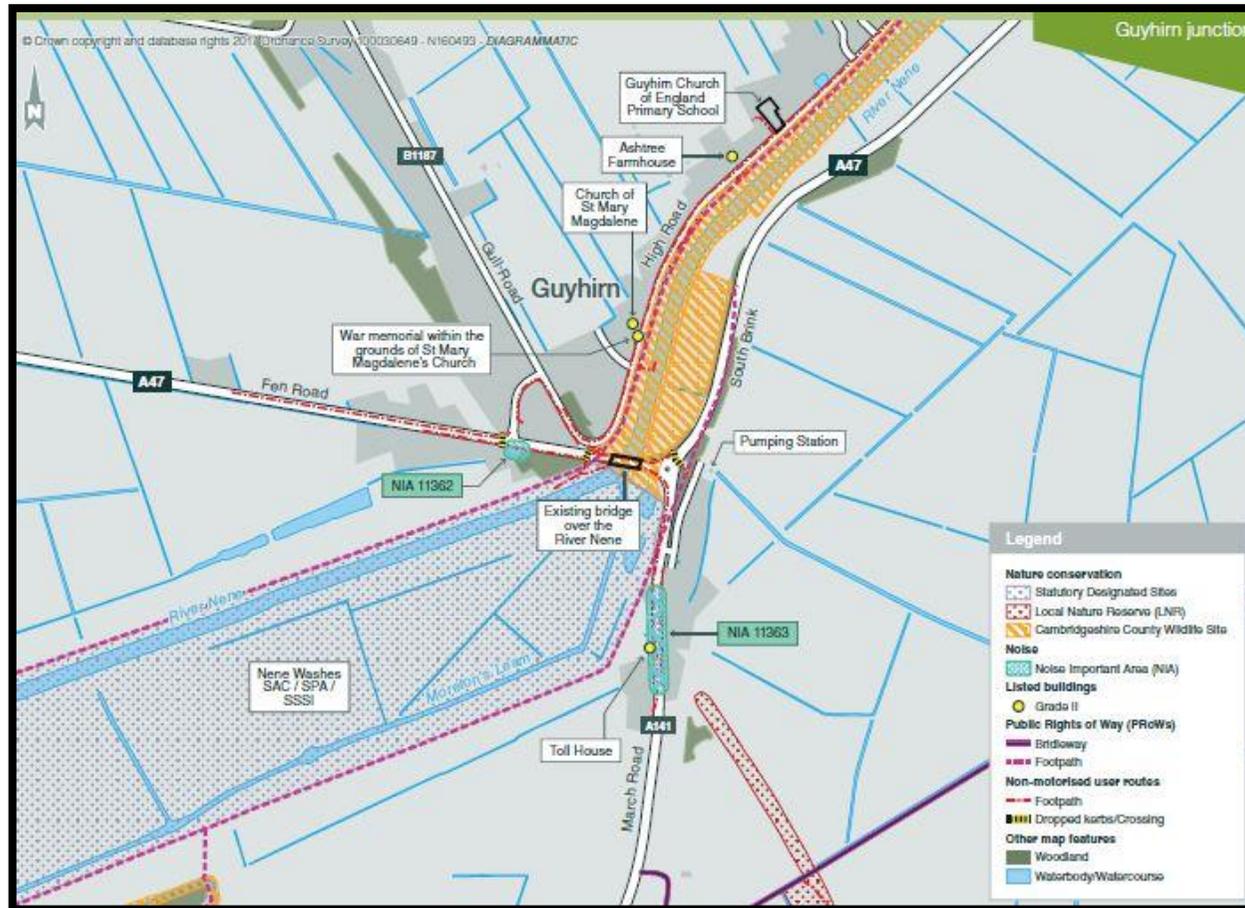
There are a number of constraints which were identified in PCF Stage 0 near the junction. The key environmental constraints close to the existing A47 are shown on Figure 4 below:

- **Existing properties and buildings:** there are a number of residential properties close to the existing junction adjacent to the A141 March Road. There are further residential and commercial properties on the A47 to the west of the junction. The village of Guyhirn is located just to the north west of the junction and the village of Ring's End is located just to the south of the junction on the A141.
- **Existing local access roads and property access:** the closest local side road to the junction is the local access A141 March Road to the east of the Guyhirn junction. The B1187 Gull Road meets the A47 to the west of Guyhirn Junction and provides access to the village of Guyhirn and a number of residential, commercial and agricultural properties. There are also a number of direct property accesses, both commercial and residential, on to the existing A47 Fen Road and A141 March Road.
- **Historic and listed buildings:** there are 4 grade II listed buildings in the study area, including the Church of St Mary Magdalene and the War Memorial within the church grounds. The key buildings closest to the existing junction are shown on the environmental constraints plan.
- **Areas of nature conservation:** there are five statutory designated nature conservation sites in close proximity to the junction which are detailed in the environmental constraints plan. The Nene Washes complex of sites incorporates a Special Protection Area (SPA), Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI).
- **Areas of potential ecological importance:** there are four priority habitats within 2km of the junction; a coastal and floodplain grazing marsh, a lowland fens, a lowland mixed deciduous woodland and traditional orchards which support a range of protected species
- **River and water bodies:** The existing Guyhirn junction is situated within a complex surface water regime. The River Nene, which passes under the A47 carriageway, to the west of the existing roundabout, is a transitional tidal waterbody. Morton's Leam, which has a confluence with the River Nene to the south of the A47 Fen road bridge, is also close by. There are 6 notable tributaries of the River Nene within the study area. There are other watercourses within the Lower Nene catchment area; these are the North Level Main Drain, North Level Pumped Areas '2 and 3', the South Holland Main Drain, which includes the North Level Internal Drainage Board (IDB). The District pumping station (operated by the Waldersey IDB) which is located to the east of the existing junction, is connected to an outfall into the River Nene that runs under the A47 South Brink via a surge chamber.

In addition to the constraints listed above there are a number of other physical constraints to the scheme such as existing underground and over ground services supplies for electricity, communications, gas and water in the area, as well as ground conditions and geological conditions.

The investigation into constraints and environmental survey and assessment work has not stopped and continues in PCF Stage 2. This is outlined later in this report.

**Figure 4 - Key Environmental Constraints at A47 Guyhirn Junction**



## Potential Route Options

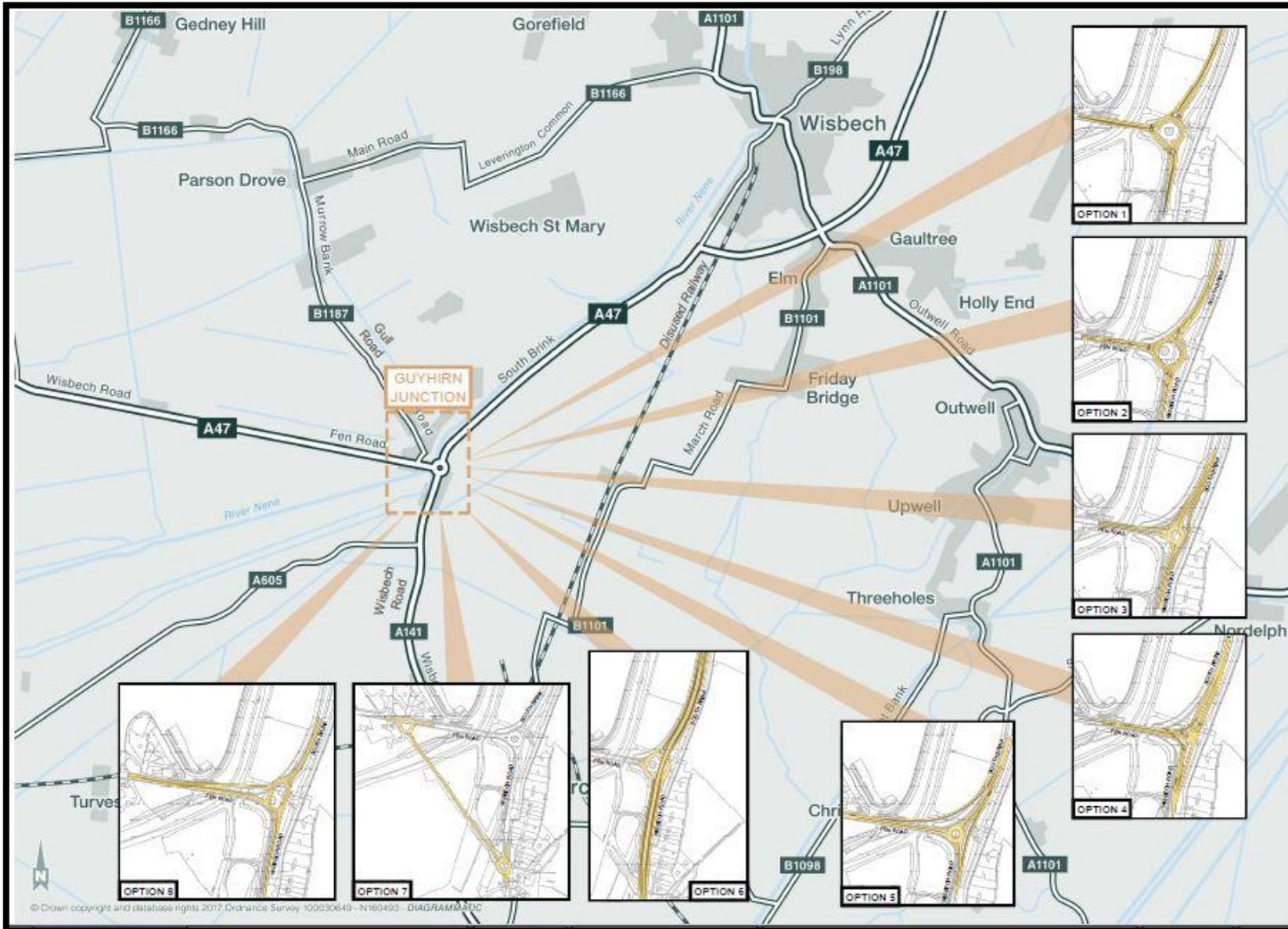
The feasibility work undertaken in PCF Stage 0 identified that increasing the roundabout size represented a potential solution to solve the identified transportation problem. As part of the PCF Stage 0 work, outline proposals were reviewed to ensure that junction improvement represented a suitable and economically cost effective solution.

During PCF Stage 1 the options developed during PCF Stage 0 were used as a basis to develop a number of more defined potential options for the junction. These options were developed initially to a high level and were numbered 1 – 8 for reference purposes and these options are listed in Table 1 below and are shown in Figure 5 on the following page.

**Table 1 – Table of Potential Options and Descriptions**

Option	Description of option
1	Enlarged roundabout symmetrically over the existing roundabout, including bridge widening
2	Enlarged roundabout in new location - moved to the east towards local March Road, no bridge widening
3	New roundabout (same size as existing) in new location with 2 free flow left turn lanes
4	Signalised T Junction (removal of roundabout)
5	Roundabout with two Free Flow Left Lanes (New Bridge A47-A47 Arm)
6	Grade separated junctions (flyover)
7	A141 March Rd to A47 Fen Rd Bypass including 2 new bridges & 2 new roundabouts
8	Oval Roundabout including new bridge linking A47 Fen Rd to A47 South Brink

Figure 5 - Potential Junction Options Plan



## Qualitative Assessment of Potential Junction Options and Sifting

Each of the 8 Options shown in Figure 5 were assessed using Highway England's objectives and KPIs to ensure that they all represented solutions which would solve the identified transportation problem and meet the commitments of the RIS.

The 8 options were initially assessed comparatively in terms of their engineering, environmental, transportation and economic suitability. These assessments were undertaken based on data gathered from desk based information supplemented by initial walk over environmental surveys undertaken in 2016.

Each of the assessments qualitatively and comparatively rated each option as either red, amber or green. The options rated red having the least favourable outcome for the assessment, the options rated green the more favourable outcome from the assessment. Amber ratings were given where assessments were considered to be in-between the red and green ratings.

**Environmental Assessment:** A qualitative environmental assessment, based on available environmental data, was undertaken to provide a comparative assessment. The following environmental topics were reviewed:

- Noise
- Air Quality
- Greenhouse gases
- Landscape
- Townscape
- Historic Environment
- Biodiversity
- Water Environment

**Transportation Assessment:** Each of the Options was assessed against the projected opening year (2021) and modelled design year (2036) taking into consideration local growth factors and future year traffic flows. Only some of the proposed options delivered improved traffic conditions in the modelled years which can be seen in the results in the table below. The best performing options showed journey time improvements, increased capacity and allowed for safer, swifter movement of traffic through the junction.

**Engineering:** A qualitative engineering assessment, based on the data available, was made taking the following engineering criteria into consideration;

- Buildability
- Landtake required
- Design Standards
- Drainage
- Geotechnical
- Structures
- Impact on Statutory Undertakers

**Economic Assessment:** A comparative economic assessment of each option was made based on high level comparative estimates of scheme costs and potential benefits.

**Assessment Results:** The results from the above assessments are presented in Table 2. These results were reviewed and used to determine a reduced number of potential options to take forward for further assessment and analysis in PCF Stage 2.

Table 2 – Results of Comparative Qualitative Option Assessment

Option	Comparative Qualitative RAG Rating				Option taken forward to PCF Stage 2	Comment
	Environment	Engineering	Traffic	Economic		
Option 1	Yellow	Yellow	Green	Yellow	Yes	Solves the traffic problem in the forecast years. Requires River Nene bridge widening but lessens impact to the existing landscape buffer to the east. Will allow cost comparison with new bridge structure (Option 8).
Option 2	Green	Yellow	Green	Yellow	Yes	Best performing option in terms of traffic and solves the problem in the forecast years. No bridge widening required.
Option 3	Yellow	Yellow	Red	Yellow	No	Performs poorly in traffic terms & would have negative impacts on the local residents particularly in local access March Road.
Option 4	Yellow	Yellow	Yellow	Green	No	Performs in traffic terms but significant land take required, departure from standards for junction realignment and environmental concerns regarding loss of habitats and woodland. Does not allow U-turns / form of junction unsuitable.
Option 5	Red	Yellow	Red	Yellow	No	Performs poorly in terms of traffic, requires a new bridge structure that would impact the surrounding environment designated sites and local residents negatively.
Option 6	Red	Yellow	Red	Yellow	No	Performs poorly in terms of traffic and has increased environmental concerns due to noise, air pollution and visual impact.
Option 7	Red	Red	Yellow	Yellow	No	Performs in terms of traffic but only addresses one of the conflict points. Significant impact on the local surrounding environment designated sites and would require the construction of 2 new bridges.
Option 8	Yellow	Yellow	Green	Yellow	Yes	Solves the traffic problem in the forecast years. New bridge structure required but could be built offline, no works required to existing bridge structure.

## Options progressed to PCF Stage 2

The final decision regarding the options to progress was taken during an Options Review Meeting that was held with senior representatives from Highways England, Amey and AECOM. The above results were discussed and presented to allow an informed decision to be made regarding the options. As a result, options 1, 2 & 8 were selected for further assessment and progression to PCF Stage 2.

## Early PCF Stage 2 Affordability and Value Management Sifting

The initial available cost estimate information at the end of PCF Stage 1 indicated that the options were not economically viable. The high costs were primarily as a result of the significant constraints present at the site (the River Nene bridge, ground conditions and the sensitive designated environmental areas at the site) limiting options and inflating design option costs.

Therefore, a value management exercise was undertaken to develop alternative solutions that would resolve the problem but reduce the high projected costs of the scheme. The best performing option was focussed upon (Option 2) and this exercise reduced the costs significantly through close examination of the design focussing on re-engineered geotechnical solution reducing the amount of earthworks and expensive piling suggested originally, amended drainage proposal and re-alignment and re-measure of the proposed layout. The option was also assessed at a high level against economic and traffic scenarios to enable comparison with previously considered options.

**Table 3 – Early PCF Stage 2 Sifting**

Option	Option taken forward to Public Consultation	Comment
Option 1	No	<ul style="list-style-type: none"> <li>• High environmental impact on designated sites due to bridge widening</li> <li>• High cost due to bridge widening</li> <li>• Extended construction duration and disruption</li> </ul>
Option 2 (amended)	Yes	<ul style="list-style-type: none"> <li>• Least environmental impact on designated sites</li> <li>• Most affordable and viable option</li> <li>• Solves the transport problem</li> </ul>
Option 8	No	<ul style="list-style-type: none"> <li>• Significant environmental impacts due to new bridge</li> <li>• High cost due to new bridge construction</li> <li>• Long construction duration</li> </ul>

### **The Option for Consultation**

The high costs of the proposed options and the results of the value management exercise described above meant that the options that were identified as not being economically viable would not be pursued any further. The amended Option 2 that had been developed as a result of the value management exercise meets the criteria set out by the RIS and appears to be economically viable and solves the transport problem. This option will therefore be presented to the public at the upcoming non-statutory public consultation to gauge public opinion and further assessment and development of the option will be considered throughout the remaining PCF Stages.

**NOTE : For simplicity in gathering public comment and presentation at the public consultation the above option will be renumbered to Option 1**

### **Non Statutory Consultation**

Option 1 will be presented for public comment at the non-statutory consultation and is shown in Figure 6 below.

Figure 6 - Option to be taken forward for Non-Statutory Consultation



## Further and Ongoing Assessment

The following work is ongoing in PCF Stage 2 alongside the non-statutory public consultation.

**Commercial Estimates:** Preliminary estimates confirm the viability of this option. A detailed estimate for the option is currently being prepared by Highways England Commercial Team.

**Value Management:** The initial available cost estimate information from Highways England Commercial Team has been reviewed in detail by the Project Team and a range of value management opportunities have been identified which will be incorporated in the designs as they are developed through PCF Stage 2.

**Traffic Modelling:** The traffic modelling completed in Stages 0 and 1 will be developed further as the scheme progresses through the stage. A bespoke traffic model of the highway network in the vicinity of Guyhirn will be developed using traffic surveys and information from existing local and regional traffic models to understand the traffic behaviour at a strategic and local level. The model will simulate existing routing behaviour, traffic conditions and operational problems.

**Environmental Surveys and Assessment:** Further environmental assessment will be required for the option to ensure that the A47 Guyhirn Junction Improvement scheme does not adversely affect the environment. These include:

- Nature Conservation and Biodiversity – detailed ecological surveys including amphibians, badger, bat, birds, invertebrates, white-clawed crayfish, otter, reptiles, water vole and invasive species etc. to inform the Ecological Impact Assessment and the Habitats Regulations Assessment;
- Air Quality – air quality monitoring at specific locations within the study area;
- Landscape and Visual – summer and winter site walkover and viewpoint photography along with characterisation of the Zone of Visual Influence (ZVI);
- Noise and Vibration – noise baseline surveys and modelling;
- People and Communities – Non Motorised User (NMU) surveys and information on land take, land ownership and land use;
- Road drainage and water – flood risk assessment;
- Geology and Soils – phase II contaminated land assessment to be combined with preliminary geotechnical ground investigation to include associated sampling and monitoring; and
- Cultural Heritage – assessment of potential archaeological effects and impacts on listed buildings.

**Required Statutory Process:** Given the potential for significant environmental effects on the sensitive designated sites in the area of the scheme it is considered likely that improvements to this junction will meet the criteria for a Nationally Significant Infrastructure Project and will therefore be subject to the Development Consent Order process.

## Preferred Route Announcement

When all the assessment work is complete and subject to the findings of the consultation, a preferred route announcement will be made in late 2017 and the pre-application stage of the development consent process will begin.