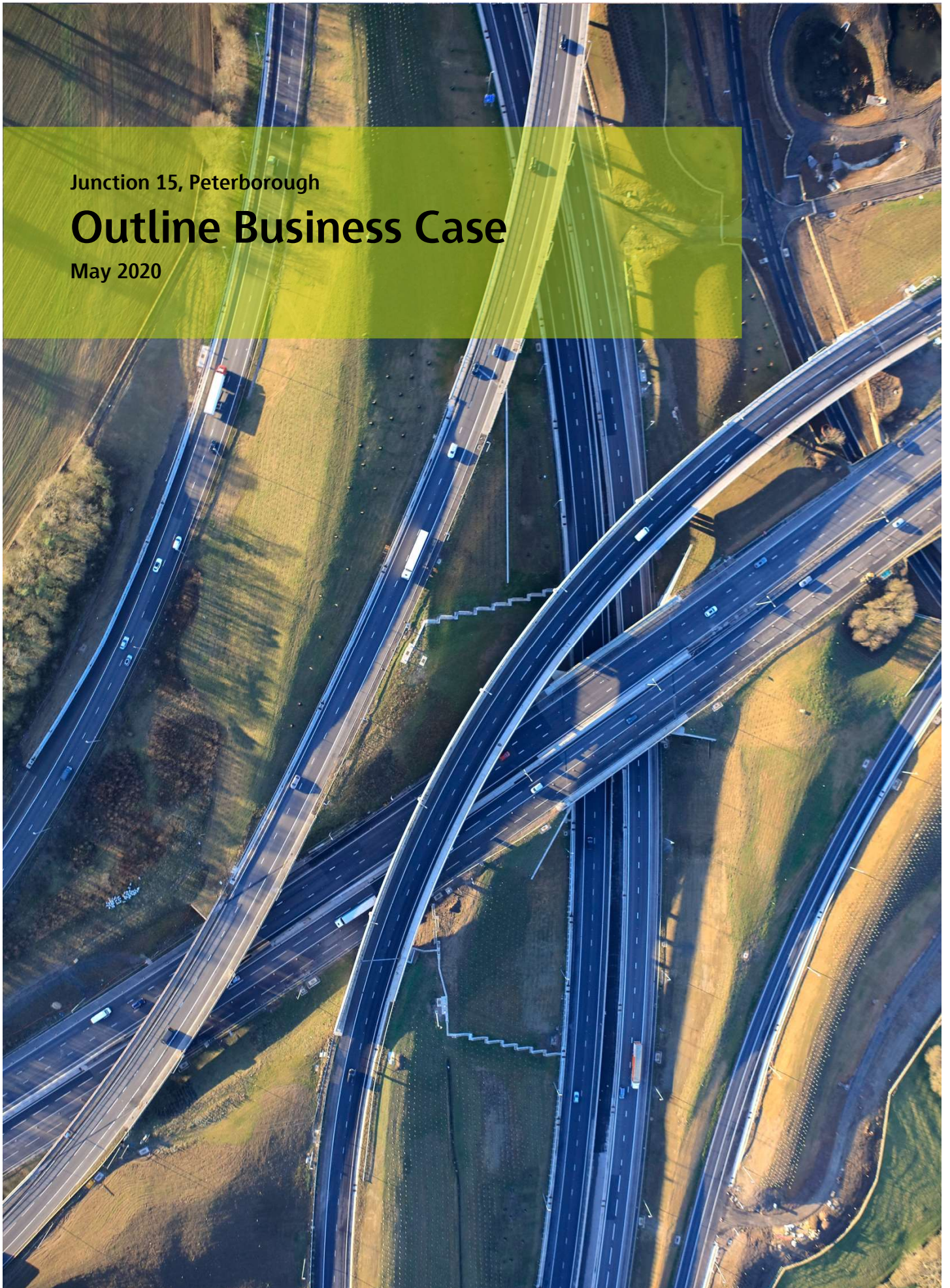


Junction 15, Peterborough

Outline Business Case

May 2020



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Executive Summary

This Outline Business Case makes a strong strategic and economic case for the Junction 15 Improvement Scheme, which will return Very High Value for Money.

Construction of the Scheme will address significant issues of congestion and delay at a crucial cornerstone of Peterborough's Parkway Network, providing much needed capacity for Peterborough City Council (PCC) and the Cambridgeshire and Peterborough Combined Authority (CPCA) to meet their agenda for growth in Peterborough.

The Outline Business Case is set out in compliance with the DfT's Five Case Business Model.

Strategic Case

The Strategic Case has considered the policy context in which a scheme for this location has been developed. As well as policy, the need for intervention is explained, which includes the following issues that compromise local growth aspirations:

- Extensive queuing on the A1260 Nene Parkway (northbound)
- Queuing on all approaches to the junction in the AM and PM peak periods
- Conflicts between dominant movements
- High accident statistic rate, particularly with rear end shunts
- Poor Pedestrian facilities and connectivity.

The policy review and data existing issues has been used to identify scheme objectives, and a long list of potential improvement options have been assessed against these objectives using the DfT's Early Assessment Sifting Tool (EAST). The scheme objectives are set out beneath.

Primary objectives include:

- **Tackle congestion and improve journey time reliability:** Tackle congestion and address journey time reliability on the primary approaches to the junction (A47 Soke Parkway and A1260 Nene Parkway approaches)
- **Support Peterborough's Growth Agenda and encourage homes and jobs:** Ensure that the planned employment and housing growth across Peterborough is promoted whilst providing for future demand.
- **Create wider economic benefits:** Provide conditions that encourage inward investment in higher value employment sectors across Peterborough, and utilise available employment space.

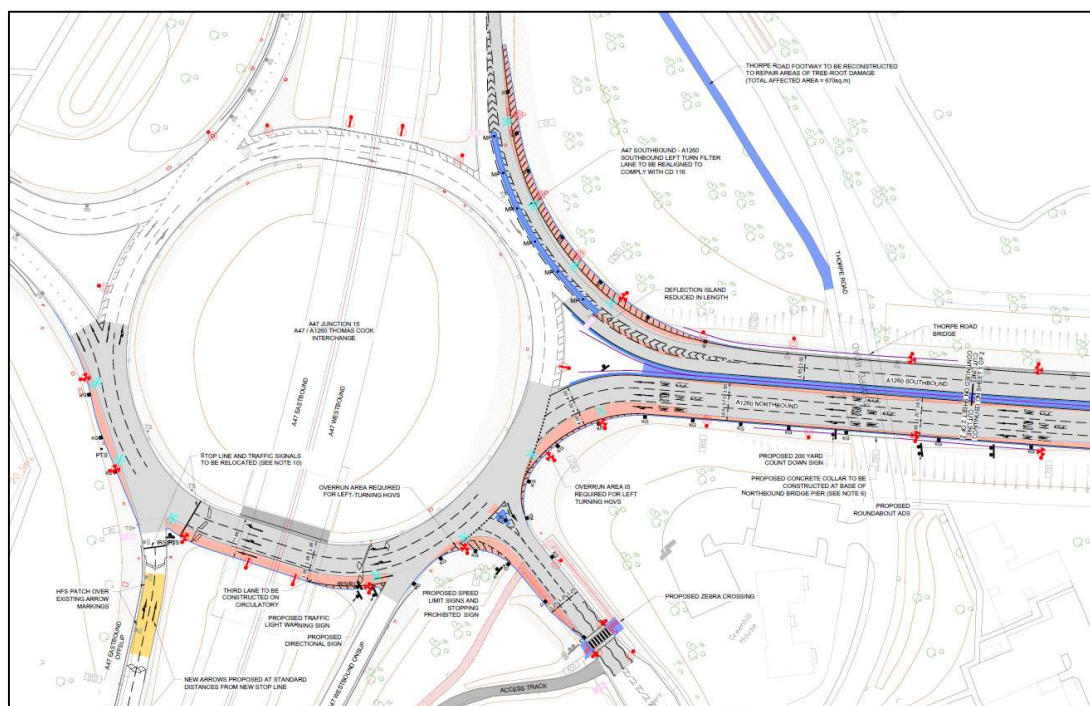
In addition to the primary objectives, several secondary objectives were identified and are discussed within the Strategic Case.

The Strategic Case concludes with details of the Preferred Option which is the subject of this Business Case. Full details of the modelling and assessment work undertaken to identify the Preferred Option can be found in the Junction 15 Option Assessment Report.

The Preferred Option ('the scheme') includes:

- Creation of a third lane (northbound) between Junction 33 and Junction 15 of the A1260 Nene Parkway
- Creation of a three-lane circulatory on Junction 15 between the A1260 Nene Parkway approach and the Bretton Way exit
- Replacement of the pedestrian footbridge over the A1260 Nene Parkway (to facilitate the creation of a third northbound lane)
- Extension of the flare on the Thorpe Wood to Junction 15 by approximately 30 metres
- Creation of a zebra crossing over Thorpe Wood close to the existing bus stops
- Reconstruction of the footpath between Thorpe Road Bridge and Longthorpe.

The northern section of the scheme is shown in the Figure beneath, and a full scheme drawing is provided in Appendix C.



Economic Case

The Economic Case demonstrates the scheme achieves a Benefit to Cost Ratio of 10.235, and offers **Very High Value for Money** based on transport user benefits alone. A breakdown of the scheme BCR is provided in the Table beneath.

Value (£'000s) 2010 prices, benefits discounted to 2010	
Benefits	
Greenhouse Gases	368
Consumer Users (commuting)	24,418
Consumer Users (Other)	17,870
Business Users/Providers	12,959
Indirect Taxes	- 867
Present Value of Benefits (PVB)	54,748
Costs	
Broad Transport Budget	5,349
Present Value of Costs (PVC)	5,349
Net Benefit / BCR Impact	
Net Present Value (NPV)	49,399
Benefit/Cost Ratio (BCR)	10.235

The Present Value of Benefits used in the assessment have been derived from a custom built Aimsun Microsimulation model used to assess the impact of the scheme in future years. Results from this modelling were then assessed using the Transport User Benefits Appraisal (TUBA, 1.9.13) tool to calculate a scheme BCR. The **Present Value of Benefits** for the scheme are **£54,748** in 2010 prices.

The present value of costs used in the Economic Assessment is based upon a robust scheme cost estimate and has been calculated in line with WebTAG guidance over a 60 year assessment period. The **Present Value of Costs** for the scheme are **£5,349** in 2010 prices.

Sensitivity testing has been undertaken to determine whether or not the proposed scheme could still achieve value for money if the expected road traffic growth differs from current predictions. This testing has been undertaken by using figures from TEMPro (version 7.2b), to feed 'low' and 'high' growth scenarios into the model.

The results from the sensitivity test are provided in the Table beneath, and show that the scheme would still offer **Very High Value for Money** in both a low and high growth scenario.

BCR Component	Low Growth	Central Growth	High Growth
PVC (£)	5,349	5,349	5,349
PVB (£)	40,504	54,748	59,524
NPV (£)	35,155	49,399	54,175
BCR	7.57	10.23	11.13

Qualitative and quantitative assessments have also been undertaken for the following areas:

- Landscape
- Heritage
- Arboriculture
- Ecology
- Noise.

These assessments did not identify any significant concerns and has been used to inform the Preliminary Designs. The assessment results are included within the Appraisal Summary Table (AST).

Financial Case

The Financial Case demonstrates that the scheme has been robustly costed in line with WebTAG guidance.

This Scheme Outturn Cost (including risk and inflation) is £4,537,272. This represents the amount required by PCC to deliver the scheme, and it is anticipated that this will be funded by the CPCA from the Single Investment Fund.

Peterborough City Council request that the Design Cost of £595,666 is released in advance of the funds required for construction, in order to undertake the Detailed Design and produce a Full Business Case. This work is provisionally programmed to be undertaken between July 2020 and January 2021, with a view to construction commencing on site in April 2021.

Commercial Case

The Commercial Case demonstrates that the scheme can be reliably procured and implemented through existing channels whilst ensuring value for money in delivery of the scheme.

All phases of the scheme, including detailed design, construction and site supervision will be delivered in house by Peterborough Highway Services (PHS), who have been responsible for all planning and design work undertaken on the Junction 15 scheme to date.

The scheme will be procured using a Target Cost payment mechanism. This incentivises both parties to work together to reduce cost through a pain / gain mechanism. To ensure that the procurement remains commercial competitive and offers value for money, all subcontract packages will be subject to competitive tendering.

Procuring the scheme directly through the PHS contract enables PCC to appoint a contractor in an efficient manner. Using PHS' in-house delivery capability offers the following benefits over alternative procurement routes.

- PHS is reliable and has a **proven track record** of delivering major schemes successfully, and this serves as a positive indicator of future performance.
- The scheme can be **procured far quicker** than would be the case with alternative procurement routes. As well as reducing the procurement costs for the procuring authority, the project benefits will be realised sooner.
- The integrated delivery model creates a **single point of responsibility** and encourages **more effective collaboration** between client, designer and contractor to reduce costs. As the scheme has been identified, planned and designed within PHS, continuity can be assured through to construction, and any issues identified on site can be quickly resolved by the design team.
- A well-established supply chain is already in place which provides **Value for Money**. All subcontract packages will be competitively tendered to ensure best value, and will be put to a minimum of three tenderers where possible.
- **Strong performance is highly incentivised** as all schemes delivered within the PHS contract contribute to a suite of KPIs which impacts on the term of the contract. Consistent good performance is rewarded with contract term extensions whereas consistently poor performance would see a reduction in the contract term.
- The contract duration and **strong collaborative relationship** encourages both parties to work towards long term gain rather than short term commercial gain.

Management Case

The Management Case demonstrates that PCC, through the PHS Framework, has the necessary experience and governance structure to successfully manage the delivery of the scheme.

The Council, through PHS, have successfully delivered the following highway improvement schemes in recent years. As with Junction 15, both of these schemes are located on the Parkway Network at strategically sensitive locations, and demonstrate PHS' ability to successfully manage and deliver highway schemes of this scale.

- Junction 20 Improvement Scheme (A47 Soke Parkway / A15 Paston Parkway) - £5.7m
- Junction 17 – Junction 2 Improvement Scheme (A1139 Fletton Parkway) - £18m.



Junction 20 Improvement (post scheme)

Delivery of the scheme will be managed by a Project Team led by a PCC Project Manager, and consisting of all the key project delivery partners. The Project Team will be responsible for the daily running of the project, coordinating with all key stakeholders, and managing the delivery programme.

The existing PHS Project Board will be used to oversee the continued development and delivery of the scheme by the Project Team, and to make key decisions relating to the delivery of the project. The Project Board will be supported by technical specialists, and key stakeholders will be invited to attend as necessary.

Every month the Project Manager will also submit a highlight report to the CPCA recording what progress has been made and whether there are any new risks that could impact the scheme.

Key project milestones for progressing to scheme delivery are outlined in the Table beneath:

Timescale	Milestone Activity
May 2020 – July 2020	Outline Business Case reviewed by CPCA and approval sought from CPCA board for the release of funding to undertake Detailed Design and produce a Full Business Case.
July 2020 – January 2021	Detailed Design undertaken and Full Business Case produced.
February 2021 – March 2021	Full Business Case reviewed by CPCA and approval sought from CPCA board for the release of funding for scheme construction.
April 2021 – December 2021	Mobilisation, construction and demobilisation.

An online public and stakeholder consultation exercise on the final scheme will be undertaken following approval of the OBC, and prior to completion of the Detailed Design. No residents are directly affected by this scheme. All other communication with key stakeholders and the public will be coordinated by a designated Project Liaison Officer who will be based with the project delivery team.

A Risk Register was produced during project initiation to identify potential risks and to evaluate factors that could have a detrimental effect on the project. The Risk Register is a live document and is reviewed regularly at progress meetings and updates are reported to the CPCA through the monthly Highlight Reports.

Details about how the scheme will be monitored and evaluated against the objectives are shown within the Management Case, and include a range of quantitative and qualitative data collection methods that will be undertaken at one, three and five years post scheme opening.

Summary

This Outline Business Case makes a strong strategic and economic case for the Junction 15 Improvement Scheme, which will return **Very High Value for Money**.

The Business Case demonstrates that the scheme has been robustly costed, can be efficiently procured through existing commercial channels whilst proving value for money, and that the necessary mechanisms are in place to ensure that the delivery of the scheme can be successfully managed on behalf of the Cambridgeshire and Peterborough Combined Authority.

1. Introduction

This document sets out the Business Case for the Junction 15 improvement scheme in Peterborough. The scheme will address severe levels of congestion and delay that are currently compromising the operational efficiency of the surrounding road network, including a cornerstone section of Peterborough's strategic Parkway Network. By addressing existing issues, and building in additional capacity, the scheme will assist with delivering growth aspirations across Peterborough.

This Outline Business Case is the second stage of the decision making process using the format as set out in "The Transport Business Cases" document published by the Department for Transport (DfT) in January 2013.

The level of detail provided within the Business Case continually builds as the project progresses from Strategic Outline Business Case (SOBC) to Outline Business Case (OBC), and then onto Full Business Case (FBC). This reflects the greater level of detail that becomes available as the list of potential schemes is refined, and a preferred scheme is identified.

A SOBC and an Optional Appraisal Report (OAR) were submitted to the Cambridgeshire and Peterborough Combined Authority (CPCA), and approved in October 2019. This paved the way for preliminary design work to be undertaken on the preferred scheme, and for this OBC to be produced.

The primary purpose of the OBC is to:

- Confirm the need for change and the policy fit of a scheme at this location, as established in the SOBC
- Demonstrate that a range of options have been considered, and that a preferred option has been identified that meets the scheme objectives
- Evidence that the preferred option offers value for money, and has been robustly costed based on all information available
- Explain how the scheme will be procured, and how delivery of the project will be managed.

Study Area

The extent of the study is shown beneath in Figure 1.1 beneath. This includes Junction 15 and nearby elements of the Principal Road Network which are directly linked to the operation of the junction.

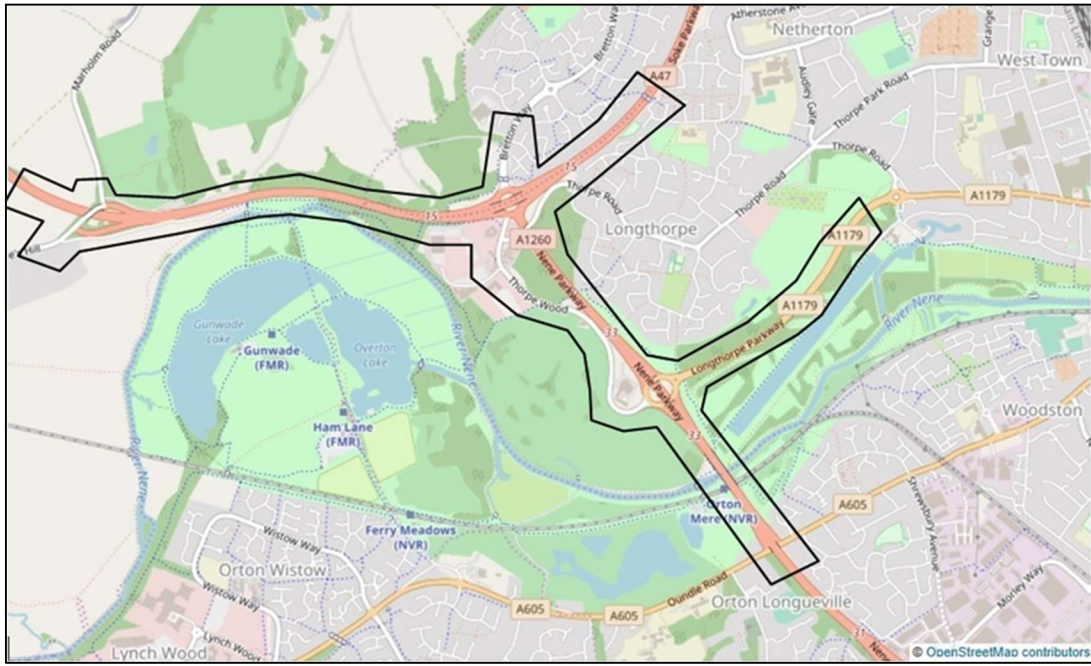


Figure 1.1: Study Area Extents

Location

Junction 15 is a large grade separated junction between two of Peterborough's busiest strategic roads. The junction is a crucial cornerstone of the Parkway Network and provides access to one of the City's three road river crossings.

The junction provides access to the A1260 Nene Parkway, Bretton Way, Thorpe Wood and the A47 Soke Parkway. The junction also provides direct access to a major employment centre (Thorpe Wood) and accommodates a large number of peak hour commuter trips to / from this location.

Figure 1.2 beneath highlights the location of Junction 15 in relation to the Parkway system and Peterborough City Centre.

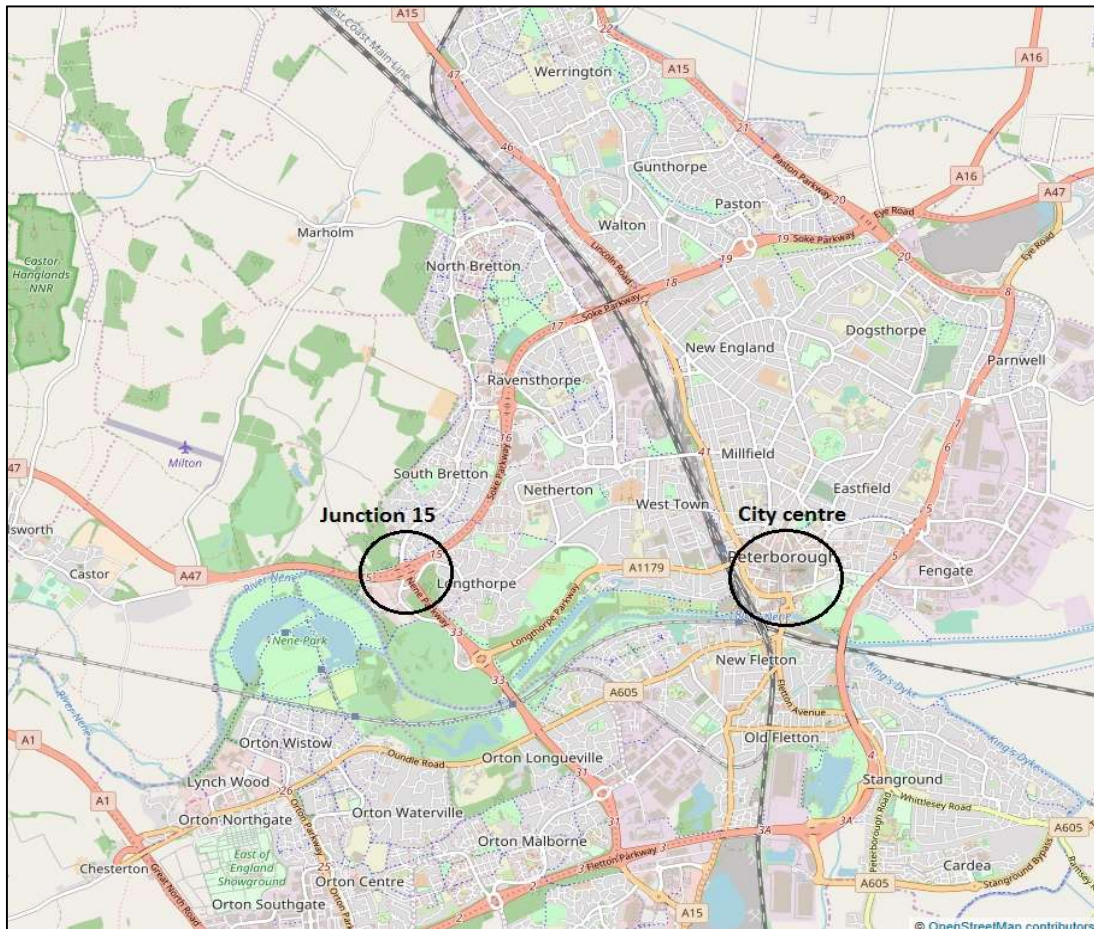


Figure 1.2: Junction 15 Location Plan

Background Context

Junction 15 is a partially signalised grade separated roundabout (positioned beneath the A47 Trunk Road), which is situated on the western edge of Peterborough's urban area.

On average 46,000 vehicles pass through Junction 15 on a typical weekday, of which 12% are classified as commercial vehicles.

The junction is used by trips from all over the Peterborough area, and experiences significant peak hour congestion, particularly northbound on the A1260 Nene Parkway where queues regularly exceed a mile during the PM peak hour, compromising the surrounding road network. Because of its strategic location, the junction is critical to Peterborough's growth aspirations.

Peterborough's Local Plan, which was adopted in July 2019, sets out the overall vision, priorities and objectives for Peterborough for the period up to 2036. The updated strategy identifies the required delivery of approximately 21,315 new homes and 17,600 new jobs between 2016 and 2036.

The population of Peterborough has grown considerably over recent years, increasing by 22% between 2001 and 2015, to 196,640 residents (2015). This places Peterborough within the UK's top ten cities for population growth, making it one of the UK's fastest growing cities.

To date Peterborough's transport network has served the city well, which was fundamentally redesigned in the 1970s to accommodate the then Peterborough New Town. However, as a consequence of recent and planned housing and employment growth, capacity issues are now emerging on the road network, resulting in congestion and delay. As congestion increases on the Parkway network, and queues form at key junctions, the potential for delivering new homes and jobs in the area will become increasingly constrained. The Council are committed to addressing these highway constraints to ensure that its full growth aspirations can be realised.

This Business Case seeks promotes a scheme that will provide the necessary increase in highway capacity to unlock congestion and significantly reduce delay at Junction 15, which is a major pinch-point on the network. This will improve the capacity and operational performance of the Peterborough Parkway system which is crucial to supporting further growth around the City.

Additionally, improvements at Junction 15 are expected to have wider network benefits beyond the Parkway system, particularly to the A605 Oundle Road which experiences congestion as vehicles queue back from the northbound on-slip onto the A1260 Nene Parkway (towards Junction 15) during the PM peak hour.

Document Structure

The remainder of this document is structured as follows:

- **Chapter 2: The Strategic Case** identifies the need for an improvement at this location, considers an initial long list of options, and how these perform against CPCA, PCC and the scheme objectives
- **Chapter 3: Economic Case** demonstrates that the preferred option offers value for money
- **Chapter 4: Financial Case** shows how the scheme has been robustly costed, and how funding needs to be profiled
- **Chapter 5: Commercial Case** sets out how PCC will procure in a way that delivers value for money
- **Chapter 6: Management Case** explains how delivery of the scheme will be managed.

2. Strategic Case

2.1 Introduction

This chapter sets out the Strategic Case for the improvement of Junction 15, and demonstrates why improvements are needed at this location, and how a scheme will fit with local, regional and national policy, and enable Peterborough to meet deliver its planned growth.

2.2 Business Strategy

The Government's strategy for facilitating further economic growth requires the continued investment in transport infrastructure to enable businesses to invest in job creation and the provision of new residential developments. Achieving economic growth, increasing living standards and the provision of new housing are key Government objectives at national, regional and local level. This section details how the Junction 15 improvement scheme will contribute to achieving these strategic aims and polices.

Department for Transport Single Departmental Plan

The Single Departmental Plan published in June 2019¹ sets out the DfT's objectives and the plans for achieving them.

The objectives are:

- Support the creation of a stronger, cleaner, more productive economy
- Help to connect people and places, balancing investment across the country
- Make journeys easier, modern and reliable
- Make sure transport is safe, secure and sustainable
- Prepare the transport system for technological progress and a prosperous future outside the EU
- Promote a culture of efficiency and productivity in everything they do.

An improvement scheme at Junction 15 will reduce congestion and improve journey time reliability, and add further capacity into Peterborough's Parkway Network. The delivery of these benefits will support housing and economic growth, As such, the delivery of a scheme at Junction 15 will provide benefits aligned to delivering the main objectives of DfT's single departmental plan.

¹ <https://www.gov.uk/government/publications/department-for-transport-single-departmental-plan/department-for-transport-single-departmental-plan--2>

Cambridgeshire and Peterborough Combined Authority

The CPCA was formed in 2017, as a Mayoral Combined Authority. It is made of seven local authorities (Cambridgeshire County Council, Peterborough City Council (PCC), Huntingdonshire District Council, East Cambridgeshire District Council, Fenland District Council, Cambridge City Council and South Cambridgeshire District Council) and the Business Board (Local Enterprise Partnership).

The focus of the CPCA is on strategic issues (such as housing, transport and infrastructure demand) which cross council borders and span the entire Cambridgeshire and Peterborough area. Figure 2.1 sets out the CPCA Policy Framework.



Figure 2.1: CPCA Policy Framework

The CPCA Mayor's Growth Ambition Strategy sets out the area's priorities for achieving ambitious levels of inclusive growth and meeting the commitments of the Devolution Deal. The Strategy is based upon significant work undertaken by the Cambridgeshire and Peterborough Independent Economic Review (CPIER).

The CPIER² was commissioned by the Combined Authority and other local partners to provide a robust and independent assessment of the Cambridgeshire and Peterborough Economy and its potential for growth. The assessment makes a number of recommendations for the CPCA to take forward over the short, medium and long-term.

² <https://www.cpier.org.uk>

The success of Cambridgeshire and Peterborough as a project of national importance is highlighted in the CPIER. This is because the area contains some of the most important companies and institutions in the country, much of the country's high value agricultural land, and the cities and towns that continue to support both.

The CPIER identifies Peterborough as a city with a dynamic business environment, built on its history of industry including brickmaking and manufacturing. It is an attractive place for business due to its position on the A1 and East Coast Main Line, as well as for aspirational workers who want easy access to London, the Midlands and the North. However it also states that it has a lower proportion of high-level skills than elsewhere in the area, and educational and health outcomes in Peterborough are relatively poor. The CPIER believes a strong focus on these issues is needed to improve productivity and well-being, which should also include new higher education provision.

The Local Industrial Strategy³ sets out the economic strategy for Cambridgeshire and Peterborough, taking a lead role in implementing the business growth, productivity and skills elements of the Growth Ambitions Strategy. The Local Industrial Strategy is focussed around five key foundations of productivity established in the UK Industrial Strategy:

- People
- Ideas
- Business Environment
- Infrastructure
- Place.

It is a core principle of the Local Industrial Strategy that the fifth foundation of place reflects the findings of the CPIER, responding to the three sub-economies identified

- Greater Cambridge
- Greater Peterborough
- The Fens.

The CPCA Assurance Framework states that investments will only be made if they can demonstrate that they will support the delivery of the Growth Ambitions Statement and the Local Industrial Strategies, as well as the more detailed place and sector strategies.

3

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/818886/Cambridge_SI_NGLE_PAGE.pdf

In January 2020, the CPCA adopted a Local Transport Plan for Cambridgeshire and Peterborough⁴ and it replaces the interim Local Transport Plan published in 2017. The plan describes how transport interventions can be used to address current and future challenges and opportunities for Cambridgeshire and Peterborough, and sets out the policies and strategies needed to secure growth and ensure that planned large-scale development can take place in the county in a sustainable way.

The Local Transport Plan is split in to two main parts: The 'Local Transport Plan' which sets out the vision, goals and objectives and the policies designed to deliver the objectives, and the 'Transport Delivery Plan' (2019 to 2035) which explains how the Local Transport Plan strategy will be delivered. It details programmes for delivery of improvements to the transport network and for its day to day management and maintenance.

The development of the Local Transport Plan was undertaken concurrently with the CPIER and the Growth Ambition Strategy which enabled the challenges and opportunities detailed in these documents to be reflected within the Local Transport Plan. The Local Transport Plan completes the suite of documents which articulates the Combined Authority's response to the CPIER.

The vision for the Local Transport Plan is:

'To deliver a world-class transport network for Cambridgeshire and Peterborough that supports sustainable growth and opportunity for all'.

The goals of the Local Transport Plan outline the wider outcomes the transport network in Cambridgeshire and Peterborough will aim to achieve. They are:

- **Economy** – deliver economic growth and opportunity for all communities
- **Society** – Provide an accessible transport system to ensure everyone can thrive and be healthy
- **Environment** – Protect and enhance our environment and tackle climate change together.

⁴ <https://cambridgeshirepeterborough-ca.gov.uk/assets/Transport/Draft-LTP.pdf>

The objectives of the Local Transport Plan underpin the delivery of goals, and form the basis against which schemes, initiatives and policies will be assessed. They are:

- **Housing** – support new housing and development to accommodate a growing population and workforce
- **Employment** – connect all new and existing communities so all residents can easily access jobs within 30 minutes by public transport
- **Business and Tourism** – Ensure all of our region’s businesses and tourist attractions are connected sustainably to our main transport hubs, ports and airports
- **Resilience** – build a transport network that is resilient and adaptive to human and environmental disruption, improving journey time reliability
- **Safety** – embed a safe systems approach in to all planning and transport operations to achieve Vision Zero (zero fatalities or serious injuries)
- **Accessibility** – promote social inclusion through the provision of a sustainable transport network that is affordable and accessible for all
- **Health and Well-being** – provide ‘healthy streets’ and high quality public realm that puts people first and promotes active lifestyles
- **Air Quality** – ensure transport initiatives improve air quality across the region to exceed good practice standards
- **Environment** – deliver a transport network that protects and enhances our natural, historic and built environments
- **Climate Change** – reduce emissions to as close to zero as possible to minimise the impact of transport and travel on climate change.

Junction 15 is identified within the Local Transport Plan as a congestion pinch point on the Peterborough Parkway network where improvements are necessary to improve journey time reliability, and enable the growth identified within the Local Plan to emerge⁵.

2.3 Fit with the Wider Policy Context

The wider policy context is set out in Table 2.1 below, each policy document is set out alongside its objectives and the impact of the study on the objectives of each policy document.

Appendix A details other local policies that are relevant to improvements at Junction 15.

⁵ Peterborough Long Term Transport Strategy, 2010

Table 2.1: Wider Policy Context and Impact of the Scheme

Policy Framework	Policy Function	Objectives	Study Impact
Department for Transport Single Departmental Plan	Sets out the DfT's objectives and the plans for achieving them	<ul style="list-style-type: none"> • Support the creation of stronger, cleaner, more productive economy • Help to connect people and places, balancing investment across the country • Make journeys easier, modern and reliable • Make sure transport is safe secure and sustainable • Prepare the transport system for technological progress and a prosperous future outside the EU • Promote a culture of efficiency and productivity in everything we do. 	<p>Improvements at Junction 15 will:</p> <ul style="list-style-type: none"> • Support the housing and economic growth ambitions of the city • Improve reliability for drivers on this section of the city's road network
Cambridgeshire and Peterborough Combined Authority Local Transport Plan	Describes how transport interventions can be used to address current and future challenges and opportunities. Sets out policies and strategies needed to secure growth and ensure planned large scale development can take place in the county in a sustainable way. The Local Transport Plan completes the suite of documents which articulates the Combined Authority's response to the CPIER	<ul style="list-style-type: none"> • Housing – support new housing and development to accommodate a growing population and workforce • Employment – connect all new and existing communities so all residents can easily access jobs within 30 minutes by public transport • Business and Tourism – Ensure all of our region's businesses and tourist attractions are connected sustainably to our main transport hubs, ports and airports • Resilience – build a transport network that is resilient and adaptive to human and environmental disruption, improving journey time reliability • Safety – embed a safe systems approach in to all planning and transport operations to achieve Vision Zero (zero fatalities or serious injuries) • Accessibility – promote social inclusion through the provision of a sustainable transport network that is affordable and accessible for all • Health and Well-being – provide 'healthy streets' and high quality public realm that puts people first and promotes active lifestyles • Air quality – ensure transport initiatives improve air quality across the region to exceed good practice standards • Environment – deliver a transport network that protects and enhances our natural, historic and built environments • Climate Change – reduce emissions to as close to zero as possible to minimise the impact of transport and travel on climate change. 	<p>Improvements at Junction 15 will:</p> <ul style="list-style-type: none"> • Support the housing and economic growth ambitions of the city • Improve journey time reliability for drivers on this section of the city's road network • Reduce the number of accidents at the junction
Peterborough City Council Strategic Priorities	The Council's priorities to help meet its vision to 'create a bigger and better Peterborough that grows the right way, and through truly sustainable growth	<ul style="list-style-type: none"> • Drive growth, regeneration and economic development • Improve educational attainment and skills • Safeguard vulnerable children and adults • Implement the Environmental Capital Agenda • Support Peterborough's culture and leisure trust Vivacity • Keep all our communities safe, cohesive and healthy • Achieve the best health and wellbeing for the city 	<p>Improvements at Junction 15 will:</p> <ul style="list-style-type: none"> • Support the housing and economic growth ambitions of the city • Improve journey time reliability for drivers on this section of the city's road network • Reduce the number of accidents at the junction
Peterborough City Council Local Plan	Updates the 2011 Core Strategy and looks to deliver 20,112 homes and 17,600 jobs by 2036		

2.4 The Need for Change

Problems Identified

Junction 15 is heavily congested during peak hours, which creates the following specific issues:

- Extensive queuing on the A1260 Nene Parkway (northbound)
- Queuing on all approaches to the junction in the AM and PM peak periods
- Conflicts between dominant movements
- High accident statistic rate, particularly with rear end shunts
- Poor Pedestrian facilities and connectivity.

If not resolved, these issues will compromise the city's growth aspirations, as well as the Council's objectives to remain a pleasant place to live and work.

Extensive queue lengths on the A1260 Nene Parkway

During both the AM and PM peak period, extensive queuing occurs on the A1260 Nene Parkway northbound approach to Junction 15. Figure 2.2 beneath shows the queues stretching back over a mile to Junction 32 (A605 Oundle Road) during the PM peak period.

The queuing that occurs along A1260 Nene Parkway Northbound approach would seem to indicate a link capacity issue as cars are slowing down early to join the queue but as they near the stop line vehicle speeds increase slightly and roll through the junction.

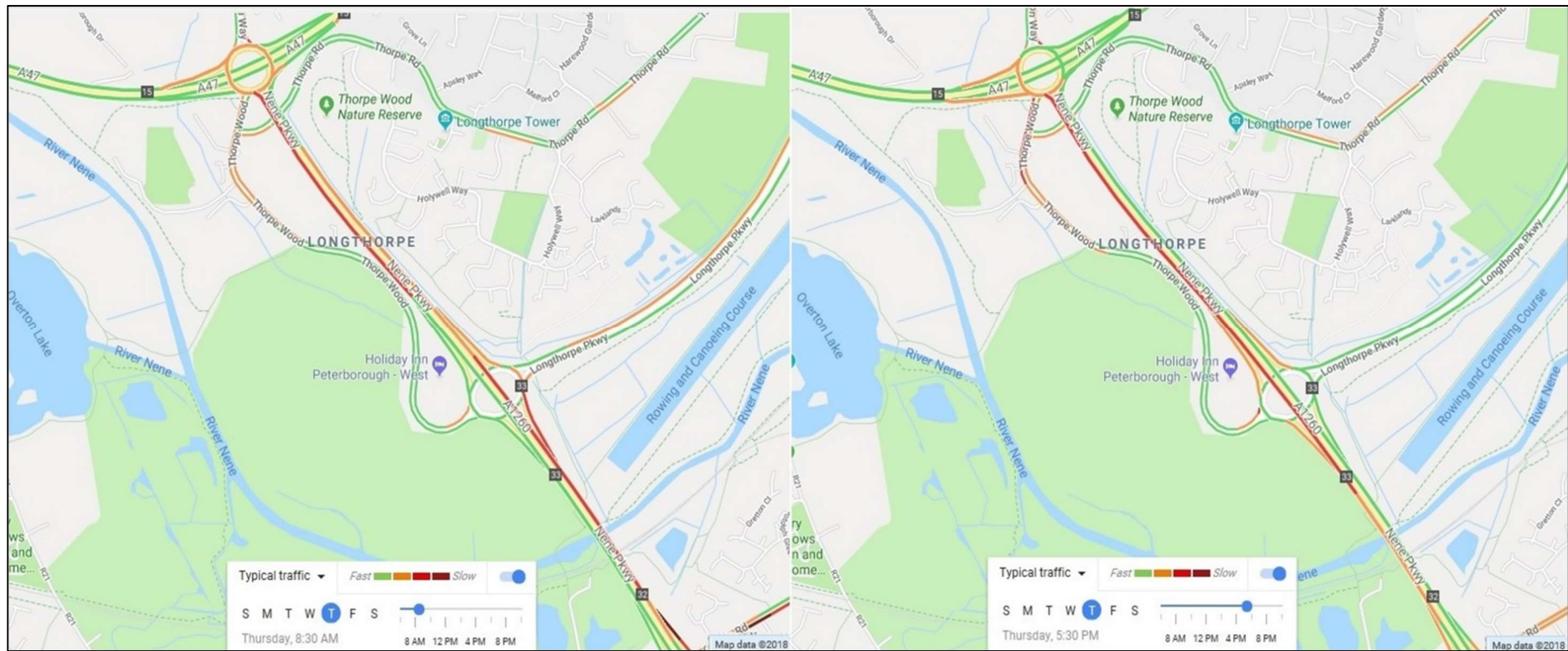


Figure 2.2: Typical AM and PM Peak Hour Congestion, Junction 15 and A1260 Nene Parkway

Figure 2.3 beneath shows queues observed along the A1260 Nene Parkway during the site visits. These pictures reiterate the northbound queuing (right side of the road) back from Junction 15 during the peak hours.



Figure 2.3: PM Peak Queues Observed along A1260 Nene Parkway

Queuing on other approaches in AM and PM Peak

During the AM peak period, traffic queues on the A47 eastbound off-slip approach to the junction. It was noted during the site visits that occasionally the queues extend back to the mainline, having the potential to reduce the performance of the A47 mainline in the future. It should be noted that queues on this approach tend to clear within the traffic signal cycle. This queuing and clearing pattern is shown in Figure 2.4.



Figure 2.4: AM Peak Hour Congestion at A47 Eastbound Off-slip

Conflicts between Movements

The primary conflict between movements at Junction 15 is between vehicles originating from the A1260 Nene Parkway and vehicles on the circulatory heading for Thorpe Wood. This conflict is shown to result in limited gap availability for motorists joining the circulatory from Nene Parkway and introduces an element of driver uncertainty when approaching or stationary at the stop line of this approach.

As a consequence of this conflict in movement, driver behaviour on Nene Parkway is impacted, with motorists shown to leave larger gaps (1 – 2 car lengths) from the car in front when approaching the stop line, resulting in the ability to reach greater speeds when joining the circulatory. This results in the majority of traffic on Nene Parkway being able to roll over the stop line, rather than having to stop.

Figure 2.5 highlights this driver behaviour. The screenshots below show the circled car provides a marker for the change in behaviour.



Figure 2.5: Change in Driver Behaviour at Stop Line

Accident Data

Between 2012 and 2017, there were 70 accidents recorded within the study area. Figure 2.6 highlights the clusters where the majority of accidents occurred, these being positioned on Junction 15, Junction 33 and Junction 32. For the purpose of this report a 'cluster' is defined as "a junction or a stretch of road (minimum length of 100 metres), which over a three year period has six or more slight accidents or three or more fatal / serious accidents".

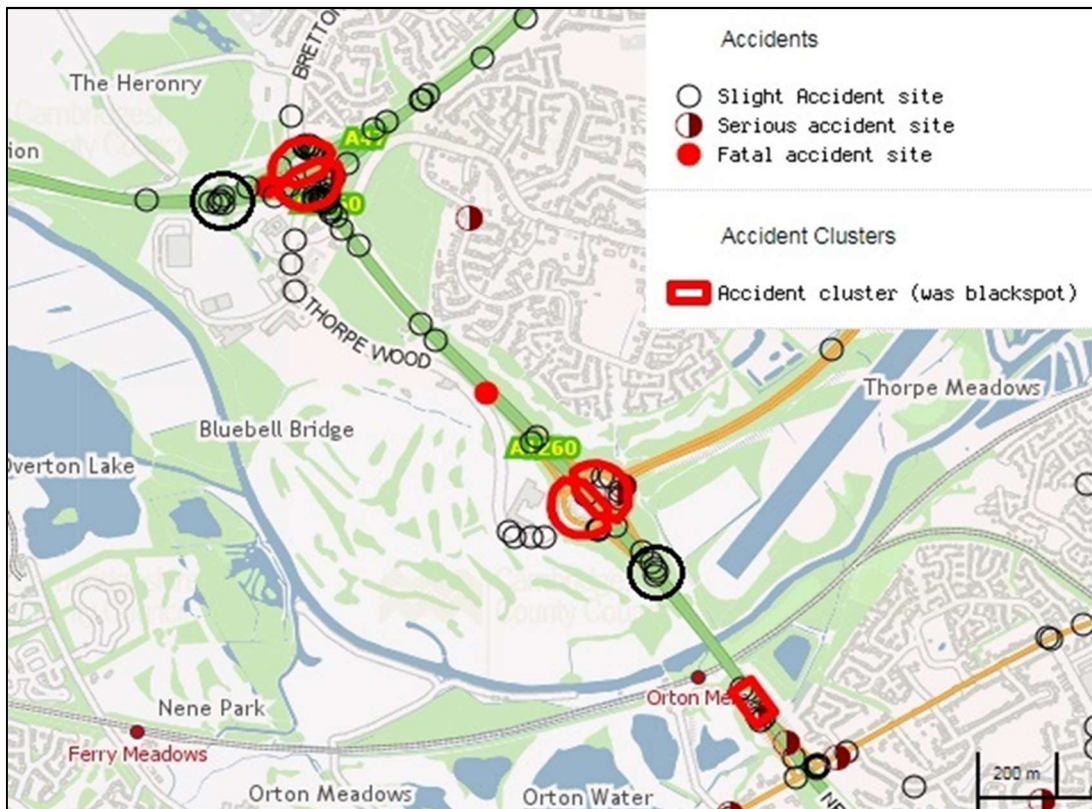


Figure 2.6: Map showing accident locations between 2012 and 2017

Table 2.2 shows that high proportion of accidents were classified as 'slight', this would indicate a high number of rear end shunts occurring on the approaches to the Junction. The accident data for A1260 Nene Parkway shows a high number of rear end shunts on its approach to the junction. This type of accident could reflect the driving nature of the circulatory, with motorists on Nene Parkway having limited gap availability at times to join the circulatory. Accidents on this approach are predominantly shown to occur between 16:30 and 18:00.

Table 2.2 : Accident Severity by Location and Year

	Junction 15			Junction 33			Junction 32		
	Slight	Seriou s	Fatal	Slight	Serious	Fatal	Slight	Serious	Fatal
2012	5			5			1		
2013	9	1	1	1	1		1		
2014	10			2	1				
2015	9			3			1		
2016	12			2			2		
2017				1			1	1	
Total	45	1	1	14	2	0	6	1	0

Poor Pedestrian Facilities and Connectivity

Pedestrian and cycle facilities at Junction 15 are primarily situated in the northwest corner or to the west of the Junction, with pathways, footbridges and an underpass connecting the residential area of Bretton to Thorpe Wood and Longthorpe via Thorpe Road.

Figure 2.7 beneath shows the location of these facilities.

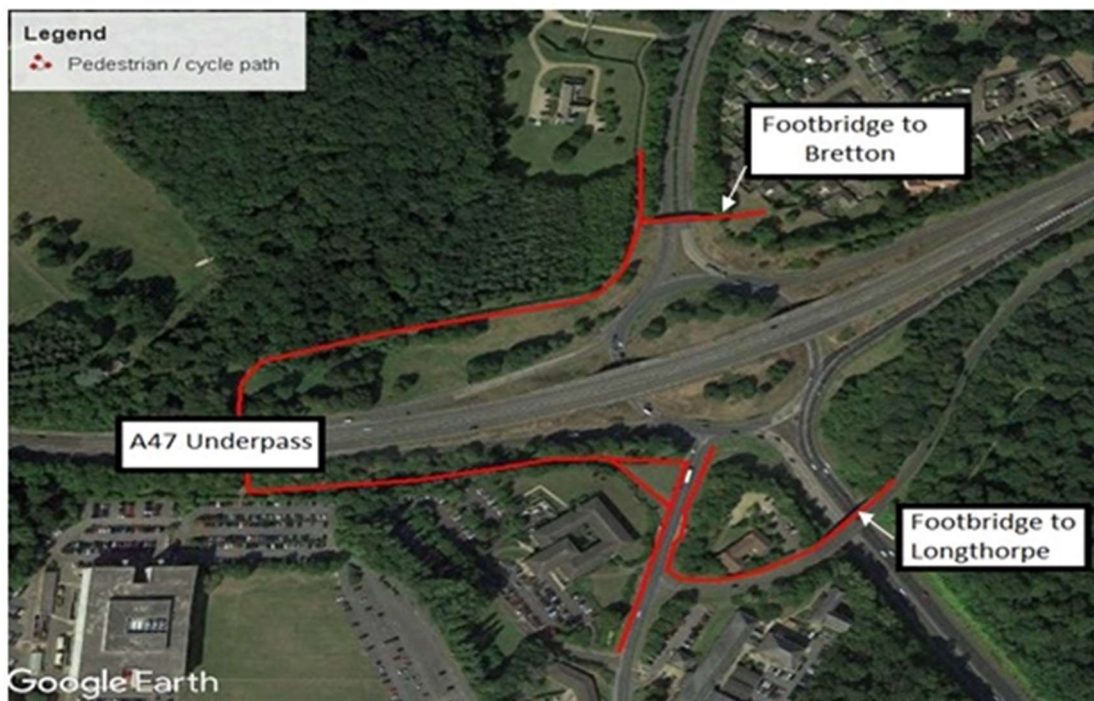


Figure 2.7: Location of Walking and Cycling Infrastructure

A non-motorised user audit has been conducted around the area highlighted in Figure 2.7 to review the quality of the walking and cycling facilities present at the junction, and to identify any improvements that could be made alongside construction of a scheme at Junction 15. During the audit, the following points were considered:

- Quality of the pedestrian / cycle footpaths
- Location of crossing points (Thorpe Wood only), and the ease of crossing
- Extent of street lighting
- Perceived safety of the underpass.

Appendix B highlights the key areas whereby pedestrian and cycle facilities were noted to be of high quality or in need of improvement.

In response to the findings of the NMU audit, the preferred scheme design includes the following improvements to the walking and cycling network in the vicinity of Junction 15:

- Provision of a zebra crossing across Thorpe Wood, close to the bus stops
- A new footpath linking the existing bus stops of the off-road walking and cycling route between Thorpe Wood Business Park and Bretton
- Reconstruction of the footpath on Thorpe Road, close to its junction with Thorpe Wood.

2.5 Impact of Not Changing Junction 15

The impact of not progressing this scheme would be:

- Worsening of congestion, delay and journey times
- Likelihood of accidents will rise
- Attractiveness of Thorpe Wood Business Park (and Peterborough) will decrease
- Attractiveness of Peterborough as a place to live, work and travel will decrease.

Congestion, Delay and Poor Journey Times

The existing issues of congestion, delay and poor journey times will continue to worsen, impacting the operational performance of Junction 15 and the wider area of Nene Parkway and A605 Oundle Road. Table 2.3 beneath compares the delay and total travel time through the junction in 2017 (Base scenario) and in 2026 (Do Minimum scenario).

Table 2.3 shows that operation of Junction 15 will deteriorate if nothing is implemented.

Table 2.3: Comparison of 2017 Base Model and 2026 Do-Nothing Model (seconds)

Junction	Approach	Exit	Delay Time				Travel Time				
			2017 AM	2026 AM	2017 PM	2026 PM	2017 AM	2026 AM	2017 PM	2026 PM	
Junction 15	Bretton Way	A47 East	17.40	49.07	21.92	26.79	45.57	77.21	50.89	55.82	
		A1260 Nene Parkway	28.38	182.59	33.88	57.95	59.63	213.70	65.39	89.38	
		Thorpe Wood	22.08	43.81	27.28	28.49	73.61	91.02	77.86	79.04	
		A47 West	21.88	47.47	31.17	32.21	65.01	90.66	75.09	76.03	
		Bretton Way	-	-	-	-	-	-	-	-	
		Total	89.74	322.94	114.25	145.44	243.82	472.60	269.25	300.26	
	A47 East	A1260 Nene Parkway	3.12	12.99	4.96	7.11	25.25	35.78	25.91	28.84	
		Thorpe Wood	18.13	27.06	12.44	16.36	52.26	61.33	48.26	52.21	
		A47 West	-	-	-	-	-	-	-	-	
		Bretton Way	40.62	55.19	29.62	34.00	96.26	110.59	86.25	90.51	
		A47 East	-	-	-	-	-	-	-	-	
		Total	61.87	95.23	47.03	57.47	173.78	207.70	160.42	171.56	
	A1260 Nene Parkway	Thorpe Wood	23.17	156.31	122.82	267.67	59.29	192.26	158.69	303.76	
		A47 West	27.40	172.94	130.11	295.94	67.11	213.32	168.26	334.00	
		Bretton Way	47.24	211.03	149.15	327.51	106.32	270.87	207.95	386.31	
		A47 East	42.07	172.96	115.80	287.51	93.41	224.60	166.79	338.57	
		A1260 Nene Parkway	-	208.45	137.30	-	-	264.47	187.20	-	
		Total	139.88	921.68	655.19	1178.63	326.13	1165.53	888.87	1362.63	
	Thorpe Wood	A47 West	15.04	35.35	120.83	277.47	43.01	63.76	148.53	304.84	
		Bretton Way	38.75	70.73	142.82	290.92	86.48	118.91	190.56	338.00	
		A47 East	38.71	63.71	135.91	281.30	78.35	104.29	175.97	321.03	
		A1260 Nene Parkway	46.37	61.79	139.03	307.28	90.51	106.50	182.23	350.51	
		Thorpe Wood	-	-	-	-	-	-	-	-	
		Total	138.87	231.58	538.59	1156.97	298.34	393.46	697.29	1314.37	
	A47 West	Bretton Way	15.59	38.04	23.49	22.03	54.86	77.46	63.41	61.75	
		A47 East	-	-	-	-	-	-	-	-	
		A1260 Nene Parkway	30.21	79.31	30.68	30.29	65.54	114.55	66.14	65.64	
		Thorpe Wood	29.37	82.26	28.27	31.49	74.23	126.91	72.95	75.35	
		A47 West	-	-	34.05	35.69	-	-	90.31	91.96	
		Total	75.17	199.60	116.48	119.51	194.63	318.92	292.81	294.70	
	Junction Total			505.54	1771.03	1471.53	2658.03	1236.70	2558.19	2308.64	3443.52

The total delay time for the Junction in the 2017 AM peak is 505 seconds and the PM peak is 1,471 seconds, in 2026 this rises to 1,771 seconds and 2,658 seconds respectively.

There would also be increased queuing delay on the A47 eastbound off-slip particularly in the AM peak period. In 2017 the total delay in the AM peak is 61 seconds, however in 2026 this is expected to increase to 95 seconds. This increased delay may result in vehicles queuing back on to the carriageway which poses a significant safety risk and jeopardises HE's aspirations to improve the A47 Trunk Road.

Bretton Way is also expected to suffer from increased delays in the AM peak period, this is assumed to be due to the increased number of vehicles turning right on to the A47 eastbound from A1260 Nene Parkway. In 2017 AM peak, the total delay is 89, but has increased to 322 in the 2026 AM Peak.

Table 2.3 shows a significant increase in delays on the A1260 Nene Parkway approach to Junction 15. In 2017, the total delay in the AM peak period is 139 seconds and in the PM peak 655 seconds. In 2026, this rises to 921 seconds and 1,178 seconds respectively.

Likelihood Accidents will Increase

It is likely that accidents will increase at Junction 15 in line with traffic growth if nothing is done, particularly accidents such as rear end shunts. As shown above, the forecast increase in delay and travel time is expected to rise which will entail more stopping and starting on approach to the junction.

Attractiveness of Thorpe Wood (and Peterborough) as a place to work will decrease

There are two access points for Thorpe Wood Business Park, one is via Junction 33 and the other is via Junction 15. As traffic and queues increase the area will become gridlocked, particularly in peak times, due to the operational breakdown of Junction 15 and Junction 33. This will increase the likelihood of businesses and employees relocating elsewhere (and possibly beyond Peterborough).

Table 2.3 shows that the increase in delay time at Thorpe Wood in the PM peak is forecast to rise significantly from 538 seconds in 2017, to 1,156 seconds in 2026.

This will also have a detrimental impact on the Council's objective for Peterborough to be an attractive place to live and work as residents and employees spend longer stuck in congestion when trying to access employment opportunities.

2.6 Internal Drivers for Change

Internal drivers for change are the factors that are driving the need for change, and come from the scheme promoter, such as aspirations for growth, or to increase network resilience.

The internal drivers for improvements at Junction 15 come from local growth aspirations, and the structured framework of support provided by the CPCA to enable this growth to be realised.

Local Growth Aspirations

Peterborough is forecast to experience significant employment and population growth over the next few decades, reflecting a continuation of past trends.

Peterborough is one of the fastest growing cities in England and plans to deliver a further 21,315 new homes and 17,600 new jobs by 2036 through the Local Plan (July 2019). This level of growth will in turn further strengthen the city's economy, contribute to regional growth, and increase the demand for travel on the local network.

Peterborough strives to become a 'destination of choice', to be continually recognised as a regional centre and economic partner with Cambridge. With the attractiveness of the city set to increase as a place to live, work and travel, this in turn creates pressure in relation to housing and employment growth, which in turn increases the strain on the transport infrastructure. Improving the transport infrastructure to enable Peterborough's strong history of growth to continue is the main internal driver for change at Junction 15.

It is acknowledged that if no changes are made to existing congestion and journey time issues on major routes across the city, then growth aspirations will be compromised. The Local Transport Plan identifies infrastructure requirements that are needed to address existing capacity constraints on the network and those that are required to cater for the travel demand arising from the growth ambitions of the city. Junction 15 Improvements is identified as a key scheme.

Combined Authority Support

The CPCA has identified a number of strategic projects which it believes will provide transformational benefits for the area. This feasibility study for Junction 15 Improvements is one of the studies shortlisted as a priority, beginning in the financial year 2017 / 2018.

The CPCA recognises that the development of a wider, multi-year pipeline of transport schemes can also contribute towards its objectives. The benefits of such a pipeline include:

- The provision of a steady flow of transport improvements over the short, medium and long term including potential strategic projects of the future
- Greater opportunity to consider local issues and spread investment around the Combined Authority area
- Early investment in the development of schemes places the Combined Authority in a strong position to bid for and secure additional funding as alternative sources become available.

In order to facilitate the pipeline of work, the process includes initially exploring the feasibility of schemes, and then developing business cases. These are essential steps in defining an improvement and securing funding for its realisation.

In October 2017 the CPCA methodology for prioritising investment was based on the criteria shown in Table 2.4 below.

Table 2.4: Combined Authority Criteria

Case	Criteria
Strategic	<ul style="list-style-type: none"> • Reduce congestion • Unlock housing and jobs
Economic	<ul style="list-style-type: none"> • Scale of impact • Value for money
Financial	<ul style="list-style-type: none"> • Other funding sources / contributors
Management	<ul style="list-style-type: none"> • Delivery certainty • Project risks • Stakeholder support

Junction 15 was prioritised for investment by the CPCA, and the CPCA’s investment strategy is another internal driver for change, and an enabler for a scheme to be developed at this location.

2.7 External Drivers for Change

External drivers for change come from outside of the scheme promoter’s organisation, and include factors such as public opinion, legislative changes or as a response to other events.

There are no direct external drivers for change behind the Junction 15 improvements, however there are several other initiatives relating to the A47 trunk road that should be considered during scheme development. These are discussed beneath.

The A47 Alliance

The A47 Alliance comprises local authorities, MPs, business groups and other stakeholders along the A47 trunk road in East Anglia. The Alliance’s primary objective is the dualling of the entire 115 mile stretch of the A47 between Peterborough and Lowestoft by 2030, including grade separated junctions where appropriate. This goal is spearheaded by the Alliance’s ‘Just Dual it’ campaign.

Junction 15 is already a grade separated junction, and is located along a section of the A47 that is already dualled, and so the A47 Alliance are not directly an external driver for change at this particular location. However, should the Alliance be successful in their campaign, then traffic demand along the A47 corridor is likely to increase, which would put further pressure on Junction 15.

A47 Wansford to Sutton Dualling

Approximately 3.5 miles to the west of Junction 15, the section of the A47 between Wansford and Sutton is currently single carriageway. As part of Highway England’s Road Investment Strategy

(RIS) this section of the trunk road has been identified for dualling within the next couple of years (construction expected in 2022). This scheme features within the A47 Alliance's campaigns.

As with improvements along other sections of the A47, this scheme may alter travel demand into (or through) Peterborough via the A47, and would potentially provide an alternative to vehicles currently travelling via the A1 and A1139 further to the south. An increase in traffic at Junction 15 as a result of this improvement would be another indirect driver for change.

2.8 Scheme Objectives

A transport scheme can have both primary and secondary objectives. The primary objectives are the fundamental outputs which must be achieved, whereas secondary objectives are other outputs that may result from the scheme, but are not necessary to the success of the scheme. The secondary objectives tend to be delivered as a consequence of delivering the primary objectives, as a causal chain effect.

The primary objectives therefore represent the transport outcomes required by the scheme.

The primary and secondary objectives for a Junction 15 improvement scheme are listed beneath. These objectives build upon CPCA objectives outlined previously within this chapter and include objectives identified by PCC.

Primary objectives include:

- **Tackle congestion and improve journey time reliability:** Tackle congestion and address journey time reliability on the primary approaches to the junction (A47 Soke Parkway and A1260 Nene Parkway approaches)
- **Support Peterborough's Growth Agenda and encourage homes and jobs:** Ensure that the planned employment and housing growth across Peterborough is promoted whilst providing for future demand.
- **Create wider economic benefits:** Provide conditions that encourage inward investment in higher value employment sectors across Peterborough, and utilise available employment space.

Secondary objectives include:

- **Positively impact traffic conditions on the wider network:** Positively impact the performance of local routes impacted by the traffic and congestion in and around Junction 15, and specifically on the A605 Oundle Road approach to Junction 32 of the A1260 Nene Parkway.
- **Improve Road Safety:** Reduce personal injury accidents and improve personal security amongst all travellers around the junction
- **Mitigate the impact of Air Quality on the local environment:** Maintain or improve air quality within the designated study area, as a result of minimising stationary / queuing traffic.

Any schemes considered for Junction 15 need to satisfy all of the primary objectives, and as many of the secondary objectives as possible.

The scheme objectives were compared and aligned to the CPCA objectives and the Council's strategic priorities (also shared by the Council's Core Strategy, Local Plan and the CPCA Local Transport Plan 4), and is illustrated in Table 2.5 below.

2.9 Measures of Success

Table 2.5 beneath sets out the measures for success against which any potential improvements should be monitored. The primary objectives are highlighted in white and the secondary objectives are highlighted in blue.

Table 2.5: Study Objectives and Measures of Success

Objective	Measure of Success
Tackle congestion and improve journey time reliability	Reduction in delay and journey times through Junction 15
Support the growth agenda and encourage the development of homes and jobs, through increasing capacity on the road network in order to cater for existing and future demand	Change in the number of journeys passing through the junction
Wider economic benefits. Increase the attractiveness of Thorpe Wood as a location to businesses by improving traffic conditions at Junction 15	Business perceptions of traffic conditions post scheme
Positively impact traffic conditions on the wider network	Reduction in delay and journey times along Oundle Road towards Junction 32 of the A1260 Nene Parkway
Reduce personal injury accidents and improve personal security amongst all travellers around the junction	Reduction in the number of reported accidents proportionate to the number of vehicles passing through the junction
Mitigate the impact of Air Quality on the local environment	No reduction in reported air quality as a result of the scheme

2.10 Constraints

The following constraints for delivery of a scheme at Junction 15 have been identified:

- **Funding:** the cost of the scheme will need to compete with other transport infrastructure funding priorities which may exceed the CPCA's core transport investment budget allocation
- **Environmental:** Land to the east of Nene Parkway is protected, supporting ancient woodland and rare species
- **Topographical:** There are significant level differences around Junction 15, which is approximately 10m – 15m beneath the level of the surrounding ground
- **Funding / Budget:** Improvements will need to be achievable within budgets available but options should not be constrained by current funding because of the emergence of the MRN and other possibilities in the future
- **Structural / Highway Boundary:** Improvements will need to be achievable within the land available. The site is further constrained by a number of existing bridges
- **Non acceptance from the public or stakeholders:** The scheme should not be considered controversial, and should be capable of gaining support during stakeholder and public consultation.

The preliminary design has taken account of these constraints.

2.11 Interdependencies

Beyond typical highway scheme risks and the constraints listed above, there are not considered to be any internal or external factors upon which the successful delivery of the scheme is dependent.

The scheme is self-contained, and does not require the completion of any other highway works to progress. There is considered to be sufficient land available, and Highways England (HE) have been consulted and are supportive of an improvement scheme at this junction.

2.12 Stakeholders

The key stakeholders are considered to be:

- Highways England (will be regularly consulted throughout the design and approvals process)
- Cambridgeshire Constabulary (based in Thorpe Wood)
- Cambridgeshire Fire and Rescue Service
- Ambulance Service
- Stagecoach
- Woodland Trust
- Local businesses based in Thorpe Wood
- Peterborough City Councillors for West Ward.

Stakeholder Consultation

Stakeholder consultation will be undertaken by the Project Team following approval of the Outline Business Case, and before work commences on the Detailed Design. All key Stakeholders will be consulted via email for comments on the preferred option prior to completion of Detailed Design.

Public Consultation

Public consultation on the concept of a scheme at this location has already been undertaken as part of the CPCA Local Transport Plan⁶ that was adopted in January 2020.

An online consultation exercise on the final scheme will be undertaken prior to completion of the Detailed Design, and the feedback from this consultation will be included within the design and Full Business Case. No residents are directly affected by this scheme.

⁶ <https://cambridgeshirepeterborough-ca.gov.uk/assets/Transport/Draft-LTP.pdf>

2.13 Options

This section discusses the process followed for developing options and shortlisting those against the scheme objectives using the DfT's Early Assessment and Sifting Tool (EAST) assessment. This section also explains the technical work undertaken to assess the shortlisted options and identify a preferred option. Further information on this is included within the Junction 15 Option Assessment Report (OAR), which was submitted along with the Strategic Outline Business Case in October 2019.

An option development workshop was held on the 19th December 2017 and attended by representatives from various disciplines within PHS and Highways England (HE). The workshop reviewed the existing conditions and future issues at Junction 15, explored its relationship with the surrounding road network and discussed the various constraints at the site. The purpose of the workshop was to develop a long list of potential improvement options to be considered by this study.

A total of nineteen options were considered in the workshop, with potential schemes ranging widely in estimated cost and level of impact on the network. These nineteen options formed the Long List which is shown Table 2.6 beneath.

Table 2.6: Long List of Options for Junction 15

A1260 Nene Parkway
Widen northbound carriageway to 3 lanes from Thorpe Bridge to Junction 15
Widen northbound carriageway to 3 lanes from Junction 33 to Junction 15
Widen Southbound carriageway to 3 lanes from Junction 15 to Junction 33
Create a hamburger style arrangement between A1260 Nene Parkway Northbound and A47 Eastbound
Create a tunnel from A1260 Nene Parkway Northbound to A47 eastbound
Signalise Nene Parkway approach and remove signals on west side of circulatory
Create a left dedicated lane from A1260 Nene Parkway northbound to the A47 westbound, additional 3rd lane on this arm required as well as the circulatory
Thorpe Wood
Complete closure of entrance/exit
Inbound traffic only
Outbound traffic only
A47 Eastbound
Widen off slip to 3 lanes and circulatory to 3 lanes
Install a Type E/F merge on to A47 eastbound slip
Grade separate A47 eastbound flow to A1260 Nene Parkway southbound
Create new A47 eastbound off slip using old A47 alignment
A47 Westbound
Remove left dedicated lane from A47 Westbound to A1260 Nene Parkway and signalise A47 westbound off slip
Increase the dedicate left turn lane on the A47 westbound to two lanes, as well as creating a Type E/F merge on A1260 Nene Parkway southbound to Junction 33
Widen off slips to 3 lanes and circulatory to 3 lanes
Circulatory Carriageway
Create a 3-lane circulatory at Junction 15 only
Improve lane markings on the roundabout circulatory and reduce circulatory speeds

EAST Assessment

The EAST assessment was used to assess the Long List of options against the scheme objectives identified in the Strategic Case, and to refine this to a Short List of options that were taken forward for technical assessment as described within the OAR.

The options were scored against the following CPCA and PCC objectives using the EAST framework. Scores were based on the discussion and collective opinion of the workshop delegates. The objectives against which the options were scored are shown in Table 2.7 beneath.

Table 2.7: Scheme Objectives

Strategic Objectives
Ability to reduce congestion
Ability to reduce journey times
Ability to improve air quality and reduce emissions
Ability to support the local growth agenda, including housing and employment growth
Economic Objectives
Affordability (Value for Money)
Scale of impact on local environment
Management/Deliverability Objectives
Project risk
Stakeholder support and public acceptability

Shortlisting Summary

A summary of the EAST assessment is shown in Table 2.8 on the following page, along with the options that were shortlisted for technical assessment.

Note that Options 1 and 3a / 3b both scored negatively in the EAST assessment but were progressed for technical assessment as these are options that had been previously considered by PCC but never assessed. The workshop unanimously agreed that it was necessary to understand how these options performed to conduct a fully informed consultation exercise.

Table 2.8: Option Shortlisting Summary

Option	Option Description	EAST Score	EAST Comments	Additional Comments (where applicable)	Shortlisted
1	The removal of the left dedicated lane from A47 westbound to A1260 Nene Parkway southbound, and signalisation of the A47 westbound off slip;	-4	Low costing / risk option predicted to slightly improve performance of Nene Parkway and Thorpe Wood. Stakeholder and public support is highly likely.		✓
2	The widening of the A47 off slips (both east and westbound) and the circulatory of Junction 15 to 3 lanes;	7	Widening the A47 off slips is predicted to add capacity to the junction, likely to reduce congestion and improve journey times.		✓
3a	Complete Closure of Thorpe Wood;	-2	Low costing option which would improve Thorpe Wood, however have marginal improvement on the wider study area.	This option will be taken forward and assessed based on the scores of the remaining two variations of option 3.	✓
3b	Thorpe Wood access to become inbound only from the roundabout;	-4	Low costing option likely to improve performance of Nene Parkway, however stakeholder support is unlikely.		✓
3c	Thorpe Wood to become outbound only at the roundabout;	9	Low costing option likely to improve Nene Parkway, and remove conflicts between movements on the roundabout.		✓
4a	Widen Nene Parkway northbound to 3 lanes up to Thorpe Road Bridge;	12	Option likely to significantly improve Nene Parkway, however costing and viability is dependent on bridge structure.	Structural information provided confirms that three lanes can be accommodated along Nene Parkway.	✓
4b	Widen Nene Parkway northbound to 3 lanes to Junction 33;	6	Option likely to significantly improve Nene Parkway, however costing and viability is dependent on bridge structures.	See above.	✓
4c	Widen Nene parkway southbound to 3 lanes, between Junction 15 and Junction 33;	8	Option likely to significantly improve Nene Parkway, remaining approaches at Junction 15 and wider study area. Structures may alter costing and viability of this option.	See above.	✓
5	Create a Hamburger roundabout design between A1260 Nene parkway northbound and the A47 eastbound;	-8	High costing option which would only benefit Nene Parkway. Additional conflicts would be introduced to the junction.	Structural information discussed suggests support for the A47 is a constraint for this option.	
6	To install a Type E/F merge onto A47 eastbound on slip;	5	Low costing option which would increase the safety on the slip road.		✓
7	To create a 3 lane circulatory at Junction 15 only;	6	Low costing option that would increase capacity on the circulatory and is predicted to offer benefit on all approaches.	Structural information provided suggests three lanes on the circulatory can be accommodated.	✓

Option	Option Description	EAST Score	EAST Comments	Additional Comments (where applicable)	Shortlisted
8	To grade separate A47 eastbound flow onto A1260 Nene Parkway southbound	-1	High costing option which only benefits two approaches. Stakeholder and public support is unlikely.	Structural information highlights the size of Junction cannot accommodate the required bridge and ramp structures required within this option.	
9	To signalise A1260 Nene Parkway approach, and remove existing signals on the western side of circulatory;	1	Low costing option which would flush more vehicles out of Nene Parkway at a time, however moves signal congestion to this approach and eastern side of circulatory.		✓
10	To create a tunnel beneath Junction 15, from Nene Parkway northbound to the A47 eastbound;	-4	High costing option which would cater for the dominant movement from Nene Parkway, however requires significant junction re-modelling and structural changes.	Structural information highlights the size of Junction 15 is a constraint for this option. The creation of a tunnel provides multiple issues which would significantly increase cost and disruption to the network, undoing any benefits discussed within the workshop.	
11	To increase the dedicate left turn lane on the A47 westbound to two lanes, as well as creating a Type E/F merge on A1260 Nene Parkway southbound to Junction 33;	3	Low costing option which would marginally benefit junction 15's performance.		✓
12	To improve lane markings on the roundabout circulatory and reduce circulatory speeds;	8	The highest scoring option devised. Option will be included into any scheme implemented.		
13	To create a new A47 eastbound off-slip using the old A47 alignment	-6	High costing option which would cater for the dominant movement from A47 eastbound, however requires significant junction re-modelling and structural changes.	Structural information highlights topography and the condition of the limiting space available from the old A47 Alignment would be issues for this option.	
14	To create a left dedicated lane from A1260 Nene Parkway northbound to the A47 westbound, additional 3 rd lane on this arm required as well as the and circulatory required. Closure of Thorpe Wood.	6	Low costing option which would benefit Nene Parkway, however improvement on remaining approaches is minimal.		✓

Technical Assessment

The shortlisted options were assessed using a purposely built AIMSUN microsimulation model. The AIMSUN traffic model has been constructed to represent the morning (AM) Peak hour from 08:00 to 09:00, and an evening (PM) peak hour from 17:00 to 18:00, in order to represent the most congested time periods.

The base model was built using current traffic data from 2017 and validated well against traffic flow and journey time data.

To understand traffic conditions in future years, growth factors were derived from the DfT's Trip End Model Presentation Program (TEMPro). Future year models were built using these growth factors for 2021, 2026 and 2031 scenarios.

The results from the modelling show that the worst delays and longest travel time in both the AM and PM peak period for the forecast years occur along the A1260 Nene Parkway approach to Junction 15. This is consistent with the existing issues observed on site and reported within the Strategic Case.

The modelling then assessed each of the shortlisted options to determine which were the best performing and most appropriate to select as the Preferred Option.

Full details of the modelling can be found in the OAR and the LMVR.

Preferred Option

Option 4b is the Preferred Option, which comprises the widening of the A1260 Nene Parkway northbound approach to three lanes from Junction 33, and the associated widening of the Junction 15 circulatory between A1260 Nene Parkway and Bretton Way.

The northern section of the scheme is shown in Figure 2.8 beneath, and a full scheme drawing is provided in Appendix C.

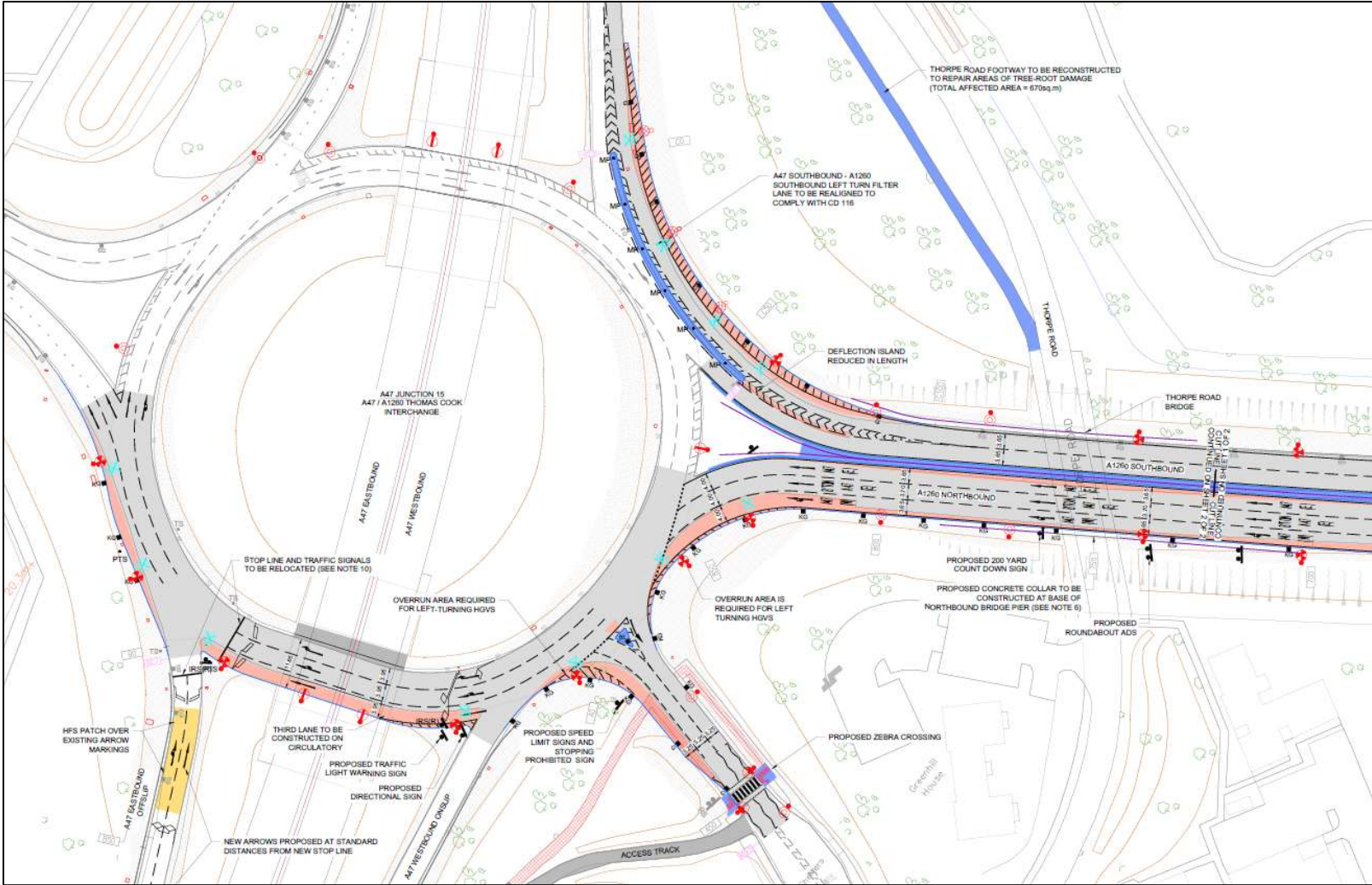


Figure 2.8: Preliminary Design Detail of the Preferred Option (4b)

In both 2021 and 2026 AM and PM Peak periods, Option 4b consistently delivers improvements to the delay and travel time experienced at the roundabout, particularly on the A1260 Nene Parkway approach and the Thorpe Wood approach to the junction. It also has a positive impact on the overall delay travel time experienced at the junction.

In the 2021 PM peak, it has a significant impact on the A1260 Nene Parkway approach, reducing delay from 1,259 seconds in the 2021 Do Minimum to 104 seconds.

In light of the results from the modelling, this option was taken forward for further Economic and Environmental assessment. Initial results from the economic assessment are reported in the OAR, and have since been updated with the most recent costs obtained from the Preliminary design. The updated Economic Assessment is reported within the Economic Case and demonstrates that the scheme offers 'Very High Value for money'.

The Environmental Assessment did not identify any significant concerns, and was used to inform the Preliminary Design. A summary of the Environmental Assessment is presented in the Economic Case and the full reports are available upon request.

2.14 Strategic Case Summary

The Strategic Case has outlined the wider policy context for the proposed scheme, including the policy framework of the CPCA, including the Local Industrial Strategy, CPIER, Growth Ambition Strategy and the Local Transport Plan.

Junction 15 is identified within the Local Transport Plan as a pinchpoint on the Peterborough Parkway network, where improvements are necessary to improve journey time reliability and enable the growth identified with the Peterborough Local Plan.

The existing conditions of Junction were examined and the following issues were identified:

- **Extensive queue lengths on A1260 Nene Parkway (northbound).** Extensive queues occur in both the AM and PM peak periods, however in the PM peak queues can stretch back over a mile.
- **Queuing on all approach in the AM and PM peak periods.** During the AM peak, traffic queues on the A47 eastbound off-slip to the junction, however site observations showed that it was occasionally back to the main line.
- **Conflicts between dominant movements.** Primary conflict between movements is vehicles originating from A1260 Nene Parkway and vehicles on the circulatory heading for Thorpe Wood. Results in limited gap availability for vehicles to join the circulatory.
- **High accident statistic rate particularly with rear end shunts.** Between 2012 and 2017, there were 70 accidents recorded within the study area, of which 65 were classified as 'slight', which indicates a high number of rear-end shunts on the approach to the junction.
- **Poor pedestrian facilities and connectivity.** An NMU audit was undertaken to identify any improvements to the walking and cycling routes close to Junction 15. A number of improvements were identified and these have fed in to the design of the scheme at Junction 15.

If no intervention were to take place at Junction 15, the existing issues of congestion, delay and poor journey times will continue to worsen, impacting the operational performance of Junction 15 and the wider area of A1260 Nene Parkway and A605 Oundle Road. A comparison of the delay through the junction in 2017 (Base Scenario) and in 2026 (Do Minimum Scenario) showed that there was an increase in delay of 1,265 seconds in the AM peak hour and 1,186 seconds in the PM peak hour.

The scheme objectives were developed by considering the existing and future issues at Junction 15, as well as the wider policy objectives.

Primary objectives include:

- **Tackle congestion and improve journey time reliability:** Tackle congestion and address journey time reliability on the primary approaches
- **Support Peterborough's Growth Agenda and encourage homes and jobs:** Ensure that the planned employment and housing growth across Peterborough is promoted whilst providing for future demand.
- **Create wider economic benefits:** Provide conditions that encourage inward investment in higher value employment sectors across Peterborough, and utilise available employment space.

This section has also discussed the constraints for the scheme at Junction 15, and the scheme design has taken these constraints in to account. There are not considered to be any interdependencies beyond the typical highway scheme risks and the scheme is self-contained and not require the completion of any other highway works to progress.

There are a number of stakeholders which will be consulted on the design following approval of the OBC and before work commences on the Detailed Design. Public consultation on the concept of a scheme as this location was undertaken as part of the CPCA Local Transport Plan consultation in Summer 2019. An online public consultation exercise will be undertaken prior to completion of the detailed design.

The option development and assessment process has been reported within this chapter. An option identification workshop was held to identify options, which were then scored using an EAST assessment to shortlist options to take forward for further assessment.

The shortlisted options were assessed using a purpose built Aimsun microsimulation model to determine which were the best performing and most appropriate to select as the Preferred Option.

Option 4b is the Preferred Option and comprises the widening of the A1260 Nene Parkway northbound approach to three lanes from Junction 33, and the associated widening of the Junction 15 circulatory between A1260 Nene Parkway and Bretton Way. It consistently delivered improvements to the delay and travel times experienced at the roundabout.

In light of the results from the modelling, this option was taken forward for further Economic and Environmental assessment.

3. The Economic Case

3.1 Introduction

This section sets out the approach taken to assess the Economic Case for the Junction 15 improvement scheme, and proves that the scheme offers **Very High Value for Money**.

The scheme appraisal focuses on the aspects of scheme performance that are relevant to the nature of the intervention. These impacts are not limited to those directly impacting on the economy or those which can be monetised. The economic, environmental, social and distributional impacts of the proposal are all examined, using qualitative, quantitative and monetised information where appropriate.

3.2 Options Appraised

Details of the option development and assessment process are summarised in the Strategic Case and full details are provided in the OAR.

The technical assessment documented in the OAR identifies Option 4b as the preferred option, and this was progressed to Preliminary Design and costing. The Economic Assessment has been undertaken on Option 4b.

Option 4b provides a third lane on the A1260 Nene Parkway (northbound) between Junction 33 and Junction 15, a three-lane section along the western half the circulatory and extension to the Thorpe Wood flare.

The key scheme components for Option 4b are listed beneath:

- Creation of a third lane (northbound) between Junction 33 and Junction 15 of the A1260 Nene Parkway
- Creation of a three lane circulatory on Junction 15 between the A1260 Nene Parkway approach and the Bretton Way exit
- Replacement of the pedestrian footbridge over the A1260 Nene Parkway (to facilitate the creation of a third northbound lane)
- Extension of the flare on the Thorpe Wood to Junction 15 by approximately 30 metres
- Creation of a zebra crossing over Thorpe Wood close to the existing bus stops
- Reconstruction of the footpath between Thorpe Road Bridge and Longthorpe.

The Preliminary Design for this scheme is provided in Appendix C. Option 4b is referred to as 'the scheme' for the remainder of the document.

3.3 Economic Assessment

Approach to Appraisal

The Economic Case for this scheme is focused on the following aspects:

- Assessing the monetised direct, localised, and economic efficiency benefits of the scheme
- Qualitative appraisal of wider scheme benefits, such as environmental, noise, and enablement of planned development
- Offsetting identified benefits against the scheme costs to provide a Benefit to Cost (BCR) ratio.

Details regarding the benefits and costs are detailed in through the rest of this chapter.

Key Risks, Sensitivities and Uncertainties

The scheme is considered to be low risk in construction terms, especially since the required land is within ownership of PCC. However, sensitivity tests have been undertaken to confirm the robustness of the business case in a lower-growth scenario. As the benefits of the scheme largely relate to reducing delay to existing and future traffic, a growth in future traffic levels beneath that anticipated is considered to be the greatest risk to the scheme. The sensitivity tests, and their impact on the business case, are detailed later in this chapter.

As part of the scheme design and costing process, a Risk Register and a Quantified Risk Assessment (QRA) have been produced and the risk allowance is incorporated into the scheme costs used within the Economic Assessment. Further details on these costs are provided beneath.

The objective of the scheme is to unlock congestion and significantly reduce delay at a key interchange on the parkway system, positively improving the operational performance of other major routes and junctions on the city network, particularly Nene Parkway and Oundle Road. As described in the Peterborough LTTS, these improvements will help facilitate the identified growth aspirations set for the city.

Present Value Costs

A scheme cost estimate has been produced based on the Preliminary Design information. The Base Investment Costs are detailed in Table 3.1 below, and the subsequent steps taken to calculate the Present Value Costs (PVC) are described beneath.

The Economic Assessment has undertaken for a 60 year assessment period (2020 to 2080).

The Base Investment Cost is the capital cost required to construct the scheme in current year (2020) prices, without a risk allowance. This is derived from the scheme cost estimate based on the Preliminary Design produced by Highway and Structures Engineers.

Table 3.1 shows the Base Investment Cost profiled over the next five calendar years, and broken down into Construction, Land, Design and Supervision costs. Note that Construction Cost has been divided into Highways and Structures elements to enable the application of different rates of Optimism Bias within the Economic Assessment.

Table 3.1: Base Investment Cost (2020 Prices)

Calendar Year	Construction Costs (Highways) (£)	Construction Costs (Structures) (£)	Land & Property Costs (£)	Preparation and Supervision Costs (£)	Total Base Investment Cost (£)
2020				595,666	595,666
2021	2,295,787	802,452		359,189	3,457,428
2022					
2023					
2024					
Total	2,295,787	802,452		954,855	4,053,095

The PVC for use in the Economic Assessment has been calculated using the following steps:

- Real Cost increases were calculated based on the Base Investment Cost spend profile. The Base Cost adjustment factor was calculated by dividing the Construction Industry Inflation Rate (5%) by the Annual GDP Factor derived from the TAG Databook for each of the years within the assessment period.
- A Risk allowance of 7.5% (£296,482) was then applied during the year of construction based on the QRA contained within the Risk Register.
- Optimism Bias was then applied based on the recommended level of the QS. The Construction Costs were separated into highway and structures elements and had different levels of Optimism Bias applied to reflect the maturity of the design. An allowance of 20% was applied to highway elements, and 66% was applied to structures costs. The total Optimism Bias applied was £1,294,346.
- Costs were then rebased back to 2010 using factors derived from the TAG Databook GDP Deflator.
- Costs were then discounted to 2010 in line with guidance provided in TAG unit A1.2.
- Finally, costs were converted to 2010 Market Prices using a factor of 1.19.

Table 3.2 beneath shows the costs described above, split into construction costs and maintenance costs.

Maintenance costs have been calculated based on information on maintenance spend for the A1260 Nene Parkway over the last ten years, and are further explained within the Financial Case.

Table 3.2: Economic Case Scheme Cost Estimates

Description of Cost Type	Construction Cost (£)	Maintenance Cost Over 60 Years (£)
Base Investment Cost	4,053,095	1,708,546
Base Cost with Real Cost Increases	4,174,201	4,453,599
Risk Adjusted Base Cost with Real Cost Increases	4,470,683	4,453,599
Risk Adjusted Base Cost with Real Cost Increases and Optimism Bias	5,765,029	4,453,599
Rebased to 2021 Price Year	4,848,234	3,622,589
Discounted to 2010 Prices	3,332,786	958,053
Adjusted to Market Prices	3,543,416	1,140,083

A full profile for these costs is provided within Appendix D.

Present Value Benefits

The transport benefits of the scheme were assessed using an Aimsun microsimulation model (Aimsun Next software Version 8.4).

Validation of the model was undertaken using Manual Classified Turning Counts (MCCs) and Automatic Traffic Counts (ATCs) against modelled demand, and modelled Journey times assessed against TomTom data. Full details relating to the calibration and validation of the model can be found in the Local Model Validation Report (LMVR).

Forecast traffic flows were then produced using information from TEMPro (version 7.2b), following the methodology as set out by the DfT's WebTAG guidance Unit A1-1. Three forecast years of 2021, 2026, and 2031 were produced to reflect the years used within PCC's Local Plan and to remain consistent with other transport scheme assessments within Peterborough. The purpose of modelling these forecast years was to ensure that the preferred scheme is able to perform with additional traffic that can be reasonably expected in the future, and to understand the level of benefit that the scheme could generate within the sixty year assessment period.

Once a forecast model was created, two core network scenarios were developed, these were the Do Minimum (DM) and Do Something (DS) scenarios. The DM scenario represents future growth without highway intervention (without scheme), and the DS scenario includes the scheme within the model network (with scheme) with the same level of future traffic growth.

The difference between the DM and DS scenarios demonstrate the benefits of implementing the scheme. These benefits are measured using:

- Network assignment statistics
- Link flow changes
- Journey times
- Journey routing.

The Model output files are then entered into the Transport User Benefits Appraisal (TUBA, 1.9.13) software to undertake the Economic Assessment and calculate a BCR.

TUBA produces figures for a number of benefits, including Greenhouse Gases, User benefits, and Indirect Taxation. Indirect taxation often provides a negative benefit figure. This is a result of the reduced fuel being purchased due to the improvements, which reduces the money the government receives in taxes.

This identifies the Present Value Benefits (PVB) to be **£54,748,000**. A breakdown of these benefits are shown in Table 3.3 beneath.

Benefit Cost Ratio

The Benefit Cost Ratio (BCR) is the ratio of PVB to PVC. Table 3.3 beneath summarises the BCR for the preferred scheme as calculated using TUBA.

Table 3.3: TUBA BCR Assessment

Value (£'000s) 2010 prices, benefits discounted to 2010	
Benefits	
Greenhouse Gases	368
Consumer Users (commuting)	24,418
Consumer Users (Other)	17,870
Business Users/Providers	12,959
Indirect Taxes	- 867
Present Value of Benefits (PVB)	54,748
Costs	
Broad Transport Budget	5,349
Present Value of Costs (PVC)	5,349
Net Benefit / BCR Impact	
Net Present Value (NPV)	49,399
Benefit/Cost Ratio (BCR)	10.235

The DfT uses the following thresholds to determine the Value for Money statement associated with a BCR:

- Low Value for Money if BCR = 1.0 to 1.5
- Medium Value for Money if BCR = 1.5 to 2.0
- High Value for Money if BCR = 2.0 to 4.0
- Very High Value for Money if BCR > 4.0.

Based on transport user benefits alone, this scheme will provide **Very High Value for Money**.

3.4 Sensitivity Test

Sensitivity testing has been undertaken to determine whether or not the proposed scheme could still achieve value for Money if the expected road traffic growth differs from current predictions. This testing has been undertaken by using figures from TEMPro (version 7.2b), to feed 'low' and 'high' growth scenarios into the model. This is done by changing the increase in trips in the forecast matrices.

The trip matrix totals are displayed in Table 3.4 below, and represented graphically in Figure 3.1 and Figure 3.2 below.

Table 3.4: Number of Trips in Low, Central, and High Growth Scenarios

Total Number of Trips by Scenario			
AM	Low	Central	High
2017	9,376	9,376	9,376
2021	9,472	9,940	10,409
2026	9,744	10,447	11,150
2031	10,041	10,918	11,795
PM	Low	Central	High
2017	9,234	9,234	9,234
2021	9,331	9,792	10,254
2026	9,616	10,309	11,001
2031	9,929	10,793	11,656

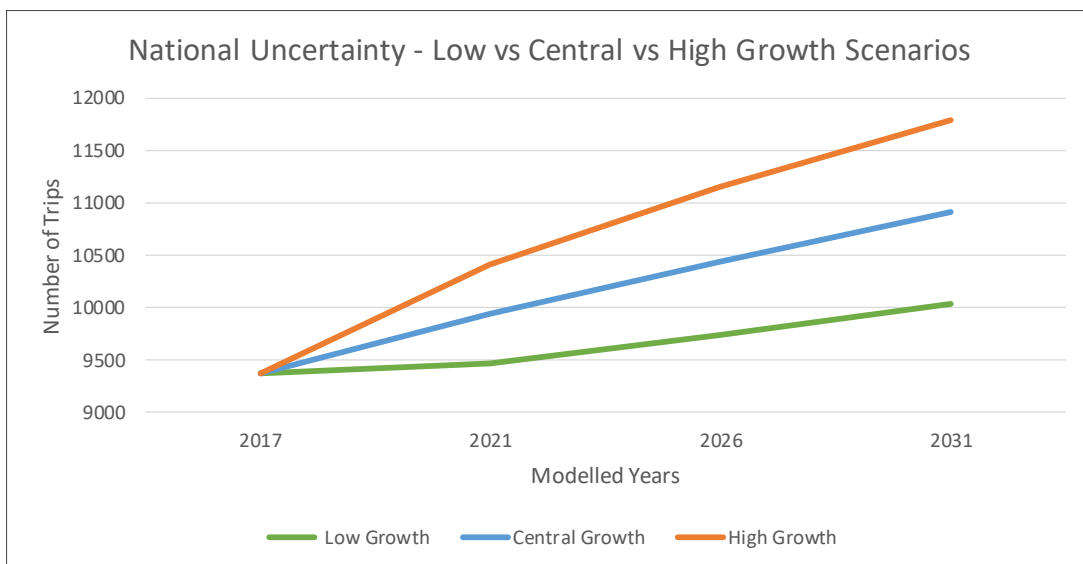


Figure 3.1: AM Peak Hour: Total Number of Trips in Model

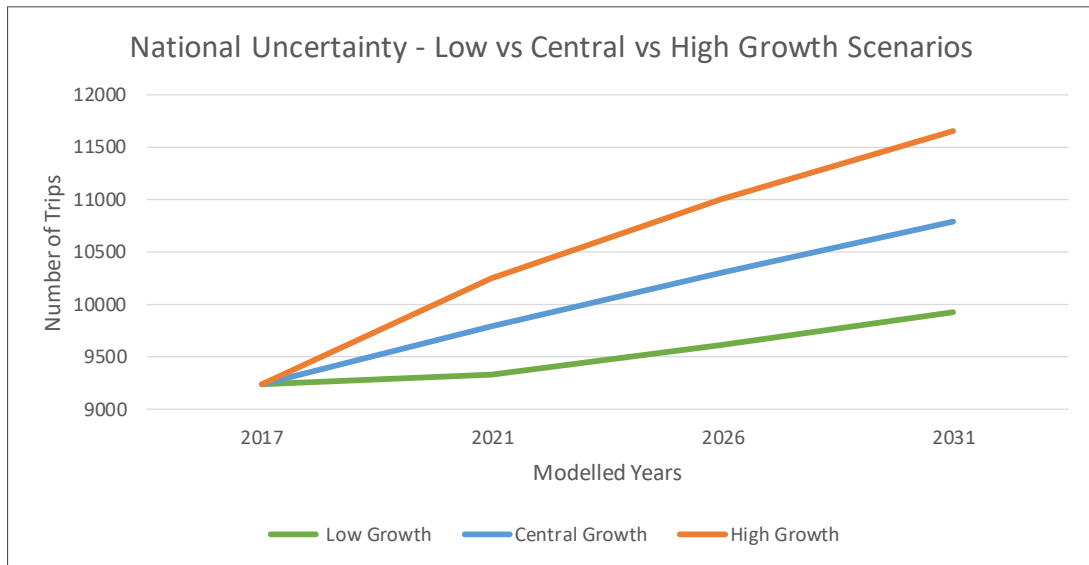


Figure 3.2: PM Peak Hour: Total Number of Trips in Model

Once the low and high growth scenarios had been run and assessed within the modelling, the Economic Assessment was repeated to determine if the scheme would still operate well and offer value for money if lower or higher than anticipated traffic growth occurred.

A summary of the BCR for each of the growth ranges used in the sensitivity test is presented in Table 3.5 below.

Table 3.5: Changes in Benefits under different Growth Scenarios

BCR Component	Low Growth	Central Growth	High Growth
PVC (£)	5,349	5,349	5,349
PVB (£)	40,504	54,748	59,524
NPV (£)	35,155	49,399	54,175
BCR	7.57	10.23	11.13

The results from the sensitivity test show that the scheme would still offer **Very High Value for Money** in both a low and high growth scenario.

3.5 Additional Qualitative Appraisal

Due to the nature of the scheme, the appraisal and Value for Money assessment has focused on transport user benefits.

However, a qualitative analysis has been undertaken for the environmental, social and distributional impacts of the Junction 15 scheme where appropriate. These are summarised beneath, and included within the Appraisal Summary Table (AST) contained within Appendix E.

Note that these qualitative assessments have not been included within an Adjusted BCR, and that the scheme BCR and Value for Money statement are based purely on transport user benefits.

Landscape

The scheme will require the removal of a strip of scrub along the northbound carriageway for the localised embankment regrading works. The areas of remaining vegetation will be retained and therefore the existing enclosed character of the highway would be retained, and not considered to alter the existing landscape. However mitigation planting in the form of replanting is recommended along the widened carriageway.

Heritage

Appraisal of the historic environment baseline has identified that the area has a high archaeological potential, due to the known buried archaeological remains nearby from the prehistoric period onwards. There has been significant development in the area during Peterborough's New Town expansion phase, which may have already partially or completely removed any buried archaeological remains. For example, construction of the A1260 Nene Parkway and the residential and commercial areas nearby will have likely impacted to a depth which could remove buried archaeological remains.

The potential impact which has been identified by the proposed Junction 15 works would be a direct, physical, impact to buried archaeological remains, if present. This potential impact would occur as a result of the new infrastructure (i.e. a new lane and associated works).

No impact to the setting of heritage assets has been identified as a result of the proposed works.

Arboriculture

Seven groups of trees have been recorded at this junction, and predominately comprise ash trees but other species include horse chestnut, lime, blackthorn, all of which provide a soft edge to the carriageway. There is evidence in some locations of coppicing along the toe of the embankment.

Thorpe Wood is a site of Ancient and semi-natural woodland. The woodland has evolved as a result of historic management traditions, natural generation of species, and the influence of human and natural influences.

The proposed scheme will not result in significant changes to the existing environment, for instance lighting levels will generally remain the same as currently experienced. There will be losses to the tree cover, however these would be minimised where possible through the adherence to an arboriculture method statement that would be supervised by an arboriculturalist. Furthermore, it is recommended that any trees that are removed are replaced on completion of the works.

Ecology

The proposed works are not located within a statutory designated site for conservation. Woodston Ponds Local Nature Reserve (LNR) and The Boardwalks LNR is approximately 1.3km NE of the proposed works. Thorpe Wood is also an ancient and semi-natural woodland for which along its fringes provide suitable opportunities for nesting birds.

Noise

The potential noise impacts associated with the highways improvements at Junction 15 were assessed using the WebTAG Guidance (Unit A3.2 Noise Impacts, DfT, August 2019)..

The study area was determined by identifying affected links within the network in accordance with DMRB criteria and incorporated an area of up to 1km around the proposed works areas. Noise levels due to road traffic were calculated at properties within 600m of the principal routes identified as having significant changes in traffic / alignment due to the proposed scheme. This included a total of 553 properties.

The results of the noise assessment for indicate a small improvement in the short term noise levels as a result of the highways improvement works. Although there are areas where the localised changes in road alignment will bring roads slightly closer to noise sensitive properties, this will be mitigated by the improved road surface.

Both long-term assessments (with / without scheme) indicated an increase in noise level. In the 'without scheme' an increase in noise level is not unexpected due to the increase in flow of traffic within the study area (up to 18%). The 'with scheme' showed a similar increase in noise level which is also considered to be largely due to the increase in traffic with the localised changes in road alignment and road surfacing balancing out additional changes in noise level.

The increase in noise level is predicted to be less than 1dB in both the long-term with / without scheme assessments, and therefore no additional noise mitigation is considered necessary as a result of the scheme.

The Noise Assessment Report is provided within Appendix I.

Summary of Benefits and Costs

The PVB has been calculated using an Aimsun model out created for the purpose of this study. The modelled benefits have been calculated (and discounted) over a 60 year assessment period, and deflated back to 2010 prices.

The immediate benefit of a scheme will be less delay and more reliable journey times for vehicles using Junction 15, particularly during peak periods.

The additional capacity delivered by a scheme in this critical strategic location on Peterborough's parkway network will contribute toward the delivery of the housing and employment growth identified within Peterborough's Local Plan, as demonstrated by the Peterborough LTTS (Long Term Transport Strategy).

The scheme costs relate to design and construction costs, as well as ongoing maintenance costs for the additional infrastructure created by the scheme.

The PVB is expected to be **£54,748,000**. The scheme PVC have been identified as **£5,349,000**. The scheme BCR is **10.235**.

Value for Money Statement

The Economic Assessment has shown that the scheme will provide **Very High Value for Money**. Sensitivity testing has demonstrated that this statement is robust.

4. The Financial Case

4.1 Introduction

This section presents the Financial Case for the Junction 15 improvement scheme. It concentrates on the affordability of the proposal and its funding arrangements.

4.2 Scheme Costing

The scheme cost estimates for the Financial Case have been prepared in line with WebTAG guidance set out in TAG Unit A1.2 Scheme Costs (DfT, July 2017). Each of the steps taken to produce the cost estimates are explained beneath. The estimate has been robustly costed based on preliminary design information, and includes a risk allowance based on a Quantified Risk Assessment (QRA).

The scheme cost estimates are presented in Tale 4.1 beneath, and each is explained in further detail beneath.

Table 4.1: Financial Case Scheme Cost Estimates

Description of Cost Type	Cost (£)
Base Investment Cost	4,053,095
Risk Adjusted Base Cost	4,349,577
Risk Adjusted Base Cost with Construction Industry Inflation (Outturn Cost)	4,537,272
Inflated Risk Adjusted Costs incorporating Whole Life Costs (60 year assessment period)	15,079,368

Note that the costs calculated for use within the Economic Assessment are presented in the Economic Case (Chapter 3).

A full 60 year schedule showing how the costs have been calculated is presented in Appendix F.

Base Investment Cost

The Base Investment Cost is the capital cost required to construct the scheme in current year (2020) prices, without a risk allowance or inflation. This is the scheme cost estimate provided by the Quantity Surveyor and based on the Preliminary Design produced by Highway and Structural Engineers.

Table 4.2 shows the Base Investment Cost broken down into Construction, Land, Design and Supervision costs (note that there are no 'Other' costs). The Construction Cost has been divided into Highways and Structures elements to enable the application of different rates of Optimism Bias within the Economic Assessment.

Table 4.2: Base Investment Cost (2020 Prices)

Calendar Year	Construction Costs (Highways) (£)	Construction Costs (Structures) (£)	Land & Property Costs (£)	Preparation and Supervision Costs (£)	Total Base Investment Cost (£)
2020				595,666	595,666
2021	2,295,787	802,452		359,189	3,457,428
2022					
2023					
2024					
Total	2,295,787	802,452		954,855	4,053,095

The scheme Base Investment Cost in 2020 prices is £4,053,095, this includes £3,098,239 of Construction related costs and £954,855 of Detailed Design and Supervision costs (£595,666 Design / £359,189 Supervision). The Detailed Design costs include all necessary surveys and an allowance to develop a Full Business Case upon completion of the Detailed Design.

The cost profile is based upon the Construction Programme shown in Appendix G and assumes that Detailed Design work will be undertaken between July and December 2020, with Construction and Supervision beginning in April 2021 and lasting for eight months.

There are no land or property costs associated with this scheme, as all the required land is within PCC's ownership.

Risk Adjusted Base Cost

The Risk Adjusted Base Cost includes a component for risk based upon the QRA. The risk allowance made for this scheme is £296,408, which represents 7.5% of the total scheme cost. The Risk Register demonstrates how this has been calculated, and is shown in Appendix H. Table 4.3 beneath shows the inclusion of the QRA within the scheme costs.

Table 4.3: Risk Adjusted Base Costs (2020 Prices)

Calendar Year	Construction Costs (Highways) (£)	Construction Costs (Structures) (£)	Preparation and Supervision Costs (£)	Risk Allowance (£)	Risk Adjusted Base Cost (£)
2020			595,666		595,666
2021	2,295,787	802,452	359,189	296,482	3,753,910
2022					
2023					
2024					
Total	2,295,787	802,452	954,855	296,482	4,349,577

The addition of the risk allowance takes the Risk Adjusted Base Cost to £4,349,577.

Inflated Risk Adjusted Cost (Outturn Cost)

The Inflated Risk Adjusted Cost, or Outturn Cost, is the Risk Adjusted Base Cost with construction industry inflation applied. An inflation rate of 5% per annum has been used based on the Office for National Statistics (ONS) Construction Output Price Indices⁷ (2019 / Q4) for 'New Work / Infrastructure'.

Inflation has been applied in line with the Construction Programme (Appendix G), and the cost of this is presented beneath in Table 4.4.

Table 4.4: Inflated Risk Adjusted Cost (2020 Prices)

Calendar Year	Risk Adjusted Base Cost (£)	Cost of Inflation (£)	Total with Inflation (£)
2020	595,666		595,666
2021	3,753,910	187,696	3,941,606
2022			
2023			
2024			
Total	4,349,577	187,696	4,537,272

The cost of inflation is £187,696, all of which is accrued during 2021 when Construction and Supervision costs (with QRA) are scheduled to occur. This brings the Scheme Outturn Cost to £4,537,272.

The Outturn Cost represents the amount required by PCC to deliver the scheme.

⁷ <https://www.ons.gov.uk/businessindustryandtrade/constructionindustry/datasets/interimconstructionoutputpriceindices>

Inflated Risk Adjusted Cost Including Whole Life Costs

Maintenance costs have been calculated for the 60 year assessment period taking account of construction industry inflation.

Maintenance costs have only been included for the new infrastructure associated with the scheme (a new third lane on the A1260 Nene Parkway northbound). All maintenance costs associated with the existing infrastructure will continue to occur separate to the Junction 15 scheme, and so have not been included within the assessment. Note that funding for the maintenance costs is not requested as part of the scheme funding.

The annual maintenance cost used to calculate the Whole Life Cost is £28,478.

Maintenance costs have been calculated using records of all maintenance, repair and capital renewal costs for the A1260 Nene Parkway for the ten year period for 2010 to 2020. Costs relating to repairs following Road Traffic Collisions (RTCs) and correction work to the Vehicle Restraint System (VRS) have been removed from the total maintenance costs. Note that capital renewal costs have not been separated from the routine maintenance costs and profiled separately.

The costs for the ten year period were then used to calculate an average per year. As the costs supplied were for the entire 3.5km length of the A1260 Nene Parkway, they have been factored by 0.22 to provide a cost for the 800m length section covered by the scheme ($800\text{m} / 3,500\text{m} = 0.22$). This cost was then factored by 0.25 to convert it from a cost for dual carriageway to a cost for a single lane. The steps taken to calculate the annual maintenance cost are shown in Table 4.5 beneath.

Table 4.5: Calculation of Annual Maintenance Costs

A1260 Nene Parkway Annual Maintenance Costs (2010 - 2020)	Cost (£)
Total Maintenance Cost	5,177,412
Average Maintenance Cost per year	517,741
Average Maintenance Cost per year for J33 - J15 (22% of total road length)	113,903
Average Maintenance Cost per year for one lane (25% of dual carriageway)	28,476

The annual maintenance costs have then been calculated for the 60 year assessment period, and inflated using the same 5% rate applied to the Inflated Risk Adjusted Cost. The resultant costs are shown in Table 4.6 beneath.

Table 4.6: Calculation of Whole Life Maintenance Costs

Whole Life Maintenance Costs	Cost (£)
Maintenance Cost per year	28,476
Maintenance Cost for 60 Assessment Period (without inflation)	1,680,070
Maintenance Cost for 60 Assessment Period (with inflation)	10,542,096

Table 4.7 beneath shows the total Inflated Risk Adjusted Cost Including Whole Life Costs.

Table 4.7: Inflated Risk Adjusted Cost Including Whole Life Costs

Inflated Risk Adjusted Cost Including Whole Life Costs	Calendar Years of Cost	Cost (£)
Risk Adjusted Base Cost with Construction Industry Inflation (Outturn Cost)	2020 - 2021	4,537,272
Inflated Whole Life Costs	2022 - 2080	10,542,096
Inflated Risk Adjusted Cost Including Whole Life Costs	2020 - 2080	15,079,368

The Inflated Risk Adjusted Cost Including Whole Life Costs over the 60 year assessment period is £15,079,368. The Outturn Cost required by PCC to deliver the scheme is £4,537,272.

The full 60 year schedule showing how the maintenance costs have been calculated is included within Appendix D.

4.3 Budgets and Funding Cover

Funding Cover

It is anticipated that the full scheme Outturn Cost of £4,537,272 will be funded by the CPCA from the Single Investment Fund.

The CPCA have an infrastructure delivery budget of £20 million per year, allocated for the next 30 years. This funding will be invested into the Cambridgeshire and Peterborough Single Investment Fund, in order to boost growth within the region. The CPCA have committed to providing £16 million of funding within its first four years, to complete major highway improvements that decrease congestion and support local growth. No local or developer contribution is available for this scheme.

Completion of the Business Case

Subject to acceptance of the Outline Business Case, the next stage of scheme development is Detailed Design and production of a Full Business Case. Costs for these tasks are currently included within the scheme costs reported within this chapter and the Value for Money assessment undertaken within the Economic Case, however funding to progress the Detailed Design and Full Business Case needs to be secured to enable this work to progress.

Peterborough City Council request that the Design Cost of £595,666 is released in advance of the funds required for construction, in order to undertake the Detailed Design and produce a Full Business Case. This work is provisionally programmed to be undertaken between July 2020 and January 2021, with a view to construction commencing on site in April 2021. These costs would then be reported as costs already incurred within the scheme cost estimates included within the Full Business Case.

5. The Commercial Case

5.1 Introduction

The Commercial Case demonstrates that the scheme can be reliably procured and implemented through existing channels whilst ensuring value for money in delivery of the scheme.

5.2 Output Based Specification

The Junction 15 Options Assessment Report (OAR) details the work undertaken to develop multiple improvement options at this location, and the modelling undertaken to identify the preferred scheme.

The Junction 15 OAR discusses the process through which the preferred scheme has been identified. The scheme will include the following outputs:

- Creation of a third lane (northbound) between Junction 33 and Junction 15 of the A1260 Nene Parkway
- Creation of a three-lane circulatory on Junction 15 between the A1260 Nene Parkway approach and the Bretton Way exit
- Replacement of the pedestrian footbridge over the A1260 Nene Parkway (to facilitate the creation of a third northbound lane)
- Extension of the flare on the Thorpe Wood to Junction 15 by approximately 30 metres
- Creation of a zebra crossing over Thorpe Wood close to the existing bus stops
- Reconstruction of the footpath between Thorpe Road Bridge and Longthorpe.

Preliminary Design work has been completed on the scheme, and the General Arrangement (GA) drawing for this is provided in Appendix C. Further design information is available upon request.

This scheme will meet all of the primary scheme objectives outlined in the Strategic Case. Details of how the scheme will be measured against these objectives are provided in the Benefits Realisation Plan (BRP) and Monitoring and Evaluation Plan (MEP) discussed within the Management Case.

5.3 Procurement Strategy

All phases of the scheme, including detailed design, construction and site supervision will be delivered in house by Peterborough Highway Services (PHS).

PHS is a ten-year NEC3 Term Service Contract between PCC and Skanska, with responsibility for improving and maintaining Peterborough's highway network. The collaboration began in 2013 and runs to 2023, with the possibility of a further ten-year extension.

PHS is built upon a collaborative and multi-disciplined team capable of developing schemes from policy concept right through to design and construction, and then maintaining them.

The team has successfully developed and delivered multiple highway schemes around Peterborough since the beginning of the contract in 2013, including several CPCA schemes. PHS has been responsible for all planning and design work undertaken on the Junction 15 scheme to date.

To ensure that the procurement remains commercial competitive and offers value for money, all subcontract packages will be subject to competitive tendering.

Contract and Payment Mechanisms

The scheme will be procured through the existing PHS NEC3 contract. The NEC is an industry-leading suite of contracts which is widely used in the construction sector. The benefits of the NEC3 contract are:

- It provides a stimulus to good project management
- It promotes collaborative working between partners
- It is relatively easy to use
- It provides flexibility.

The following Payment Mechanisms will be used:

- Option A (Schedule of Rates) will be used for the completion of the Full Business Case and Detailed Design
- Option C (Target Cost) will be used for construction of the scheme. This incentivises both parties (PCC and Skanska) to work together to reduce cost through a pain / gain mechanism, which is tapered to ensure that neither party experiences excessive pain nor gain.

Under these commercial arrangements, payment would be monthly based on work done to date. In the case of Option C, closure of the final account would include the proportioning of any pain/gain amount.

Contract Length

The Construction Programme (Appendix G) sets out an eight-month construction programme for the scheme, with work on site beginning in April 2021.

A high-level overview of the project timescales is provided in Table 5.1 beneath. Note that timescales relating to CPCA review and approval are assumed, and have not yet been agreed.

Table 5.1: Project Implementation Timescales

Timescale	Activity
May 2020 – July 2020	Outline Business Case reviewed by CPCA and approval sought from CPCA board for the release of funding to undertake Detailed Design and produce a Full Business Case.
July 2020 – January 2021	Detailed Design undertaken and Full Business Case produced.
February 2021 – March 2021	Full Business Case reviewed by CPCA and approval sought from CPCA board for the release of funding for scheme construction.
April 2021 – December 2021	Mobilisation, construction and demobilisation.

The construction of a scheme at Junction 15 is subject to CPCA approval and the availability of funding, however it is anticipated that it will be delivered within the initial lifespan of PHS.

Risk Allocation and Management

Because the PHS contract is already established there is limited opportunity to modify the allocation of risk, however the contract does include inherent features that encourage effective risk management and mitigation, such as:

- Each party is required notify each other of any matter which could affect the cost, completion, progress or quality of the project through Early Warning Notices. This is to promote early intervention which could reduce the impact of any potential risk
- In the case of Option C (Target Price) both parties are incentivised to reduced cost through the pain / gain mechanism.

The above will also be supplemented with good project management practices during the delivery of the scheme. Both parties will maintain a shared Risk Register, which will be reviewed regularly at project progress meetings. Further details on the management of risk are provided in the Management Case.

Detail about the allocation of project risk between the CPCA and PCC, and the responsibilities for managing this, can be found within Chapter 6 of the CPCA's Assurance Framework⁸.

However, in summary, risk is allocated to the CPCA by default, but the CPCA reserve the right to reallocate this risk to PCC in the event that the risk has not been managed appropriately. The signed Funding Agreement, and Project Initiation Document, will be used to determine whether PCC has managed the project risk appropriately, and therefore where the risk should be allocated.

Contract Management

Project Progress Meetings and existing governance arrangements such as the Peterborough Highways Project Board will be used to monitor the delivery of the scheme and all commercial arrangements relating to this.

PCC will both nominate a Project Manager to work closely with the delivery team throughout the project. The Project Manager will be responsible for the delivery of the scheme.

Performance monitoring and key decisions will be managed by the PHS Project Board which meets on a monthly basis to discuss progress and matters relating to live and upcoming schemes.

Governance between PCC and the CPCA will be managed through progress meetings and monthly highlight reports in line with the CPCA's Assurance Framework.

Further details of how PHS will manage the contract are set out within the Management Case.

⁸ <https://cambridgeshirepeterborough-ca.gov.uk/assets/Assurance-Framework-Publication-Nov-2019.pdf>

Benefits of Procurement Strategy

Procuring the scheme directly through the PHS contract enables PCC to appoint a contractor to construct the scheme in an efficient manner. Using PHS' in-house delivery capability offers the following benefits over alternative procurement routes.

- PHS is reliable and has a **proven track record** of delivering major schemes successfully, and this serves as a positive indicator of future performance.
- The scheme can be **procured far quicker** than would be the case with alternative procurement routes. As well as reducing the procurement costs for the procuring authority, the project benefits will be realised sooner.
- The integrated delivery model creates a **single point of responsibility** and encourages **more effective collaboration** between client, designer and contractor to reduce costs. As the scheme has been identified, planned and designed within PHS, continuity can be assured through to construction, and any issues identified on site can be quickly resolved by the design team.
- A well-established supply chain is already in place which provides **Value for Money**. All subcontract packages will be competitively tendered to ensure best value, and will be put to a minimum of three tenderers where possible.
- **Strong performance is highly incentivised** as all schemes delivered within the PHS contract contribute to a suite of KPIs which impacts on the term of the contract. Consistent good performance is rewarded with contract term extensions whereas consistently poor performance would see a reduction in the contract term.
- The contract duration and **strong collaborative relationship** encourages both parties to work towards long term gain rather than short term commercial gain.

6. The Management Case

6.1 Introduction

The Management Case explains how the scheme promoter will successfully manage the delivery of the proposed scheme and achieve the expected outcomes.

6.2 Evidence of Similar Projects

Peterborough has a long history of significant growth spanning back to its designation as a New Town in 1967, and consequently the City is used to managing and delivering large highway infrastructure projects.

The Council, through PHS, has completed the following highway improvement schemes in recent years. As with Junction 15, both of these schemes are located on the Parkway Network at strategically sensitive locations, and demonstrate PHS' ability to successfully manage and deliver highway schemes of this scale.

[Junction 20 Improvement Scheme \(A47 Soke Parkway / A15 Paston Parkway\) - £5.7m](#)

This scheme was constructed between summer 2016 and spring 2017, and involved fully signalling a grade separated roundabout and adding significant capacity through the creation of additional lanes on approaches and the circulatory of the roundabout. The scheme was required to address an existing congestion pinchpoint and to enable nearby housing growth.

Since completion, the scheme has met its objectives and reduced congestion and journey times at a crucial section of the network. It has also provided additional network capacity, enabling the developments of Norwood and Paston Reserve to be progressed.

Junction 20 is a major interchange on Peterborough's network, and at the time of construction up to 4,500 vehicles an hour passed through it. With such a high traffic demand, the careful planning and implementation of the traffic management required to construct the scheme was crucial. Close collaboration between all delivery partners meant that this was achieved with limited disruption to the highway network.

As with Junction 15, Junction 20 is located on the strategic A47 route linking the A1 and Midlands with Norfolk and East Anglia. The Council and its partners worked closely with HE to successfully plan and manage the delivery of the scheme.

The Junction 20 scheme was completed on time and within the £5.7m budget. Funding for the scheme was secured from the Greater Cambridgeshire and Greater Peterborough Local Enterprise Partnership.



Figure 6.1: Junction 20 Improvement (post scheme)

Junction 17 – Junction 2 Improvement Scheme (A1139 Fletton Parkway) - £18m

This scheme was constructed between spring 2014 and summer 2015 and involved the widening of the A1139 Fletton Parkway from two to three lanes between the A1 (M) and Junction 2 in Peterborough to provide significant and critically needed capacity improvements. The total cost of the scheme was £18m and it was funded through the Greater Cambridgeshire and Greater Peterborough Local Enterprise Partnership, Developer Funding and Council Capital Funding.

The scheme successfully delivered a major upgrade to Peterborough’s Parkway network. Despite extensive ground investigations during the design phase, abnormally high levels of soil contamination were discovered during construction throughout the site, and significant volumes of soil had to be sent for specialist treatment and disposal. However, through careful management and collaborative working amongst all partners, there was minimal impact on the scheme delivery programme, and additional funding was provided by the DfT due to the severity of the contamination which had not been detected despite all of the industry standard Waste and Contamination (WAC) tests being undertaken.



Figure 6.2: Section of the A1173 Fletton Parkway Junction 17 Improvement

6.3 Programme / Project Dependencies

The scheme programme considers the following key dependencies:

- **Highways England Consents** – delivery of the scheme will be dependent on consent from HE to work on sections of their network in and around Junction 15. This specifically includes the A47 WB off slip down to the roundabout circulatory, although other space may be needed within their boundary for the positioning of equipment and the deployment of traffic management. HE are aware of the scheme, and were an active stakeholder during the option development phase. The Council have a successful track record of working with HE on schemes along the A47, and they will be included within the scheme delivery planning phase.
- **Programme Constraints** – the construction programme will need to carefully consider any other infrastructure works that may be underway on the highway network during the same period. The programme will be planned to avoid works that may compound the disruption caused to road users as a result of the Junction 15 scheme, although this will be limited through the careful planning of traffic management arrangements.
- **Construction Disruption** – The Council have significant recent experience of undertaking maintenance and delivering improvements on its highway network, particularly on the Parkway network, and is proficient in mitigating the impact of this.
- **Utility Diversions** – initial stats searches have identified some utilities within the area of the proposed scheme that will be impacted by the works. The design has taken account of these utilities, and any necessary diversions have been included within the scheme cost estimates and Risk Register. Early engagement with the relevant utilities companies will begin during the detailed design phase to ensure that these diversions are factored into the construction programme to mitigate any delay to the delivery of the scheme.

6.4 Governance, Organisational Structures and Roles

The CPCA are the organisation ultimately responsible for the delivery of the Junction 15 scheme, and PCC are nominated as the delivery partner.

Delivery of the scheme will be managed by a Project Team led by a PCC Project Manager, and consisting of all the key project delivery partners. The Project Team will be responsible for the daily running of the project, coordinating with all key stakeholders, and managing the delivery programme.

The existing PHS Project Board will be used to oversee the continued development and delivery of the scheme by the Project Team, and to make key decisions relating to the delivery of the project. The Project Board will be supported by technical specialists, and key stakeholders will be invited to attend as necessary.

Project Management Team

The Project Management Team will report to the Project Board, and ultimately to the CPCA Board.

The Project Team will be responsible for scheme delivery, and the day to day management of all partners. The Project Team will co-ordinate inputs from technical advisors responsible for the delivery of key work streams within an agreed programme, including:

- Stakeholder Engagement
- Design Development
- Transport Modelling
- Environmental Assessment
- Business Case Development
- Early Contractor Involvement (ECI) and Scheme delivery.

The key roles and lines of accountability for the development and delivery of the scheme are shown beneath in Figure 6.3.

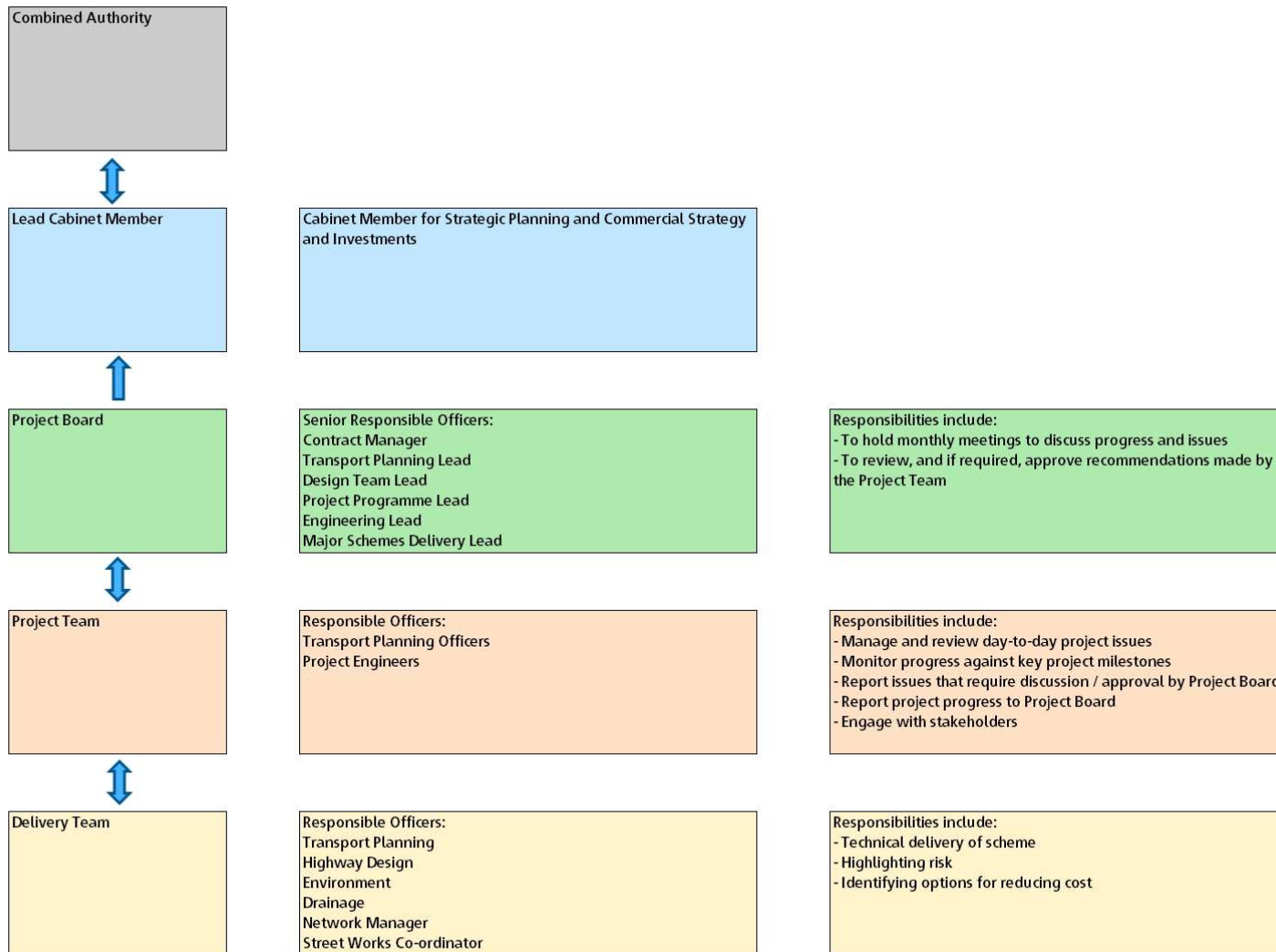


Figure 6.3: Key Project Roles and Responsibilities

6.5 Programme / Project Reporting

The Project Manager will report how the project is performing against the project objectives / key milestones. This will be completed using established finance and programme management tools such as Verto and reported on a regular basis to the Project Board.

Every month the Project Manager will also submit a highlight report to the CPCA recording what progress has been made and whether there are any new risks that could impact the scheme. Financial progress will be reported to the PHS Dashboard, which monitors the progress of work delivered through the PHS contract, and approval for any key decisions is made by the Project Board.

Regular Project Progress Meetings will be held throughout the duration of the scheme to allow key staff to discuss important issues that could affect the delivery of the scheme.

Delivery of the scheme through the PHS Framework contract ensures that all stages of work are conducted in-house, ensuring a smooth transition of information and communication between the different delivery teams.

6.6 Programme / Project Plan

Key project milestones for progressing to scheme delivery are outlined in Table 6.1 beneath:

Table 6.1: Key Project Milestones

Timescale	Milestone Activity
May 2020 – July 2020	Outline Business Case reviewed by CPCA and approval sought from CPCA board for the release of funding to undertake Detailed Design and produce a Full Business Case.
July 2020 – January 2021	Detailed Design undertaken and Full Business Case produced.
February 2021 – March 2021	Full Business Case reviewed by CPCA and approval sought from CPCA board for the release of funding for scheme construction.
April 2021 – December 2021	Mobilisation, construction and demobilisation.

These dates are indicative only and assume that funding will be available to progress each of the stages.

In addition to the project programme, a detailed construction programme is included within Appendix G. The programme shows that the scheme would take eight months to construct..

6.7 Assurance and Approvals Plan

The Council will manage the project in line with their existing assurance and approvals process. The Project Manager will be responsible for the daily running of the project, and any approvals required will be provided by the Project Board.

Technical Assurance is provided by the CPCA's technical assurance framework, and each stage of the project is reviewed by the CPCA's independent technical reviewer. Once the independent technical reviewer is satisfied, a recommendation is made to the CPCA Board to approve funding for further stages of the project, including construction.

6.8 Communications and Stakeholder Management

Communication and Stakeholder engagement will consist of:

- Providing regular updates on delivery progress and key activities to the local community, businesses and key stakeholders
- Engaging with the local community, businesses and key stakeholders about the delivery to ensure local needs are taken into account throughout the duration of the project
- Ensuring information is shared using appropriate methods of communication to all sectors of the community, businesses and key stakeholders.

Project Liaison Officer

A designated Project Liaison Officer (PLO) will be assigned to the scheme throughout the public consultation period and during construction, and will act as a single point of contact for outgoing and incoming communication. The PLO will be attached to the scheme delivery team and their responsibilities will include issuing progress updates via email and social media in the lead up to, and during construction, and coordinating responses to members of the public and key stakeholders when queries are received.

Stakeholder Consultation

Stakeholder consultation will be undertaken by the Project Team following approval of the OBC, and before work commences on the Detailed Design. This consultation will be on the preferred option, and will enable feedback from key stakeholders to be taken into consideration during the Detailed Design stage.

The key stakeholders identified for this consultation event include:

- Highways England (will be regularly consulted throughout the design and approvals process)
- Cambridgeshire Constabulary (based in Thorpe Wood)
- Cambridgeshire Fire and Rescue Service
- Ambulance Service
- Stagecoach
- Woodland Trust
- Local businesses based in Thorpe Wood
- Peterborough City Councillors for West Ward

All key Stakeholders will be consulted via email for comments on the preferred option prior to completion of Detailed Design. Key Stakeholders will also be communicated to regularly throughout the construction phase by the PLO.

Public Consultation

Public consultation on the concept of a scheme at this location has already been undertaken as part of the CPCA Local Transport Plan⁹ that was adopted in January 2020.

An online consultation exercise on the final scheme will be undertaken following approval of the OBC, and prior to completion of the Detailed Design. The feedback from this consultation will be included within the FBC and reflected in the Detailed Design. No residents are directly affected by this scheme.

6.9 Risk Management Strategy

A Risk Register was produced during project initiation to identify potential risks and to evaluate factors that could have a detrimental effect on the project. The Risk Register identifies potential risks, considers the impact they may have, the likelihood of them occurring, and the measures that will be taken to mitigate these.

The Risk Register is a live document and is reviewed regularly at progress meetings and updates are reported to the CPCA through the monthly Highlight Reports.

6.10 Scheme Evaluation Plan (Benefits Realisation and Monitoring)

This Scheme Evaluation Plan for the Junction 15 study has been prepared prior to scheme construction to set out guidance detailing how this scheme's effects should be evaluated following implementation of the scheme.

The Scheme Evaluation Plan comprises the Benefits Realisation Plan and the Monitoring and Evaluation Plan.

The purpose of the Scheme Evaluation Plan is to clearly set out which indicators should be monitored to verify that the scheme achieves its objectives. Post monitoring is important for determining that the scheme has been successful.

Expected Benefits

The scheme objectives, outputs and outcomes are summarised below. These objectives are described within the Strategic Case and explain what the scheme is expected to deliver.

⁹ <https://cambridgeshirepeterborough-ca.gov.uk/assets/Transport/Draft-LTP.pdf>

Primary objectives include:

- **Tackle congestion and improve journey time reliability:** Tackle congestion and address journey time reliability on the primary approaches
- **Support Peterborough's Growth Agenda and encourage homes and jobs:** Ensure that the planned employment and housing growth across Peterborough is promoted whilst providing for future demand.
- **Create wider economic benefits:** Provide conditions that encourage inward investment in higher value employment sectors across Peterborough, and utilise available employment space.

Secondary objectives include:

- **Positively impact traffic conditions on the wider network:** Positively impact the performance of local routes impacted by the traffic and congestion in and around Junction 15, such as the A605 Oundle Road and Thorpe Wood.
- **Improve Road Safety:** Reduce personal injury accidents and improve personal security amongst all travellers around the junction
- **Mitigate the impact of Air Quality on the local environment:** Maintain or improve air quality within the designated study area, as a result of minimising stationary / queuing traffic.

Benefits Monitoring and Evaluation

Monitoring and evaluation of the schemes performance against its objectives must be undertaken to determine whether the scheme has been a success. Details of how this will be measured are provided in Table 6.2 beneath.

Monitoring will take place prior to scheme opening to provide a baseline and then at predefined intervals upon successful delivery of the scheme (such as 1, 3, and 5 years post opening).

Table 6.2: Benefits Realisation Monitoring

Objective	Indicator	Measure	Timescale	Owner
Primary Objectives				
Tackle congestion and improve journey time reliability	Reduction in delay and journey times through Junction 15	Vivacity Sensors or Satellite navigation data (or similar)	1 year post completion	PCC
Support the growth agenda and encourage the development of homes and jobs, through increasing capacity on the road network in order to cater for existing and future traffic demand	Change in number of journeys passing through the junction	Traffic count information	1 year post construction	PCC
Wider economic benefits. Increase the attractiveness of Thorpe Wood as a location to businesses by improving traffic conditions at Junction 15	Business perceptions of traffic condition post scheme	Survey of businesses within Thorpe Wood Business Park	1 year post construction	PCC
Secondary Objectives				
Positively impact traffic conditions on the wider network	Reduction in delay and journey times along Oundle Road towards Jn 32 of the A1260 Nene Parkway	Vivacity Sensors or Satellite navigation data (or similar)	1 year post construction	PCC
Reduce personal injury accidents and improve personal security amongst all travellers around the junction	Change in number of recorded accidents across the study area	Review accident data for the junction post scheme	5 years post construction	PCC
Mitigate the impact of Air Quality on the local environment	No reduction in reported Air Quality	Temporary air quality sensors deployed by PCC	1 & 5 years post construction	PCC

7. Appendices

Appendix A: Wider Policy Context

Appendix A: Wider Policy Context

National Planning Policy Framework

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and should be considered in the preparation of development plans. Proposed development that accords with an up to date Local Plan should be approved unless other material considerations indicate otherwise.

The NPPF states that all plans are expected to be based upon and to reflect the presumption in favour of sustainable development with clear policies that will guide how the presumption should be applied locally.

The scheme will contribute to delivering the following NPPF objectives:

- **Delivering a sufficient supply of homes.** The scheme will provide crucial transport capacity along the Parkway network which will support the housing growth set out for Peterborough within the Local Plan.
- **Building a strong, competitive economy.** The NPPF states that development proposals should support economic growth and productivity. The scheme will provide essential network capacity at a crucial location to enable Peterborough to deliver the jobs set out in the Local Plan.
- **Promoting healthy and safe communities and sustainable transport.** The NPPF stipulates that communities should be safe, accessible and supportive of a healthy lifestyle through the provision of cycling and walking facilities. The scheme not only provides highway capacity for strategic Parkway trips, but also includes local sustainable transport infrastructure improvements to upgrade access to Thorpe Wood Business Park from the east and the south.

Department for Transport Single Departmental Plan

The single departmental plan for the Department for Transport sets out the strategic objectives to 2020 and the plans for achieving them. The DfT's overall mission is to create a safe, secure, efficient and reliable transport system that works for the people who depend on it; supporting a strong productive economy and the jobs and homes people need.

The objectives outlined in the plan are:

- Support the creation of a stronger, cleaner more productive economy
- Help to connect people and places, balancing investment across the country
- Make journeys easier, modern and reliable
- Make sure transport is safe, secure and sustainable

- Prepare the transport system for technological progress, and a prosperous future outside the EU
- Promote a culture of efficiency and productivity in everything we do.

Peterborough City Council's Vision and Strategic Priorities

The Council's vision is to

'Create a bigger and better Peterborough that grows the right way and through truly sustainable development and growth:

- *Improves the quality of life of all its people and communities, and ensures that all communities benefit from the growth and the opportunities it brings*
- *Creates a truly sustainable Peterborough, the urban centre of a thriving sub-regional community of villages and market towns, a healthy, safe and exciting place to live, work and visit, famous as the environmental capital of the UK'.*

The strategic priorities for the Council are:

- Drive growth, regeneration and economic development
- Improve education attainment and skills
- Safeguard vulnerable children and adults
- Implement the Environment Capital agenda
- Support Peterborough's culture and leisure trust Vivacity
- Keep all our communities safe, cohesive and healthy
- Achieve the best health and wellbeing for the city

Peterborough City Council Local Plan

The Local Plan (adopted July 2019) updates the 2011 Core Strategy and looks to deliver 20,112 new homes between 2017 and 2036, and 17,600 jobs between 2015 and 2036. The development strategy for the new Local Plan is to focus the majority of new housing development in, around and close to the urban area of the city of Peterborough. Only a small percentage of residential development is allocated to the villages and rural area. Similarly, employment development will be focussed on the city centre, urban area or urban extensions.

The Local Plan will deliver the council's corporate priorities (listed below) which aim to improve the quality of life for all residents and communities.

- Drive growth, regeneration and economic development
- Improve education attainment and skills
- Safeguard vulnerable children and adults

- Implement the Environment Capital agenda
- Support Peterborough's culture and leisure trust Vivacity
- Keep all our communities safe, cohesive and healthy
- Achieve the best health and wellbeing for the City. The Local Plan identifies Thorpe Wood as a strategic employment location for the city and additional B1 use is allocated within the area.

Policy LP13: Transport states that the impact of growth on the city's transport infrastructure will require careful planning and that new development must ensure that appropriate provision is made for the transport need that it will create.

Policy LP14: Infrastructure identifies that the major growth and expansion of Peterborough will be supported by necessary infrastructure such as roads, schools and health and community facilities is in place to help the creation of sustainable communities.

Appendix B: NMU Audit Findings

Appendix B: Walking Audit Observations



Poor lighting on the approach and through the underpass, increasing safety concerns at night.

Graffiti present throughout the underpass.



No street lighting present on this side of the A47 underpass, increasing safety concerns at night.

Signs present when approaching the underpass also have no lighting, cannot be seen at night.

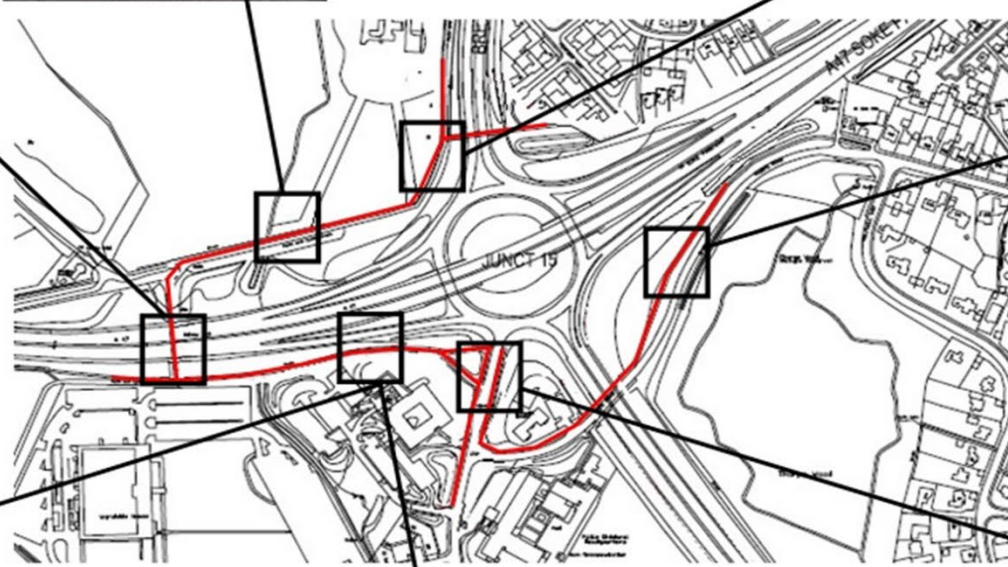
Poor uneven pathing.



No street lighting on this northwest corner of the junction, increasing safety concerns at night.

Desire line observed heading down the verge and across junction 15 circulatory.

Poor uneven pathing.



Uneven pathing, vegetation is well maintained along this pathway.



Uneven pathing along the entirety of this pedestrian / cycle route.

The central fence line is unnecessary and is broken in places.

Street lighting is present on this side of the A47 underpass.



Uneven pathing on the approach to this pedestrian / cycle pathway.

No street lighting present.



Informal crossing on Thorpe Wood present, located immediately off the entrance / exit of the roundabout. Limited use observed.

Difficulty for pedestrians crossing the road, observed across Thorpe Wood.

Appendix C: Preliminary Design General Arrangement Drawings

- Notes:
- DO NOT SCALE FROM THIS DRAWING.
 - SITE VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION
 - REPORT ALL DISCREPANCIES TO THE DRAWING ORIGINATOR IMMEDIATELY
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTS AND DRAWINGS
 - NO WORKS ARE TO BE UNDERTAKEN BASED ON INFORMATION ON THIS DRAWING
 - EXISTING COLUMNS TO BE REMOVED ARE NOT IN EXACT POSITION FOR DRAWING CLARITY
 - THIS DRAWING TO BE PRINTED IN COLOUR

Residual Risk Assessment
 Wherever possible, risk is designed-out of this proposal during the design process. Where this is not possible, the risk will be minimised and any residual significant risk will be noted and indicated by the symbol.

SIGNIFICANT CDM HEALTH & SAFETY RISKS

1.
- KEY:
- EXISTING LIGHTING UNIT TO REMAIN - **45No.**
 - PROPOSED LIGHTING UNIT - **12No.**
 - EXISTING LIGHTING COLUMN TO HAVE NEW LED - **4No.**
 - PROPOSED COMBINED BELISHA BEACON/ PEDESTRIAN CROSSING LIGHTING UNIT - **2No.**
 - EXISTING LIGHTING UNIT TO BE REMOVED - **11No.**
 - PROPOSED POSITION OF NEW HIGHWAYS ENGLAND LIGHTING UNIT (SPECIFICATION FOR LIGHTING UNIT TO BE CONFIRMED PRIOR TO DETAIL DESIGN) - **3No.**

Rev	Date	Description	Dwn	Chk'd
P02	26/02/20	PRELIMINARY ISSUE - UPDATED BASE MAP AND POSITION OF COLUMNS	JS	MF
P01	23/01/20	PRELIMINARY ISSUE	JS	MF

Revisions

Client

Drawing Originator
SKANSKA | Infrastructure Services
 Dodson House
 Fengate, Peterborough
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Drawing Status
PRELIMINARY

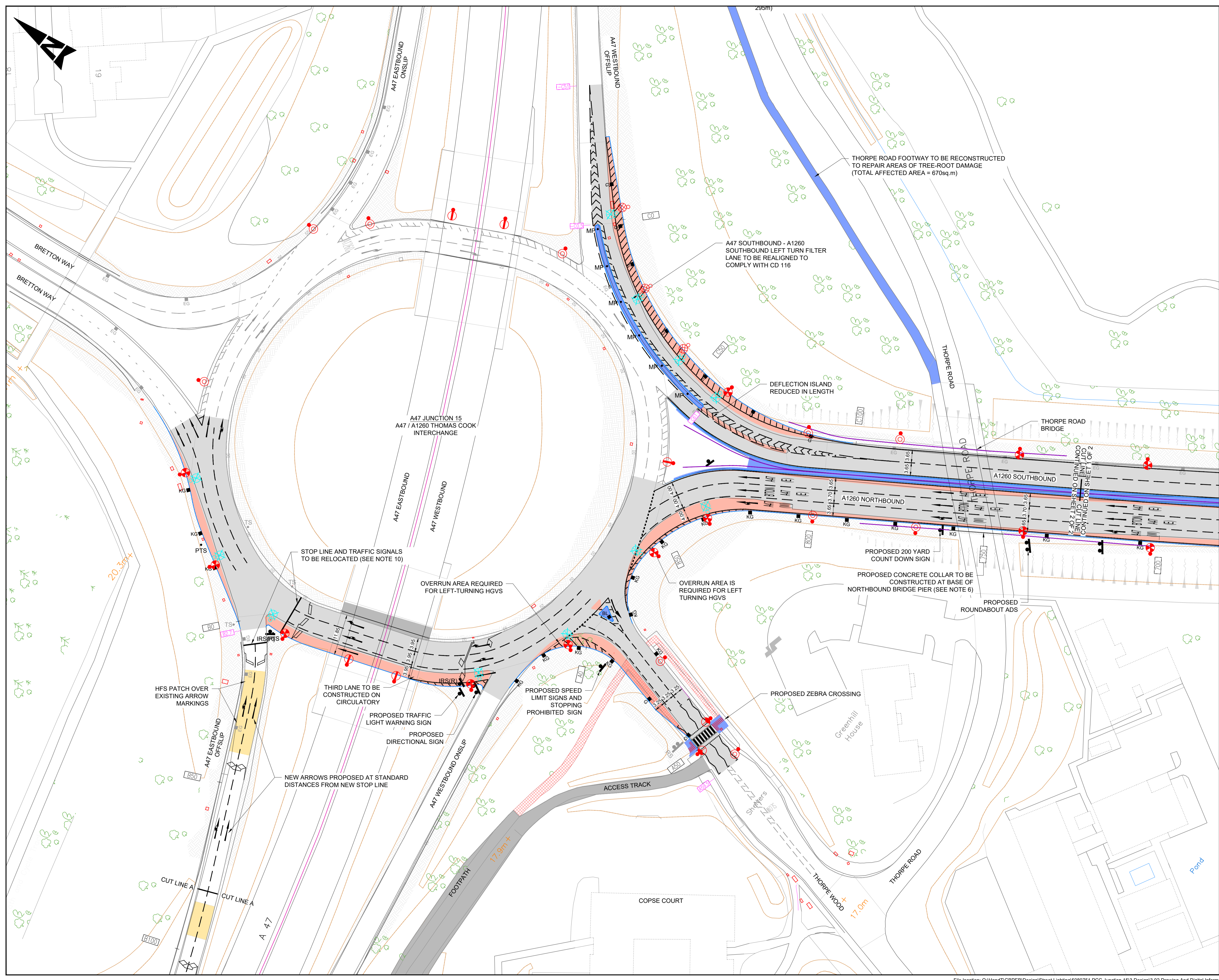
Project Name
A47 JUNCTION 15

Title
PRELIMINARY STREET LIGHTING DESIGN LAYOUT SHEET 1 OF 2

Original drawing sheet is A1

Scale	Drawn by	Checked by	Approved by
1:500	JS	MF	SB
	Drawn Date 23/01/20	Checked Date 29/01/20	Approved Date 30/01/20


Drawing Number	Rev
5080751-SKA-HGL-OR-DR-EO-1301-S0	P02

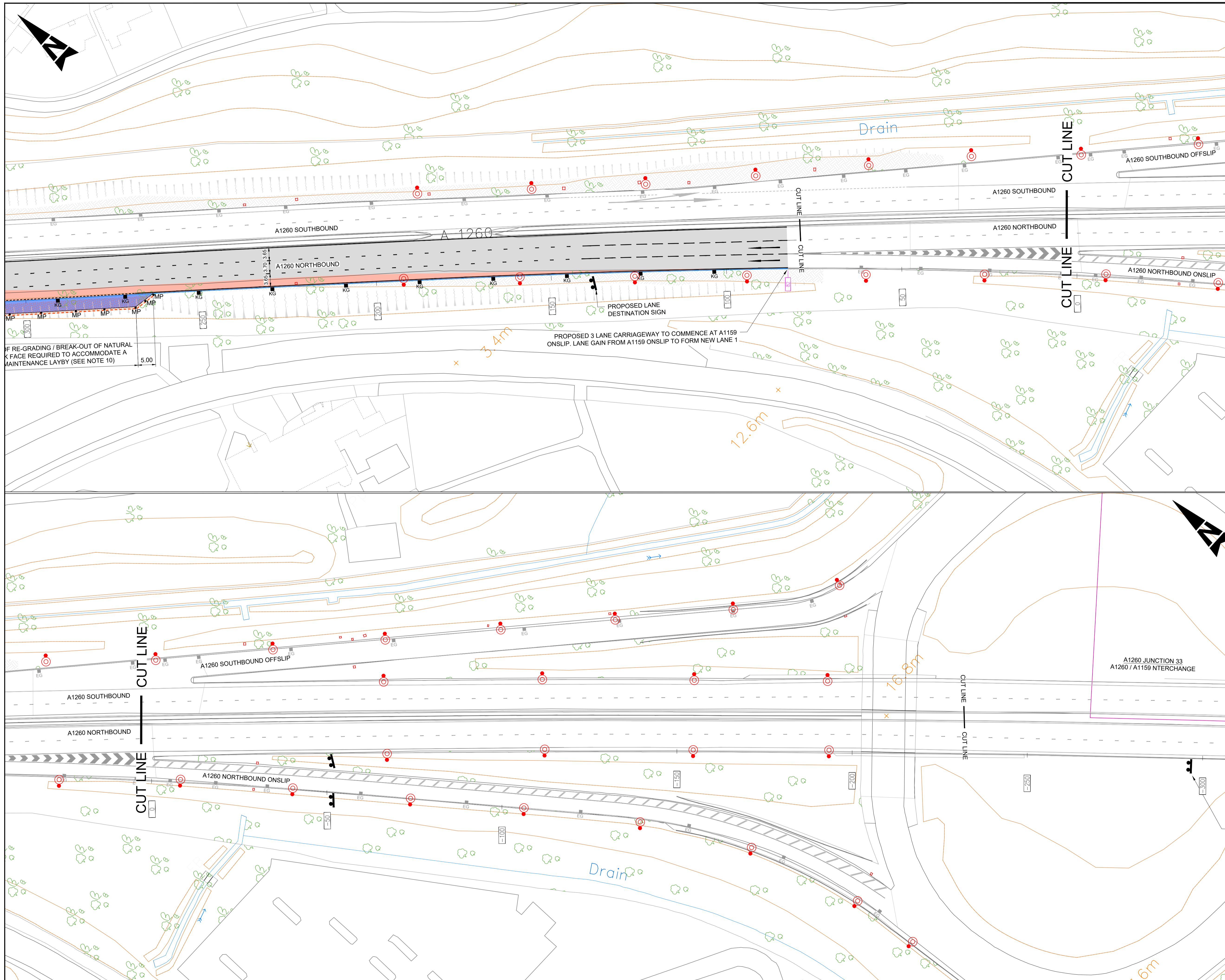


- Notes:
- DO NOT SCALE FROM THIS DRAWING.
 - SITE VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION
 - REPORT ALL DISCREPANCIES TO THE DRAWING ORIGINATOR IMMEDIATELY
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTS AND DRAWINGS
 - NO WORKS ARE TO BE UNDERTAKEN BASED ON INFORMATION ON THIS DRAWING
 - THIS DRAWING TO BE PRINTED IN COLOUR

Residual Risk Assessment
 Wherever possible, risk is designed-out of this proposal during the design process. Where this is not possible, the risk will be minimised and any residual significant risk will be noted and indicated by the symbol.

SIGNIFICANT CDM HEALTH & SAFETY RISKS

1.
- KEY:
 EXISTING LIGHTING UNIT TO REMAIN - 45No.



Rev	Date	Description	Dm	Chktd
P02	26/02/20	PRELIMINARY ISSUE - UPDATED BASE MAP AND POSITION OF COLUMNS	JS	MF
P01	23/01/20	PRELIMINARY ISSUE	JS	MF

Revisions

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 Fengate
 Peterborough
 PE1 5XG
 Tel: +44 (0)1733 747474

Drawing Status
PRELIMINARY
 Project Name
A47 JUNCTION 15

Title
PRELIMINARY STREET LIGHTING DESIGN LAYOUT
SHEET 2 OF 2

Scale	Drawn by	Checked by	Approved by
1:500	JS	MF	SB
	Drawn Date 23/01/20	Checked Date 29/01/20	Approved Date 30/01/20

Drawing Number	Rev
5080751-SKA-HGL-OR-DR-EO-1302-S0	P02

Appendix D: Economic Case Construction and Maintenance Cost Estimates

Junction 15 - Do Something Scheme Costs in 2010 Market Prices for Input to Economic Case

Calendar Year	Assessment Year	(1) Base Cost Estimate (2020 Prices)						(2) Base Cost Estimate Including Real Cost Increases (2020 Prices)			(3) Risk Adjusted Base Cost (2020 Prices)		(4) Total Contribution of Optimism Bias		(5) Rebased to 2010 Price Base	(6) Discounted to 2010 Prices			(7) Adjusted to Market Prices
		Construction Costs (Highways)	Construction Costs (Structures)	Land & Property Costs	Preparation and Supervision Costs	Other Costs	Total	Real Cost Inflation	Contribution to Real Cost Increases	Total (Including Real Cost Increases)	Quantified Risk Adjustment	Risk Adjusted Cost	Optimism Bias Adjustment	Optimism Bias Adjusted Cost		Discount Rate	Discount Factor	Discounted to 2010 Prices	
2020	0	£0	£0	£0	£595,666	£0	£595,666	0.000	£0.00	£595,666	£0	£595,666	£0	£595,666	£500,939	1.035	0.709	£355,125	£422,599.26
2021	1	£2,295,787	£802,452	£0	£359,189	£0	£3,457,428	1.035	£121,106.65	£3,578,535	£296,482	£3,875,017	£1,294,346	£5,169,362	£4,347,295	1.035	0.685	£2,977,661	£3,543,416
2022	2	£0	£0	£0	£0	£0	£0	1.070	£0.00	£0	£0	£0	£0	£0	1.035	0.662	£0	£0	
2023	3	£0	£0	£0	£0	£0	£0	1.105	£0.00	£0	£0	£0	£0	£0	1.035	0.639	£0	£0	
2024	4	£0	£0	£0	£0	£0	£0	1.143	£0.00	£0	£0	£0	£0	£0	1.035	0.618	£0	£0	
2025	5	£0	£0	£0	£0	£0	£0	1.179	£0.00	£0	£0	£0	£0	£0	1.035	0.597	£0	£0	
2026	6	£0	£0	£0	£0	£0	£0	1.215	£0.00	£0	£0	£0	£0	£0	1.035	0.577	£0	£0	
2027	7	£0	£0	£0	£0	£0	£0	1.251	£0.00	£0	£0	£0	£0	£0	1.035	0.557	£0	£0	
2028	8	£0	£0	£0	£0	£0	£0	1.286	£0.00	£0	£0	£0	£0	£0	1.035	0.538	£0	£0	
2029	9	£0	£0	£0	£0	£0	£0	1.322	£0.00	£0	£0	£0	£0	£0	1.035	0.520	£0	£0	
2030	10	£0	£0	£0	£0	£0	£0	1.358	£0.00	£0	£0	£0	£0	£0	1.035	0.503	£0	£0	
2031	11	£0	£0	£0	£0	£0	£0	1.394	£0.00	£0	£0	£0	£0	£0	1.035	0.486	£0	£0	
2032	12	£0	£0	£0	£0	£0	£0	1.431	£0.00	£0	£0	£0	£0	£0	1.035	0.469	£0	£0	
2033	13	£0	£0	£0	£0	£0	£0	1.470	£0.00	£0	£0	£0	£0	£0	1.035	0.453	£0	£0	
2034	14	£0	£0	£0	£0	£0	£0	1.510	£0.00	£0	£0	£0	£0	£0	1.035	0.438	£0	£0	
2035	15	£0	£0	£0	£0	£0	£0	1.551	£0.00	£0	£0	£0	£0	£0	1.035	0.423	£0	£0	
2036	16	£0	£0	£0	£0	£0	£0	1.593	£0.00	£0	£0	£0	£0	£0	1.035	0.409	£0	£0	
2037	17	£0	£0	£0	£0	£0	£0	1.635	£0.00	£0	£0	£0	£0	£0	1.035	0.395	£0	£0	
2038	18	£0	£0	£0	£0	£0	£0	1.678	£0.00	£0	£0	£0	£0	£0	1.035	0.382	£0	£0	
2039	19	£0	£0	£0	£0	£0	£0	1.722	£0.00	£0	£0	£0	£0	£0	1.035	0.369	£0	£0	
2040	20	£0	£0	£0	£0	£0	£0	1.768	£0.00	£0	£0	£0	£0	£0	1.035	0.356	£0	£0	
2041	21	£0	£0	£0	£0	£0	£0	1.816	£0.00	£0	£0	£0	£0	£0	1.035	0.344	£0	£0	
2042	22	£0	£0	£0	£0	£0	£0	1.865	£0.00	£0	£0	£0	£0	£0	1.035	0.333	£0	£0	
2043	23	£0	£0	£0	£0	£0	£0	1.915	£0.00	£0	£0	£0	£0	£0	1.035	0.321	£0	£0	
2044	24	£0	£0	£0	£0	£0	£0	1.966	£0.00	£0	£0	£0	£0	£0	1.035	0.310	£0	£0	
2045	25	£0	£0	£0	£0	£0	£0	2.020	£0.00	£0	£0	£0	£0	£0	1.035	0.300	£0	£0	
2046	26	£0	£0	£0	£0	£0	£0	2.076	£0.00	£0	£0	£0	£0	£0	1.035	0.290	£0	£0	
2047	27	£0	£0	£0	£0	£0	£0	2.133	£0.00	£0	£0	£0	£0	£0	1.035	0.280	£0	£0	
2048	28	£0	£0	£0	£0	£0	£0	2.192	£0.00	£0	£0	£0	£0	£0	1.035	0.271	£0	£0	
2049	29	£0	£0	£0	£0	£0	£0	2.254	£0.00	£0	£0	£0	£0	£0	1.035	0.261	£0	£0	
2050	30	£0	£0	£0	£0	£0	£0	2.317	£0.00	£0	£0	£0	£0	£0	1.035	0.253	£0	£0	
2051	31	£0	£0	£0	£0	£0	£0	2.382	£0.00	£0	£0	£0	£0	£0	1.030	0.298	£0	£0	
2052	32	£0	£0	£0	£0	£0	£0	2.447	£0.00	£0	£0	£0	£0	£0	1.030	0.289	£0	£0	
2053	33	£0	£0	£0	£0	£0	£0	2.514	£0.00	£0	£0	£0	£0	£0	1.030	0.281	£0	£0	
2054	34	£0	£0	£0	£0	£0	£0	2.583	£0.00	£0	£0	£0	£0	£0	1.030	0.272	£0	£0	
2055	35	£0	£0	£0	£0	£0	£0	2.654	£0.00	£0	£0	£0	£0	£0	1.030	0.264	£0	£0	
2056	36	£0	£0	£0	£0	£0	£0	2.728	£0.00	£0	£0	£0	£0	£0	1.030	0.257	£0	£0	
2057	37	£0	£0	£0	£0	£0	£0	2.804	£0.00	£0	£0	£0	£0	£0	1.030	0.249	£0	£0	
2058	38	£0	£0	£0	£0	£0	£0	2.882	£0.00	£0	£0	£0	£0	£0	1.030	0.242	£0	£0	
2059	39	£0	£0	£0	£0	£0	£0	2.962	£0.00	£0	£0	£0	£0	£0	1.030	0.235	£0	£0	
2060	40	£0	£0	£0	£0	£0	£0	3.044	£0.00	£0	£0	£0	£0	£0	1.030	0.228	£0	£0	
2061	41	£0	£0	£0	£0	£0	£0	3.129	£0.00	£0	£0	£0	£0	£0	1.030	0.221	£0	£0	
2062	42	£0	£0	£0	£0	£0	£0	3.215	£0.00	£0	£0	£0	£0	£0	1.030	0.215	£0	£0	
2063	43	£0	£0	£0	£0	£0	£0	3.303	£0.00	£0	£0	£0	£0	£0	1.030	0.209	£0	£0	
2064	44	£0	£0	£0	£0	£0	£0	3.393	£0.00	£0	£0	£0	£0	£0	1.030	0.203	£0	£0	
2065	45	£0	£0	£0	£0	£0	£0	3.484	£0.00	£0	£0	£0	£0	£0	1.030	0.197	£0	£0	
2066	46	£0	£0	£0	£0	£0	£0	3.575	£0.00	£0	£0	£0	£0	£0	1.030	0.191	£0	£0	
2067	47	£0	£0	£0	£0	£0	£0	3.668	£0.00	£0	£0	£0	£0	£0	1.030	0.185	£0	£0	
2068	48	£0	£0	£0	£0	£0	£0	3.763	£0.00	£0	£0	£0	£0	£0	1.030	0.180	£0	£0	
2069	49	£0	£0	£0	£0	£0	£0	3.861	£0.00	£0	£0	£0	£0	£0	1.030	0.175	£0	£0	
2070	50	£0	£0	£0	£0	£0	£0	3.962	£0.00	£0	£0	£0	£0	£0	1.030	0.170	£0	£0	
2071	51	£0	£0	£0	£0	£0	£0	4.066	£0.00	£0	£0	£0	£0	£0	1.030	0.165	£0	£0	
2072	52	£0	£0	£0	£0	£0	£0	4.172	£0.00	£0	£0	£0	£0	£0	1.030	0.160	£0	£0	
2073	53	£0	£0	£0	£0	£0	£0	4.281	£0.00	£0	£0	£0	£0	£0	1.030	0.155	£0	£0	
2074	54	£0	£0	£0	£0	£0	£0	4.392	£0.00	£0	£0	£0	£0	£0	1.030	0.151	£0	£0	
2075	55	£0	£0	£0	£0	£0	£0	4.507	£0.00	£0	£0	£0	£0	£0	1.030	0.146	£0	£0	
2076	56	£0	£0	£0	£0	£0	£0	4.625	£0.00	£0	£0	£0	£0	£0	1.030	0.142	£0	£0	
2077	57	£0	£0	£0	£0	£0	£0	4.745	£0.00	£0	£0	£0	£0	£0	1.030	0.138	£0	£0	
2078	58	£0	£0	£0	£0	£0	£0	4.869	£0.00	£0	£0	£0	£0	£0	1.030	0.134	£0	£0	
2079	59	£0	£0	£0	£0	£0	£0	4.996	£0.00	£0	£0	£0	£0	£0	1.030	0.130	£0	£0	
2080	60	£0	£0	£0	£0	£0	£0	5.127	£0.00	£0	£0	£0	£0	£0	1.030	0.126	£0	£0	
Total		£2,295,787	£802,452	£0	£954,855	£0	£4,053,095		£121,107	£4,174,201	£296,482	£4,470,683	£1,294,346	£5,765,029	£4,848,234			£3,332,786	£3,543,416

Step	Description	Scheme Cost at Each Step
(1)	Outlines the initial estimate of the investment costs in 2020 prices but taking no account of real increases in construction costs. Includes Design cost, Construction cost profile, Land cost, Preparation and Administration costs. Year of Opening is assumed to be 2021 in this assessment. No historic (bygone) costs have been provided and it is assumed that these won't influence the investment decision.	£4,053,095
(2)	The base costs have been adjusted to incorporate real cost increases (WebTAG A1.2) in construction costs.	£4,174,201
(3)	Following the real cost adjustment a quantified risk contribution has been applied.	£4,470,683
(4)	The next stage is to apply optimism bias.	£5,765,029
(5)	Optimism bias adjusted costs have been converted to the current price base (i.e. 2010) using the governments GDP deflator tool (WebTAG A1.2).	£4,848,234
(6)	Costs have been discounted to 2010 present values by applying a discount rate of 3.5% per year for 30 years and 3.0% thereafter (WebTAG A1.2).	£3,332,786
(7)	The final stage in preparing the scheme costs is to convert them from the factor cost to the market price unit of account using the indirect tax correction factor of 1.19	£3,543,416

Junction 15 - Do Something Scheme Costs in 2010 Market Prices for Input to Economic Case

Calendar Year	Assessment Year	(1) Base Cost Estimate (2020 Prices)		(2) Base Cost Estimate Including Real Cost Increases (2020 Prices)			(3) Risk Adjusted Base Cost (2020 Prices)		(4) Total Contribution of Optimism Bias		(5) Rebased to 2010 Price Base	(6) Discounted to 2010 Prices			(7) Adjusted to Market Prices
		Maintenance Costs	Total	Real Cost Inflation	Contribution to Real Cost Increases	Total (Including Real Cost Increases)	Quantified Risk Adjustment	Risk Adjusted Cost	Optimism Bias Adjustment	Optimism Bias Adjusted Cost		Discount Rate	Discount Factor	Discounted to 2010 Prices	
		£0	£0	£0.000	£0.00	£0	£0	£0	£0.00	£0	£0	1.035	0.709	£0	£0.00
2020	0	£0	£0	0.000	£0.00	£0	£0	£0	£0.00	£0	£24,786	1.035	0.685	£16,977	£20,203
2021	1	£28,476	£28,476	1.035	£997.45	£29,473	£0	£29,473	£0.00	£29,473	£25,617	1.035	0.662	£16,953	£20,174
2022	2	£28,476	£28,476	1.070	£1,985.03	£30,461	£0	£30,461	£0.00	£30,461	£31,480	1.035	0.639	£16,927	£20,144
2023	3	£28,476	£28,476	1.105	£3,004.03	£31,480	£0	£31,480	£0.00	£31,480	£27,361	1.035	0.618	£16,903	£20,115
2024	4	£28,476	£28,476	1.143	£4,058.98	£32,535	£0	£32,535	£0.00	£32,535	£28,234	1.035	0.597	£16,853	£20,055
2025	5	£28,476	£28,476	1.179	£5,097.36	£33,573	£0	£33,573	£0.00	£33,573	£29,096	1.035	0.577	£16,780	£19,968
2026	6	£28,476	£28,476	1.215	£6,122.61	£34,598	£0	£34,598	£0.00	£34,598	£29,953	1.035	0.557	£16,690	£19,861
2027	7	£28,476	£28,476	1.251	£7,140.98	£35,617	£0	£35,617	£0.00	£35,617	£30,805	1.035	0.538	£16,584	£19,735
2028	8	£28,476	£28,476	1.286	£8,154.79	£36,631	£0	£36,631	£0.00	£36,631	£31,655	1.035	0.520	£16,466	£19,594
2029	9	£28,476	£28,476	1.322	£9,165.46	£37,641	£0	£37,641	£0.00	£37,641	£32,519	1.035	0.503	£16,343	£19,448
2030	10	£28,476	£28,476	1.358	£10,192.40	£38,668	£0	£38,668	£0.00	£38,668	£33,380	1.035	0.486	£16,208	£19,288
2031	11	£28,476	£28,476	1.394	£11,216.64	£39,692	£0	£39,692	£0.00	£39,692	£34,271	1.035	0.469	£16,078	£19,133
2032	12	£28,476	£28,476	1.431	£12,276.10	£40,752	£0	£40,752	£0.00	£40,752	£35,194	1.035	0.453	£15,953	£18,984
2033	13	£28,476	£28,476	1.470	£13,373.25	£41,849	£0	£41,849	£0.00	£41,849	£36,152	1.035	0.438	£15,833	£18,841
2034	14	£28,476	£28,476	1.510	£14,512.08	£42,988	£0	£42,988	£0.00	£42,988	£37,136	1.035	0.423	£15,714	£18,700
2035	15	£28,476	£28,476	1.551	£15,682.30	£44,158	£0	£44,158	£0.00	£44,158	£38,139	1.035	0.409	£15,593	£18,555
2036	16	£28,476	£28,476	1.593	£16,875.42	£45,351	£0	£45,351	£0.00	£45,351	£39,149	1.035	0.395	£15,465	£18,403
2037	17	£28,476	£28,476	1.635	£18,076.78	£46,553	£0	£46,553	£0.00	£46,553	£40,184	1.035	0.382	£15,336	£18,250
2038	18	£28,476	£28,476	1.678	£19,306.82	£47,783	£0	£47,783	£0.00	£47,783	£41,246	1.035	0.369	£15,210	£18,099
2039	19	£28,476	£28,476	1.722	£20,570.37	£49,046	£0	£49,046	£0.00	£49,046	£42,345	1.035	0.356	£15,087	£17,953
2040	20	£28,476	£28,476	1.768	£21,876.42	£50,352	£0	£50,352	£0.00	£50,352	£43,483	1.035	0.344	£14,968	£17,812
2041	21	£28,476	£28,476	1.816	£23,229.96	£51,706	£0	£51,706	£0.00	£51,706	£44,651	1.035	0.333	£14,850	£17,672
2042	22	£28,476	£28,476	1.865	£24,618.33	£53,094	£0	£53,094	£0.00	£53,094	£45,851	1.035	0.321	£14,734	£17,533
2043	23	£28,476	£28,476	1.915	£26,045.66	£54,521	£0	£54,521	£0.00	£54,521	£47,092	1.035	0.310	£14,621	£17,399
2044	24	£28,476	£28,476	1.966	£27,520.73	£55,996	£0	£55,996	£0.00	£55,996	£48,378	1.035	0.300	£14,512	£17,270
2045	25	£28,476	£28,476	2.020	£29,050.65	£57,526	£0	£57,526	£0.00	£57,526	£49,708	1.035	0.290	£14,407	£17,144
2046	26	£28,476	£28,476	2.076	£30,631.52	£59,107	£0	£59,107	£0.00	£59,107	£51,080	1.035	0.280	£14,304	£17,022
2047	27	£28,476	£28,476	2.133	£32,263.29	£60,739	£0	£60,739	£0.00	£60,739	£62,432	1.035	0.271	£14,206	£16,905
2048	28	£28,476	£28,476	2.192	£33,956.68	£62,432	£0	£62,432	£0.00	£62,432	£53,978	1.035	0.261	£14,110	£16,791
2049	29	£28,476	£28,476	2.254	£35,709.07	£64,185	£0	£64,185	£0.00	£64,185	£55,496	1.035	0.253	£14,017	£16,680
2050	30	£28,476	£28,476	2.317	£37,514.12	£65,990	£0	£65,990	£0.00	£65,990	£57,050	1.030	0.298	£16,980	£20,206
2051	31	£28,476	£28,476	2.382	£39,362.31	£67,838	£0	£67,838	£0.00	£67,838	£58,605	1.030	0.289	£16,934	£20,152
2052	32	£28,476	£28,476	2.447	£41,211.28	£69,687	£0	£69,687	£0.00	£69,687	£60,202	1.030	0.281	£16,889	£20,098
2053	33	£28,476	£28,476	2.514	£43,110.67	£71,586	£0	£71,586	£0.00	£71,586	£61,847	1.030	0.272	£16,845	£20,046
2054	34	£28,476	£28,476	2.583	£45,066.24	£73,542	£0	£73,542	£0.00	£73,542	£63,551	1.030	0.264	£16,805	£19,998
2055	35	£28,476	£28,476	2.654	£47,092.23	£75,568	£0	£75,568	£0.00	£75,568	£65,323	1.030	0.257	£16,771	£19,957
2056	36	£28,476	£28,476	2.728	£49,200.04	£77,676	£0	£77,676	£0.00	£77,676	£67,141	1.030	0.249	£16,736	£19,915
2057	37	£28,476	£28,476	2.804	£51,361.68	£79,837	£0	£79,837	£0.00	£79,837	£69,011	1.030	0.242	£16,701	£19,874
2058	38	£28,476	£28,476	2.882	£53,585.23	£82,061	£0	£82,061	£0.00	£82,061	£70,930	1.030	0.235	£16,665	£19,831
2059	39	£28,476	£28,476	2.962	£55,867.51	£84,343	£0	£84,343	£0.00	£84,343	£72,906	1.030	0.228	£16,630	£19,790
2060	40	£28,476	£28,476	3.044	£58,216.16	£86,692	£0	£86,692	£0.00	£86,692	£74,927	1.030	0.221	£16,594	£19,746
2061	41	£28,476	£28,476	3.129	£60,620.42	£89,096	£0	£89,096	£0.00	£89,096	£76,988	1.030	0.215	£16,553	£19,699
2062	42	£28,476	£28,476	3.215	£63,070.46	£91,546	£0	£91,546	£0.00	£91,546	£79,094	1.030	0.209	£16,511	£19,648
2063	43	£28,476	£28,476	3.303	£65,574.34	£94,050	£0	£94,050	£0.00	£94,050	£81,243	1.030	0.203	£16,465	£19,594
2064	44	£28,476	£28,476	3.393	£68,129.87	£96,606	£0	£96,606	£0.00	£96,606	£83,427	1.030	0.197	£16,416	£19,535
2065	45	£28,476	£28,476	3.484	£70,726.65	£99,202	£0	£99,202	£0.00	£99,202	£85,608	1.030	0.191	£16,354	£19,462
2066	46	£28,476	£28,476	3.575	£73,321.00	£101,797	£0	£101,797	£0.00	£101,797	£87,833	1.030	0.185	£16,291	£19,386
2067	47	£28,476	£28,476	3.668	£75,966.51	£104,442	£0	£104,442	£0.00	£104,442	£90,119	1.030	0.180	£16,228	£19,311
2068	48	£28,476	£28,476	3.763	£78,684.30	£107,160	£0	£107,160	£0.00	£107,160	£92,471	1.030	0.175	£16,166	£19,238
2069	49	£28,476	£28,476	3.861	£81,481.03	£109,957	£0	£109,957	£0.00	£109,957	£94,884	1.030	0.170	£16,105	£19,165
2070	50	£28,476	£28,476	3.962	£84,350.76	£112,827	£0	£112,827	£0.00	£112,827	£97,360	1.030	0.165	£16,044	£19,092
2071	51	£28,476	£28,476	4.066	£87,295.38	£115,771	£0	£115,771	£0.00	£115,771	£99,901	1.030	0.160	£15,983	£19,020
2072	52	£28,476	£28,476	4.172	£90,316.85	£118,793	£0	£118,793	£0.00	£118,793	£102,509	1.030	0.155	£15,923	£18,948
2073	53	£28,476	£28,476	4.281	£93,417.18	£121,893	£0	£121,893	£0.00	£121,893	£105,184	1.030	0.151	£15,862	£18,876
2074	54	£28,476	£28,476	4.392	£96,598.43	£125,074	£0	£125,074	£0.00	£125,074	£107,929	1.030	0.146	£15,802	£18,805
2075	55	£28,476	£28,476	4.507	£99,862.70	£128,338	£0	£128,338	£0.00	£128,338	£110,746	1.030	0.142	£15,742	£18,733
2076	56	£28,476	£28,476	4.625	£103,212.16	£131,688	£0	£131,688	£0.00	£131,688	£113,636	1.030	0.138	£15,683	£18,663
2077	57	£28,476	£28,476	4.745	£106,649.04	£135,125	£0	£135,125	£0.00	£135,125	£116,602	1.030	0.134	£15,623	£18,592
2078	58	£28,476	£28,476	4.869	£110,175.62	£138,651	£0	£138,651	£0.00	£138,651	£119,645	1.030	0.130	£15,564	£18,521
2079	59	£28,476	£28,476	4.996	£113,794.24	£142,270	£0	£142,270	£0.00	£142,270	£122,768	1.030	0.126	£15,505	£18,451
2080	60	£28,476	£28,476	5.127	£117,507.30	£145,983	£0	£145,983	£0.00	£145,983	£3,622,589			£958,053	£1,140,083
Total		£1,708,546	£1,708,546		£2,745,053	£4,453,599	£0	£4,453,599	£0	£4,453,599					

Step	Description	Scheme Cost at Each Step
(1)	Outlines the initial estimate of the investment costs in 2020 prices but taking no account of real increases in construction costs. Includes Design cost, Construction cost profile, Land cost, Preparation and Administration costs. Year of Opening is assumed to be 2021 in this assessment. No historic (bygone) costs have been provided and it is assumed that these won't influence the investment decision.	£1,708,546
(2)	The base costs have been adjusted to incorporate real cost increases (WebTAG A1.2) in construction costs.	£4,453,599
(3)	Following the real cost adjustment a quantified risk contribution has been applied.	£4,453,599
(4)	The next stage is to apply optimism bias.	£4,453,599
(5)	Optimism bias adjusted costs have been converted to the current price base (i.e. 2010) using the governments GDP deflator tool (WebTAG A1.2).	£3,622,589
(6)	Costs have been discounted to 2010 present values by applying a discount rate of 3.5% per year for 30 years and 3.0% thereafter (WebTAG A1.2).	£958,053
(7)	The final stage in preparing the scheme costs is to convert them from the factor cost to the market price unit of account using the indirect tax correction factor of 1.19	£1,140,083

Appendix E: Appraisal Summary Table (AST)

Appendix E – Appraisal Summary Table

Impacts		Summary of key impacts	Assessment	
			Qualitative	Quantitative (Monetary)
Economy	Business Users & Transport Providers	A bespoke spreadsheet model has applied the value of time savings to 60 years of benefits, discounted to the 2010 base year and expressed in 2010 market prices. This identifies that the Present Value Benefits (PVB) is estimated to be £54,748,000. The benefit calculations are only based on de-congestion benefits.	Not Assessed	£ 54,748,000 (PVB)
	Reliability Impact on Business Providers	Business users are expected to benefit from more reliable journey times because of congestion reductions.	Slight Beneficial	Not Assessed
	Regeneration	No regeneration proposals in the vicinity of the scheme	Not Assessed	Not Assessed
	Other impacts – impact on local business	Thorpe Wood Employment Area is accessed via Junction 15. Any proposed measures to improve journey time reliability and reduce congestion should help to keep the employment area as an attractive location for businesses.	Slight Beneficial	Not Assessed
Environmental	Noise	The noise assessment showed that without the scheme the majority of properties within the study area experience an increase in noise level of up to 0.9dB in the short term and 2.9dB in the long-term. With the scheme, the predicted long-long term change in noise level is an increase of 0.1dB to 2.9dB for all properties within the study area. With the scheme, the predicted short-long term change in noise level is an increase of between 0.1dB to 0.9dB for the majority of properties within the study area.	Slight Adverse	£41,669
	Air Quality	The reduction in queueing, and therefore idling, is anticipated to have a beneficial impact on air quality at receptors near the scheme site. However, further assessments will be required as the scheme progresses.	Slight Beneficial	Not Assessed
	Greenhouse Gases	Due to the decrease in congestion, there it is likely a small positive impact on greenhouse gas emissions will be seen upon scheme completion. Further assessments will be undertaken as the scheme progresses	Slight Beneficial	£368,000
	Landscape	Existing character of the highway will be retained and the scheme is not considered to alter the landscape.	Neutral	Not Assessed
	Townscape	Existing character of the highway will be retained and the scheme is not considered to alter the townscape.	Neutral	Not Assessed
	Historic Environment	The potential impact identified by the proposed Junction 15 works would be a direct, physical, impact to buried archaeological remains, if present. This potential impact would occur as a result of the new infrastructure (i.e. a new lane and associated works).	Neutral	Not Assessed
	Biodiversity	The proposed works are not located within a statutory designated site for conservation. The proposed scheme will not result in significant changes to the existing environment, for instance lighting levels will generally remain the same as currently experienced. There will be losses to the tree cover, however these would be minimised where possible through the adherence to an arboriculture method statement that would be supervised by an arboriculturalist. Furthermore, it is recommended that any trees that are removed are replaced on completion of the works.	Neutral	Not Assessed
	Water Environment	No part of the Study Area is within an area at risk of flooding (Env Agency Flood Map for Planning)	Neutral	Not Assessed
Social	Commuting & Other Users	A bespoke spreadsheet model has applied the value of time savings to 60 years of benefits, discounted to the 2010 base year and expressed in 2010 market prices. This identifies that the Present Value Benefits (PVB) is estimated to be £54,748,000. Users are expected to benefit from improved journey times because of congestion reductions.	Not Assessed	£ 54,748,000 (PVB)
	Physical Activity	Improvements for pedestrians and cyclists will be delivered as part of the scheme.	Slight Beneficial	Not Assessed
	Journey Quality	Driver's frustration caused by unreliable journey times is likely to be reduced significantly. Overall improvement in safety.	Slight Beneficial	Not Assessed
	Accidents	Scheme improvements centred on the busiest junction approach of Junction 15 is expected to have a slight benefit on road safety.	Slight Beneficial	Not Assessed
	Personal Security	Although improved pedestrian facilities could lead to users feeling more secure, an in-depth analysis has not been undertaken at this stage.	Not Assessed	Not Assessed
	Access to the transport system	No significant improvements in accessibility to the transport network, however journeys will be more reliable	Slight Beneficial	Not Assessed

Appendix E – Appraisal Summary Table

Impacts		Summary of key impacts	Assessment	
			Qualitative	Quantitative (Monetary)
	Affordability	No specific changes to the cost of travel (public transport fares, road user pricing or car parking increases)	Neutral	Not Assessed
	Severance	Improvements in pedestrian facilities could ease severance,	Neutral	Not Assessed
	Option & Non-Use Values	Not Applicable	Not Assessed	Not Assessed
Public Accounts	Cost to Broad Transport Budget	The scheme PVC has been identified as £5,349,000. The scheme BCR is 10.235.	Not Assessed	Very High Value for Money (BCR 10.235)
	Indirect Tax Revenues	The indirect taxes would be -£867,000	Not Assessed	- £867,000

Appendix F: Financial Case Cost Estimates

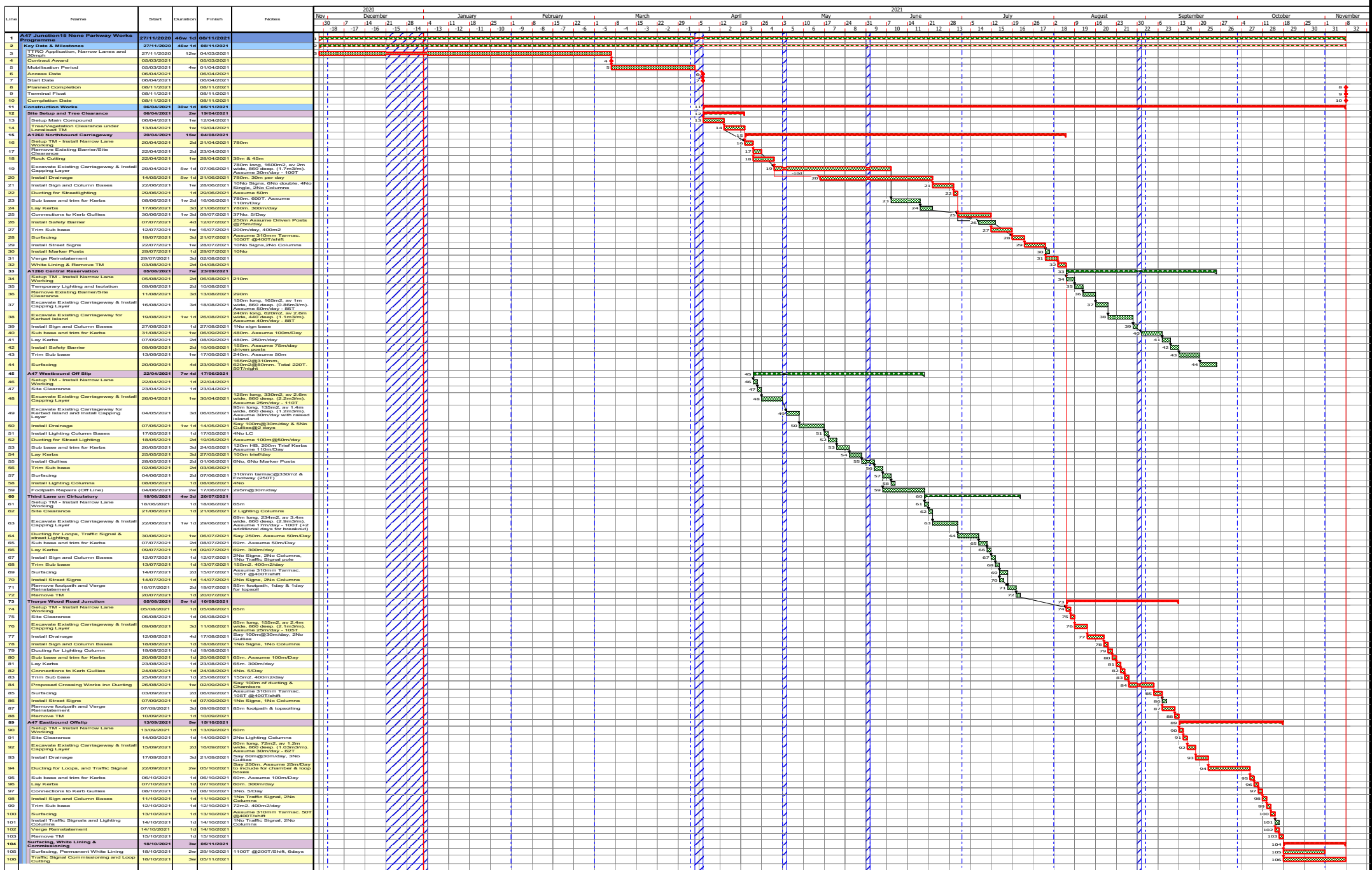
Junction 15 - Do Something Scheme Costs for Input to Financial Case

Calendar Year	Assessment Year	(1) Base Cost Estimate 2020 Prices						(2) Risk Adjusted Cost		(3) Risk Adjusted Cost Estimate Including Construction Price Inflation			(4) Inflated Risk Adjusted Cost Including Whole Life Costs		
		Construction Costs (Highways)	Construction Costs (Structures)	Land & Property Costs	Preparation and Supervision Costs	Other Costs	Total	Quantified Risk Adjustment	Risk Adjusted Cost	Inflation Rate	Cost of Inflation	Total (Including Inflation)	Whole Life Costs	Inflated Whole Life Costs	Total (Including Whole Life Costs)
2020	0	£0	£0	£0	£595,666	£0	£595,666	£0	£595,666	0.000	£0.00	£595,666	£0	£0	£595,666
2021	1	£2,295,787	£802,452	£0	£359,189	£0	£3,457,428	£296,482	£3,753,910	1.050	£187,695.51	£3,941,606	£0	£0	£3,941,606
2022	2	£0	£0	£0	£0	£0	£0	£0	£0	1.103	£0.00	£0	£28,476	£31,395	£31,395
2023	3	£0	£0	£0	£0	£0	£0	£0	£0	1.158	£0.00	£0	£28,476	£32,964	£32,964
2024	4	£0	£0	£0	£0	£0	£0	£0	£0	1.216	£0.00	£0	£28,476	£34,612	£34,612
2025	5	£0	£0	£0	£0	£0	£0	£0	£0	1.276	£0.00	£0	£28,476	£36,343	£36,343
2026	6	£0	£0	£0	£0	£0	£0	£0	£0	1.340	£0.00	£0	£28,476	£38,160	£38,160
2027	7	£0	£0	£0	£0	£0	£0	£0	£0	1.407	£0.00	£0	£28,476	£40,068	£40,068
2028	8	£0	£0	£0	£0	£0	£0	£0	£0	1.477	£0.00	£0	£28,476	£42,072	£42,072
2029	9	£0	£0	£0	£0	£0	£0	£0	£0	1.551	£0.00	£0	£28,476	£44,175	£44,175
2030	10	£0	£0	£0	£0	£0	£0	£0	£0	1.629	£0.00	£0	£28,476	£46,384	£46,384
2031	11	£0	£0	£0	£0	£0	£0	£0	£0	1.710	£0.00	£0	£28,476	£48,703	£48,703
2032	12	£0	£0	£0	£0	£0	£0	£0	£0	1.796	£0.00	£0	£28,476	£51,138	£51,138
2033	13	£0	£0	£0	£0	£0	£0	£0	£0	1.886	£0.00	£0	£28,476	£53,695	£53,695
2034	14	£0	£0	£0	£0	£0	£0	£0	£0	1.980	£0.00	£0	£28,476	£56,380	£56,380
2035	15	£0	£0	£0	£0	£0	£0	£0	£0	2.079	£0.00	£0	£28,476	£59,199	£59,199
2036	16	£0	£0	£0	£0	£0	£0	£0	£0	2.183	£0.00	£0	£28,476	£62,159	£62,159
2037	17	£0	£0	£0	£0	£0	£0	£0	£0	2.292	£0.00	£0	£28,476	£65,267	£65,267
2038	18	£0	£0	£0	£0	£0	£0	£0	£0	2.407	£0.00	£0	£28,476	£68,530	£68,530
2039	19	£0	£0	£0	£0	£0	£0	£0	£0	2.527	£0.00	£0	£28,476	£71,957	£71,957
2040	20	£0	£0	£0	£0	£0	£0	£0	£0	2.653	£0.00	£0	£28,476	£75,555	£75,555
2041	21	£0	£0	£0	£0	£0	£0	£0	£0	2.786	£0.00	£0	£28,476	£79,332	£79,332
2042	22	£0	£0	£0	£0	£0	£0	£0	£0	2.925	£0.00	£0	£28,476	£83,299	£83,299
2043	23	£0	£0	£0	£0	£0	£0	£0	£0	3.072	£0.00	£0	£28,476	£87,464	£87,464
2044	24	£0	£0	£0	£0	£0	£0	£0	£0	3.225	£0.00	£0	£28,476	£91,837	£91,837
2045	25	£0	£0	£0	£0	£0	£0	£0	£0	3.386	£0.00	£0	£28,476	£96,429	£96,429
2046	26	£0	£0	£0	£0	£0	£0	£0	£0	3.556	£0.00	£0	£28,476	£101,251	£101,251
2047	27	£0	£0	£0	£0	£0	£0	£0	£0	3.733	£0.00	£0	£28,476	£106,313	£106,313
2048	28	£0	£0	£0	£0	£0	£0	£0	£0	3.920	£0.00	£0	£28,476	£111,629	£111,629
2049	29	£0	£0	£0	£0	£0	£0	£0	£0	4.116	£0.00	£0	£28,476	£117,210	£117,210
2050	30	£0	£0	£0	£0	£0	£0	£0	£0	4.322	£0.00	£0	£28,476	£123,071	£123,071
2051	31	£0	£0	£0	£0	£0	£0	£0	£0	4.538	£0.00	£0	£28,476	£129,224	£129,224
2052	32	£0	£0	£0	£0	£0	£0	£0	£0	4.765	£0.00	£0	£28,476	£135,685	£135,685
2053	33	£0	£0	£0	£0	£0	£0	£0	£0	5.003	£0.00	£0	£28,476	£142,470	£142,470
2054	34	£0	£0	£0	£0	£0	£0	£0	£0	5.253	£0.00	£0	£28,476	£149,593	£149,593
2055	35	£0	£0	£0	£0	£0	£0	£0	£0	5.516	£0.00	£0	£28,476	£157,073	£157,073
2056	36	£0	£0	£0	£0	£0	£0	£0	£0	5.792	£0.00	£0	£28,476	£164,926	£164,926
2057	37	£0	£0	£0	£0	£0	£0	£0	£0	6.081	£0.00	£0	£28,476	£173,173	£173,173
2058	38	£0	£0	£0	£0	£0	£0	£0	£0	6.385	£0.00	£0	£28,476	£181,831	£181,831
2059	39	£0	£0	£0	£0	£0	£0	£0	£0	6.705	£0.00	£0	£28,476	£190,923	£190,923
2060	40	£0	£0	£0	£0	£0	£0	£0	£0	7.040	£0.00	£0	£28,476	£200,469	£200,469
2061	41	£0	£0	£0	£0	£0	£0	£0	£0	7.392	£0.00	£0	£28,476	£210,493	£210,493
2062	42	£0	£0	£0	£0	£0	£0	£0	£0	7.762	£0.00	£0	£28,476	£221,017	£221,017
2063	43	£0	£0	£0	£0	£0	£0	£0	£0	8.150	£0.00	£0	£28,476	£232,068	£232,068
2064	44	£0	£0	£0	£0	£0	£0	£0	£0	8.557	£0.00	£0	£28,476	£243,671	£243,671
2065	45	£0	£0	£0	£0	£0	£0	£0	£0	8.985	£0.00	£0	£28,476	£255,855	£255,855
2066	46	£0	£0	£0	£0	£0	£0	£0	£0	9.434	£0.00	£0	£28,476	£268,648	£268,648
2067	47	£0	£0	£0	£0	£0	£0	£0	£0	9.906	£0.00	£0	£28,476	£282,080	£282,080
2068	48	£0	£0	£0	£0	£0	£0	£0	£0	10.401	£0.00	£0	£28,476	£296,184	£296,184
2069	49	£0	£0	£0	£0	£0	£0	£0	£0	10.921	£0.00	£0	£28,476	£310,993	£310,993
2070	50	£0	£0	£0	£0	£0	£0	£0	£0	11.467	£0.00	£0	£28,476	£326,543	£326,543
2071	51	£0	£0	£0	£0	£0	£0	£0	£0	12.041	£0.00	£0	£28,476	£342,870	£342,870
2072	52	£0	£0	£0	£0	£0	£0	£0	£0	12.643	£0.00	£0	£28,476	£360,014	£360,014
2073	53	£0	£0	£0	£0	£0	£0	£0	£0	13.275	£0.00	£0	£28,476	£378,014	£378,014
2074	54	£0	£0	£0	£0	£0	£0	£0	£0	13.939	£0.00	£0	£28,476	£396,915	£396,915
2075	55	£0	£0	£0	£0	£0	£0	£0	£0	14.636	£0.00	£0	£28,476	£416,761	£416,761
2076	56	£0	£0	£0	£0	£0	£0	£0	£0	15.367	£0.00	£0	£28,476	£437,599	£437,599
2077	57	£0	£0	£0	£0	£0	£0	£0	£0	16.136	£0.00	£0	£28,476	£459,479	£459,479
2078	58	£0	£0	£0	£0	£0	£0	£0	£0	16.943	£0.00	£0	£28,476	£482,453	£482,453
2079	59	£0	£0	£0	£0	£0	£0	£0	£0	17.790	£0.00	£0	£28,476	£506,575	£506,575
2080	60	£0	£0	£0	£0	£0	£0	£0	£0	18.679	£0.00	£0	£28,476	£531,904	£531,904
Total		£2,295,787	£802,452	£0	£954,855	£0	£4,053,095	£296,482	£4,349,577		£187,696	£4,537,272	£1,680,070	£10,542,096	£15,079,368

Step	Description	Scheme Cost at Each Step
(1)	Outlines the initial estimate of the investment costs in 2020 prices but taking no account of real increases in construction costs. Includes Design cost, Construction cost profile, Land cost, Preparation and Administration costs. Year of	£4,053,095
(2)	The base costs have been adjusted to incorporate risk.	£4,349,577
(3)	The risk adjusted costs have been adjusted to incorporate increases in construction costs.	£4,537,272
(4)	The inflated risk adjusted costs have been adjusted to incorporate whole life costs.	£15,079,368

Appendix G: Construction Programme

A47 Junction 15 Nene Parkway Draft Works Programme (Rev1)



Appendix H: Risk Register

General Risk Register

Estimate Value (£)

Scheme #: Junction 15- A47- Widening Budget Estimate				Scheme Name: Junction 15- A47- Widening Budget							
Ref	Risk/ Opportunity Subject Allocation	Features of Risk/Opportunity	Measures to be Applied - Mitigate, Transfer, Prevent, Accept, Share	Comments on Apportionment, Probability and Assessment of Impact	Holder	Manager	Minimum Impact (£)	Likely Impact (£)	Maximum Impact (£)	Probability (%)	Suggested Client Contingency (£)
A	B	C	D	E	F	G	H	I	J	K	
Sequential Reference Number. Use to Group as B	Group Heading - e.g. Design, Labour, Plant etc.	A clear description of the Risk. As an aid to clarity, the drafter should describe the risk as if it begins with the words: "The Risk is that.....". It is important that the description is carefully worded so as to define the scope of the risk.	Brief description what measures could be taken to reduce or minimise the risk. Could be used to help evaluate.	Modelling Note. A realistic assessment of resources and costs that will be used to populate the Minimum, Most Likely and Maximum Cost cells.	Used to allocate risks to either contractor or client - n.b. impact on change control	Person or Party who will take the measures required to control the risk on behalf of the Holder	Based on Modelling Note in Column E	Based on Modelling Note in Column E	Based on Modelling Note in Column E	Likelihood of the Risk occurring (regardless of impact)	K x (H+I+J)/3. Indicative value where Risk Software is not used
1	Working Areas	Public issues/ Access Issues	Allow % disruption	3% of the cost	Client	Client	£39,530.95	£79,061.89	£158,123.78	10%	£9,223.89
2	Working Areas	Weather disruption	Check forecasts, manage sites accordingly	5 -8 days @ £3000	Client	Client	£45,460.59	£56,825.73	£71,032.17	10%	£5,777.28
3	Working Areas	Working around Stats/3rd Parties/ disrupted working	programme can only allow concurrent working and this will very likely lead to a loss of production for us during the simultaneous working period	3-10% total cost	Client	Client	£118,592.84	£177,889.25	£296,482.09	25%	£49,413.68
4	Working Areas	Under ground condition- soft spots	Delay to the Programme due to dealing with soft spots additional excavation, disposal and filling works	5% total cost for bridge construction	Client	Client	£25,000.00	£37,500.00	£50,000.00	30%	£11,250.00
5	Working Areas	Contamination	Cost to remove and dispose contaminated materials	3% Client	Client	Client	£118,592.84	£237,185.67	£237,185.67	10%	£19,765.47
6	Working Areas	RTA	Removal of TM by instruction	5 days@ 3000	Client	Client	£15,000.00	£30,000.00	£30,000.00	10%	£2,500.00
7	Working Areas	Working Restrictions	Restrictions are not clear at the moment, currently assumed that though there may be restriction in some part of the worksite, we will be able to works in a controlled manner.	10% of total Labour and Plant if not work is allowed with in the restricted time	Client	Client	£177,889.25	£266,833.88	£355,778.51	15%	£40,025.08
8	Working Areas	Other issues classed in risk	all other risk that are possible	2.50% Client	Client	Client	£98,827.36	£197,654.73	£395,309.45	45%	£103,768.73
9	Working Areas	Works delayed by community disruption	Programme could be affected by community disruption	Delay on programme/ rephasing of works	Client	Client	£197,654.73	£197,654.73	£197,654.73	15%	£29,648.21
10	Working Areas	Risk associated with Covid 19- or its impact	difficult to assess and excluded at this stage	Delay on programme/ rephasing of works	Client	Client	£79,061.89	£118,592.84	£177,889.25	20%	£25,036.27

£915,610.44
£1,399,198.72
£1,969,455.65

£296,408.61

Suggested Risk figure

Appendix I: Noise Assessment Report

**Technical
Memo**

To: Joanne Baldwin, Skanska
From: Helen Makewell
Date: 19/02/2020
Copy:
Our reference: PB2649-RHD-ZZ-XX-NT-Z-0001
Classification: Project related

Subject: A47 (Soke Parkway) J3 / A1260 (Nene Parkway) Noise WebTAG

Joanne,

Please find the results of the Noise WebTAG assessment for Junction 15 presented below. Should you have any questions or require additional clarifications regarding the contents please let me know.

1 Introduction

The potential noise impacts associated with the highways improvements at Soke Parkway (A47) J15 and A1260 Nene Parkway have been assessed using the WebTAG Guidance (Unit A3.2 Noise Impacts, DfT, December 2015 as updated in August 2019). The calculation of traffic noise follows the methodology set out in the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 7, Noise and Vibration (DMRB 11.3.7 LA111) for a detailed assessment and the calculation procedure detailed within Department of Transport (Welsh Office) Technical Memorandum Calculation of Road Traffic Noise (CRTN), 1988.

The proposed improvements are inclusive of limited widening works within the carriageway of the J15 gyratory, the A47 westbound on-slip, the northbound carriageway of the A1260 between J33 and J15 and the A1260 northbound on-slip at J33.

2 Traffic Data

Traffic data for the scheme was factored accordingly for the following scenarios:

- Do Minimum (DM)/without scheme for 2022;
- Do Something (DS)/with scheme for 2022;
- Do Minimum (DM)/without scheme for 2037; and
- Do Something (DS)/with scheme for 2037.

The traffic data were provided as Annual Average Weekday Traffic (AAWT), with the percentage of HGVs and average speed for each road link.

3 Assessment Methodology

The WebTAG assessment included the following steps:

- Scoping assessment;
- Quantification of noise impacts;
- Estimation of the affected population; and
- Monetary valuation of changes in noise impact

In line with the WebTAG methodology, a scoping assessment was first undertaken to identify if there were likely to be any significant impacts across the network as a result of the proposed road network improvement scheme. This was done by comparing both the 'with' and 'without' scenarios in the opening year (2022) in relation to the DMRB criteria to determine 'affected links' as follows:

- A change in the alignment or elevation of the carriageway; or
- A change in traffic flows, speed or composition that is likely to cause a change in noise level of at least 1dB(A) L_{10,18h} (short term) or 3dB(A) L_{10,18h} (long term); or
- Any change to the physical infrastructure surrounding the road or any change in the way in which the road is used that could cause a change in noise level of at least 1dB(A) L_{10,18h} (short term) or 3dB(A) L_{10,18h} (long term).

A detailed assessment of noise impacts was undertaken using SoundPLAN 8.1 noise modelling software.

4 Study Area

The study area was determined by identifying affected links within the network in accordance with the DMRB criteria and incorporated an area of up to 1km around the proposed works areas.

Noise levels due to road traffic were calculated at properties within 600m of the principal routes identified as having significant changes in traffic/alignment due to the proposed scheme. This included a total of 553 properties.

5 Appraisal of Noise Impacts

The quantification and appraisal of noise impacts was undertaken on 553 properties within the study area of the affected routes. A summary of the appraisal is presented in Tables 1 to 3.

Table 1: Summary of Noise Impacts – Short Term Noise Level Change (with scheme)

	Noise Level Change (dB L _{A10})	Number of Properties
Decrease	<5	0
	3.0 – 4.9	0
	1.0 – 2.9	0
	0.1 – 0.9	305
No Change	0	248
Increase	<5	0
	3.0 – 4.9	0
	1.0 – 2.9	0
	0.1 – 0.9	0

Table 2: Summary of Noise Impacts – Long-Term Noise Level Change (With Scheme)

	Noise Level Change (dB L _{A10})	Number of Properties
Decrease	<10	0
	5.0 – 9.9	0
	3.0 – 4.9	0
	0.1 – 2.9	0
No Change	0	0
	<10	0

	Noise Level Change (dB LA10)	Number of Properties
Increase	5.0 – 9.9	0
	3.0 – 4.9	0
	0.1 – 2.9	553

Table 3: Summary of Noise Impacts – Long-Term Noise Level Change (Without Scheme)

	Noise Level Change (dB LA10)	Number of Properties
Decrease	<10	0
	5.0 – 9.9	0
	3.0 – 4.9	0
	0.1 – 2.9	0
No Change	0	0
Increase	<10	0
	5.0 – 9.9	0
	3.0 – 4.9	0
	0.1 – 2.9	553

6 Monetary Valuation of Noise Impacts

A summary of the monetary valuation of noise impacts is presented in Table 4.

Table 4: Noise Valuation Summary – A47 Junction 15

Present value base year	2010
Current year	2020
Proposal opening year	2022
Project type	Road
Overall Assessment Score	
Net present value of impact on sleep disturbance (£):	£20,239
Net present value of impact on amenity (£):	£14,479
Net present value of impact on AMI (£):	£3,043
Net present value of impact on stroke (£):	£1,558
Net present value of impact on dementia (£):	£2,351
Total value of change in noise	£41,669
Quantitative Assessment	
Households experiencing increased daytime noise in forecast year:	0
Households experiencing reduced daytime noise in forecast year:	6
Households experiencing increased night time noise in forecast year:	0
Households experiencing reduced night time noise in forecast year:	3
Qualitative comments: Valuation shows a net benefit of £45,914	
Data Sources: Valuation of noise impacts undertaken using WebTAG Noise Assessment Workbook, July 2017 version.	

It should be noted that the numbers of households experiencing increases or reductions detailed in Table 4 (and Table 5 below) refers to those households where the increase in noise moves them from one 3dB noise band to another (when assessed in accordance with the WebTAG Noise Assessment Workbook). As such, these figures differ from those presented within Tables 1-3.

7 Appraisal Summary Table of Noise Impacts

The Appraisal Summary Table for noise impacts is presented in Table 5.

Table 5: Appraisal Summary Table of the Noise Assessment

Impact	Summary of Key Impacts	Quantitative	Qualitative	Monetary
Noise	The majority of properties within the study area experience an increase in noise level of up to 0.9dB in the short term and 2.9dB in the long-term as a result of the scheme.	Households experiencing increased daytime noise in forecast year: 0	Without the scheme, the predicted long-long term change in noise level is between no change and an increase of 0.1dB to 2.9dB for all properties within the study area	Net present value of impact on sleep disturbance: £20,239
		Households experiencing reduced daytime noise in forecast year: 6	With the scheme, the predicted long-long term change in noise level is an increase of 0.1dB to 2.9dB for all properties within the study area	Net present value of impact on amenity: £14,479
		Households experiencing increased night time noise in forecast year: 0	With the scheme, the predicted short-long term change in noise level is an increase of between 0.1dB to 0.9dB for the majority of properties within the study area	Net present value of impact on AMI: £3,043
		Households experiencing reduced night time noise in forecast year: 3		Net present value of impact on stroke: £1,558
				Net present value of impact on dementia: £2,351
			Total value of change in noise: £41,669	

Helen Makewell

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